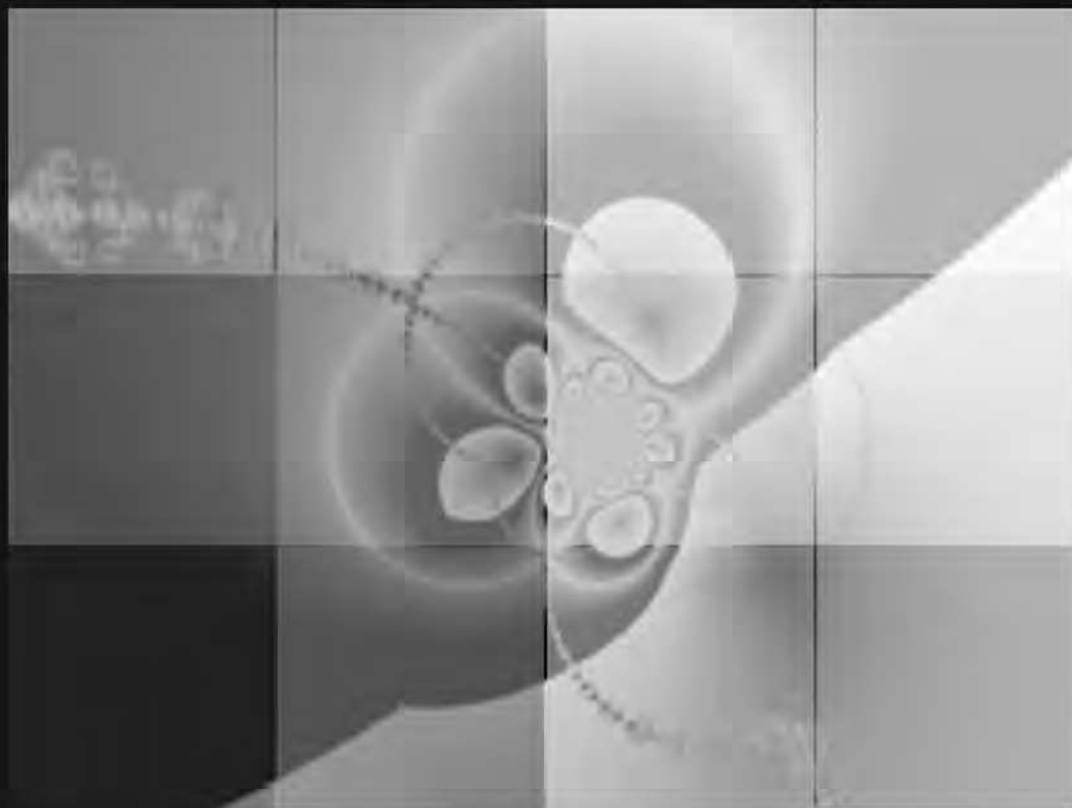


Computer Art Congress

[CAC 2]

Emerging forms of computer art: making the digital sense



Proceedings of the 2nd international congress
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Computer Art Congress 2008

Emerging forms of computer art: making the digital sense

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The first Computer Art Congress (Paris, 2002) considered that the origins of Computer Art (CA) are to be found in the fields of Art and Sciences. This unusual duality has greatly delayed its recognition among cultural spheres.

Nowadays, we witness an enlargement of Computer Art boundaries mainly led by its unusual development. The increasing interest of artists to work and experiment with capabilities of digital technologies is coupled with the motivation of scientists to observe these new forms. Concepts such as time, space and interactivity, to mention just some cases, are constantly re-contextualized from the point of view of different disciplines but also from the moment they constitute an expression element to achieve a digital artwork. In that manner, Computer Art implies to rethink about processes that endeavor to make sense of emerging forms of computer art.

Distance between Art and Science has narrowed to the point that CA looks to be quite an independent and autonomous field starving to reach its maturity. From this perspective, CA cannot evolve separately from the information technology (IT) development strategy. Today, along with digital content production, which is in some measure produced accordingly to collective intelligence schemes, we also observe emerging forms of CA that strive to develop new ways to interact with digital content, new artifacts that suggest digital content and new paradigms that aim to make sense of CA.

We believe that several questions need to be posed and analyzed:

- Does CA have its own identity? If yes, what about it?
- Does CA belong to the Art universe? If yes, how to situate it?
- Does CA belong to the digital universe? If yes, how to situate it?

Among several manifestations on digital art, from exhibitions to scientific publications, the Computer Art Congress aims to be a common forum for exchange between Artists, Researchers, and Technologists involved in this artistic area. The topics of the congress were chosen to establish a multidisciplinary environment for participants from several backgrounds, to discuss how computer/media/network art can take its own place in the art.

For this edition, CAC has chosen Mexico to call administrators, artists, authors, creators, distributors, instructors, inventors, managers, producers, researchers and technologists, concerned by those emerging artistic and technological forms, contributing, collaborating and exchanging their artworks, experiences, know-how, knowledge and visions on the digital sense.

Acknowledgments

We started to work on the second edition of the Computer Art Congress in Paris during 2006. Our vision was to offer a multidisciplinary forum to further develop some of the questions found in CAC.1. To achieve this goal, it was determinant for us to widen the profile of participants and to hold the congress in a country where digital artists and exhibition spaces need to be fostered.

We would like to thank participants for answering to our call for papers and artworks. Their contributions and dialogue during the congress' sessions constitute the *coeur* for exchanging and exploring emerging perspectives on computer art.

We are also grateful to committee members and advisory board. Their serious work on evaluating and offering improvements to participants is reflected on the quality of this book of proceedings.

The organizing committee was in charge of logistics and sponsorship. Our congress would not have been possible without Fernando Gutiérrez, Adriana Facha, José Pablo Macías, Claudia Cortés and the unconditional support of Dr. Roberto Rueda, president of the Center Region of Tecnológico de Monterrey system. We thank all staff members and personnel from both host campus: Toluca and Estado de México.

Finally, we acknowledge special thanks to those people who believed in this project: Mtro. Carlos Olvera, director of the Museum of Modern Art in Toluca City, who kindly allowed us to exhibit artworks, Dr. Lev Manovich, who lectured the opening keynote, Dr. Ron Burnett, Dr. Pierre Boulanger and Matt Jones, who also participated as keynote speakers, and Dr. Roger Malina, who supported the 40th anniversary panel of Leonardo.

This second edition of CAC is dedicated also to the memory of our friend Bernard Caillaud digital artist and co-organizer of the first Computer Art Congress (1939-2004).

Under Construction

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Technique employed: Interactive device with sound, programmed with flash. Flash shockwave. (Available for pc and Mac)

Presentation support: Projection to a wall screen from a computer provided with Macromedia flash player 8 software and connected to a projector and loudspeakers.



Concept

En Construcción (*Under Construction*) is an art-device that conceives of the city as a continuously-changing environment. The city is not only a physical but a mental space that is being constructed and reconstructed by the uses and appropriations that its citizens make of the urban landscape.

The urban space is not only a physical space, planned and organised following a utopian plan that must be realised in the future, but it is a perceived and lived space. It is constituted according to the collective point of view, so it can no exist previously to culture and politics. It is a space for temporality. It is always under construction and, for this reason, it can be reconstructed.

The city is, then, an open and accessible space that leaves room to the creative power of the subjective desire, becoming a plural and changing place where multiple situations come about according to the uses and necessities of the citizens. It is a space for temporality and changes, allowing the creation of alternative spaces for a self-managed life.

As Foucault said: “We are at the epoch of simultaneity. We are at the moment when our experience of the world is less that a long life developing though time than that of a network that connects points and intersects with its own skein”.

Medium

The computer format chosen for this project is a Flash programme supported on Shock Wave. It provides a medium that allows go beyond the conventional, linear narration; and that favours certain areas whilst excluding what is happening all around, thus expressing the complex interrelationships established by man with his environment – the media, the industry, and the landscape.

Shock Wave provides a level of interactivity that offers the viewer many simultaneous options, so that the result doesn't need to unfold at the same pace nor at the same order, therefore breaking up any semblance of

linear order. This aids the reflection of the plurality and complexity of our reality, whilst, at the same time, it shows how the individual is not only a passive spectator of what is happening around, but it actively participates in the formation of his environment by means of the relationships that he establishes.

This work has been conceived in a way that the participator's decisions determine the form that the work takes, establishing both the order and temporality of the events, and giving space to a multitude of possible meanings. It has also to be considered that the work is experienced in a public space, which it is also unpredictable due to its nature.

It is not offered as a finished work just for be contemplated but it proposes a scene for experimentation and the generation of activities where every body can construct its stories by using its own experiences. A space where different realities can be generated from a same material, the quotidian.

This format allows creating a second virtual reality, a Heterotopia, a space that has the property of being in relation with all the other spaces, like a mirror or reflect, and that is capable of juxtaposing, in a single real place, several spaces that are incompatible themselves.

Description

En Construcción offers the viewer the possibility to create its own city and to convert a collective space into an individual one. By means of a trip impossible to map, in which space is constructed according to will and desire. As the nomadic passer by Deleuze and Guattari the spectator plans his journey at the same time he executes it

Via a drifting journey over different images taken from the reality and belonging to different cities and environments, the interacting person follows his impulses choosing amongst different options in form of typical urban elements content in the represented landscape. At this way the images are assembled shaping, with each click, new and unpredictable cityscapes. It is conformed by pieces of different cities, thus reflecting that all cities can become another one. Mobility and communication have become the main agents for guaranteeing global uniformity.

The work is formed by 160 images taken from photographs of various land and cityscapes. The combination of all these images comes to form more than 400 possible landscapes that are formed depending upon the selections of the viewer who is also guided by the sounds emitted by the different elements. These sounds are recordings taken in these different environments.

The urban landscapes that appear are formed, therefore, by clippings of our present reality. Most of the elements come from environments common to any city, but there are also elements taken from cities of other cultures and continents that have entered our reach by tourism and media; which are registered in our memories affecting our perception of the environment and how we use it.

The environment/landscape is not only the place where man is located, but it is what surrounds him and it is given to man depending on his intentionality: it is defined and takes sense according to the experiences and situations occurred on it.

In this way, this project attempts to pierce the linear narrative and to find a way to express the complexity and plurality of the relations between man and his environment. It is a way to penetrate the geographical space defined by the urban environment and change it into an existential space.

Michel de Certeau said that walking is a mechanism for constructing citizenship, indeed for constructing the city oppositely to the panorama city.



Using temporal semiotics in a-media digital poetry

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Introduction

The time-based behaviours become an important question in artistic hypermedia. They modify every traditional semiotic system that are used, especially the textual semiotics. The effect of introducing time in this context has been first analysed by Philadelpho Menezes through his concept of intermedia he defines as “*a traffic between signs of different languages*”. But what happens during this traffic? Is another semiotics at stake?

The answer came in 2002 while I was programming a digital poem in collaboration with the composer Marcel Fremiot. Marcel Fremiot was the founder of the MIM, the Laboratoire de Musique Informatique de Marseille, and made with his team a semiotic theory of temporal significant in music in which some temporal structures, named Temporal Semiotic Units (UST), play an important role due to their specific significant. While reading this theory, I discovered I was also making such structures on the visual in programmed animations. This observation generated three ideas. The first one is that temporal semiotics may not only be a musical semiotic system, it may also occur in different media. The second is that temporal semiotics can play an important role in animation by giving a significant in transitions and sequences when traditional semiotics fail. Indeed, in these conditions, we observe a jump of signification by passing from a semiotic system to another with a perceptive continuity of coherence, that seems paradoxical. My hypothesis is that temporal semiotics is a “weak background” semiotic system that intervenes only when no other semiotic system acts. And the third idea was that one can imagine a new kind of hypermedia that would be based on temporal processes and not on media. Such a kind of hypermedia would create new relationships between media. I named it “a-media” hypermedia. Of course, there always exist media in an a-media hypermedia but they are not used in the same manner as in classical hypermedia. So I began to program my works in such a way and I invented a programming method for this purpose : the horizontal editing. These ideas were expressed for the first time at e-poetry 2003 in Morgantown. But there needed many other researches and creation to understand how temporal semiotics can act in sound moving and what are characteristics of a-media hypermedia.

A pluridisciplinary research group composed of artists (composers, a dancer, a painter, a poet) and academic researchers (a musicologist, psychologists, neuro-physiologists, an hypermedia theorist) has been working three years on temporal semiotics and obtained important results. A-media hypermedia, contrariwise, has been created in artistic works. These two ways have been developed together, one acting on the other, and I will talk here about the last results of this collaboration between art and science. I will successively present the temporal semiotics and how it can be used to product an a-media hypermedia. I will finish by showing the more general a-media model of braids

Temporal semiotics

The researches of the role of time in music are not new but the temporal semiotics takes a new point of departure at the beginning of the 1990's. Composers of the Laboratoire de Musique Informatique de Marseille (MIM), led by Marcel Frémot and François Delalande, wanted to reintroduce significant analyse

in music as a next step in the way followed by Pierre Schaeffer. Pierre Schaeffer (SCH, 1996) has found and classified musical objects in a typo-morphologic description, without taking significance in account.

The MIM researched a significance in relationship with the concept of time and found and described 19 UST both on structure of the signifier and signification. These units are musical forms with a specific significance independent of there musical context. François Delalande defines an UST as “*a class of equivalence of musical segments that have, even out of context, a temporal significance due to analogue morphologic organisations*” (MIM, 1996, p. 19). The MIM found these units in different types of music. The UST model forms a new tool for analysing old or recent music works (MIM, 2001).

This significance of UST is associated with a mental representation of movement. This is why a Unit is named by a label relative to a movement. For example *Chute* (“fall”), *Élan* (“running up”), *Trajectoire inexorable* (“inexorable trajectory”). These labels are not metaphoric. Psychologists think that, in fact, UST could be abstract representations of time in brain that are coded as categories in a “spatial form” that creates a non sequential coding between past, present and future. Spatial representation of movement constitutes such a coding. So, time could be coded in the brain in relationship with a coding of movement. Psychologists made 2 experiences of categorisation of UST, one at the beginning of the study and the other at the end. In these 2 studies, people had to put together pieces of music that seemed to have the same temporal behaviour of his matter. These pieces were of course musical excerpts from one given UST. In each experiment, people put together pieces of the same UST with a high degree of success. But the first one (DAQ, 2004) gave another result reinforcing the idea that UST are truly mind categories coded as movements. In this experiment, psychologists asked to people to name the groups they made. Of course, nobody knew anything about the UST, not even their name or the description of their significant. Often, people did not use verbal language but draw. And these drawing may be seen as spatial description of the movement which is associated with the UST. For example, someone draws these drawing for the set of UST named *Qui tourne* (“which is turning”). The significant of this UST is described by the MIM as “giving the impression of an object turning on itself or in space. Giving the impression of a phenomenon we do not know where it begins or where it ends. Giving the impression of a lack of progression, despite some possible variations” (MIM, 1996, p.87).

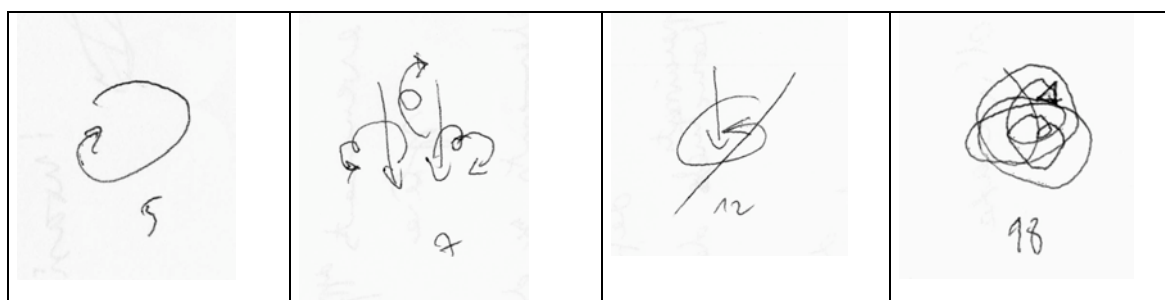


Figure 1 : some drawing made by a participant while hearing examples of the UST “which is turning” (Daquet, 2004, p. 29)

Recently, measures of cerebral waves by the Event-Related brain Potential (ERP) method have found waves characterising the phenomena of categorisation (FRE, 2008). In this experiment, experts and non experts heard couples of pieces of music. For each couple, the first piece is a well formed UST while the second is an incongruous UST: it begins on a UST and ends on another. Experts are people who know and work with

USTs, non expert are people who do not know anything about USTs. Experiment measures the brain Potential just after the incongruity. The results are shown on Figure 2.

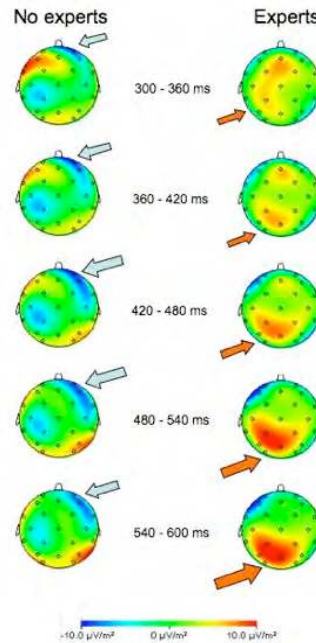


Figure 2 : brain activity in answer to the incongruity

This figure shows several results. First, each subject develops a wave 300 ms after the incongruity. This wave belongs to the P300 family (it has a positive voltage, in red and yellow on the figure) and is well known by psychologist. It means that people have involuntarily detected the incongruity, perceived a new stimulus and changed their attention. The followed behaviour is different between experts and non experts. Experts continue to develop on the long run (until 1000 ms) another wave of the P300 family. This second wave, a P3b, characterises a voluntary memory comparison that evaluates the current stimulus in the context of the previous stimulus : they re-evaluate the category of the piece in UST. Non experts develop another wave from 400 ms: a N400. This kind of wave was found in relationship with semantic effects. Its characterises a difficulty of semantic integration in a given context.

These results confirm the results of categorisation tasks experiments: the P300 reinforces the existence of categories. But it tends also to prove that a temporal semantic level really exists in these pieces.

Finally, USTs seem to form a real semiotic system and not only a formal external structure that would be applied on music by some composers.

Xavier Hautbois and I made a structural description of these USTs: the Temporal Parametrized Motifs (MTP) model (HAU, 2007). We found that the signifier can be described by only 2 quantitative parameters: the perceived sound volume and the frequency. The UST is characterised by a typical global evolution of these parameters. This global evolution can be described by a function of time. The detail of the function has no importance, only the global form of this function characterises the UST. We found that only eight forms (named profilemes) are used in UST. Each UST is a special association of such profilemes in intensity and in

frequency. Such a model can be described by formulas or normalised schemas in which each symbol has the same significant in each UST. The same temporal form applied on different parameters gives very different signified. For Example, the UST *Qui tourne* and the UST *Obsessionnel* (“Obsessional”) have the same profileme: a periodic bell type curve of period T1 (duration: a fraction of second). This profileme is applied on frequency in UST *Qui tourne*, and on volume in UST *Obsessionnel* while the other parameter of the UST does not vary significantly during this profileme. But the meaning of these USTs are very different. UST *Obsessionnel* is described as “character of insistence. Seems to be a mechanical repetitive process on which one cannot act”.

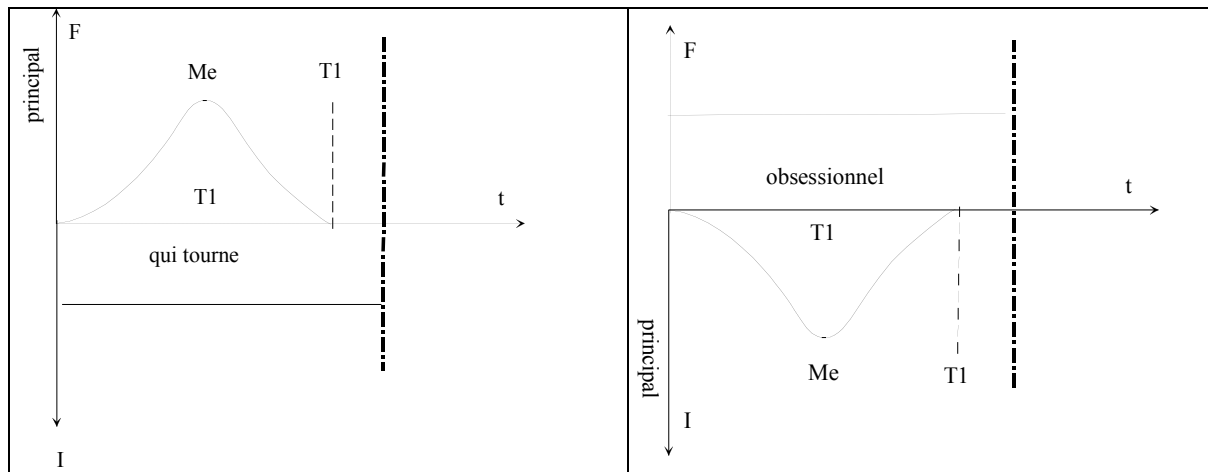


Figure 3 : MTP of 2 UST : « Qui tourne » at left and « obsessionnel » (obsessional) at right¹

This model can easily be implemented in musical programming and Xavier Hautbois first used it to create sound filters in open music capable of changing any music into a single UST. He simulated examples of the total set of UST. These examples were treated by participants of experiments of categorisation and in measures of cerebral waves without difference with real music. It proves that our model is correct : one cannot make any difference in temporal behaviour between our simulations and musical UST.

¹ Extract from (HAU, 2007)

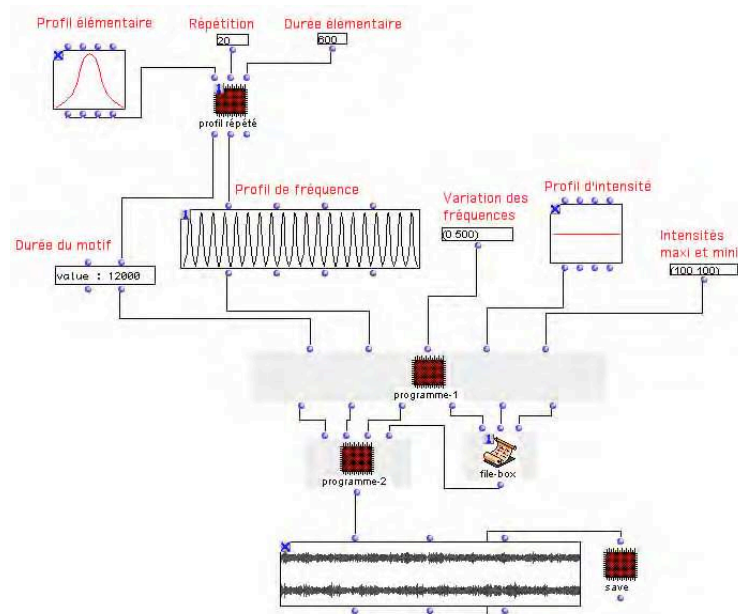


Figure 4 : schema of the patch in open music for the filter that produces a "which is turning".

After having constructed this model, we began to look if it could be translated in the visual domain by analysing hypermedia works and films. This study is still in progress but we have found UST by using 2 ways : Xavier used the description of the significant and I used the MTP model by searching visual parameters equivalent to the sound volume and frequency. We have found by these 2 methods the same UST in visual works but the correspondence between sound and visual parameters depends on the work. We are sure that colour intensity is similar to sound intensity but it seems that there is no mechanical correspondence for the frequency.

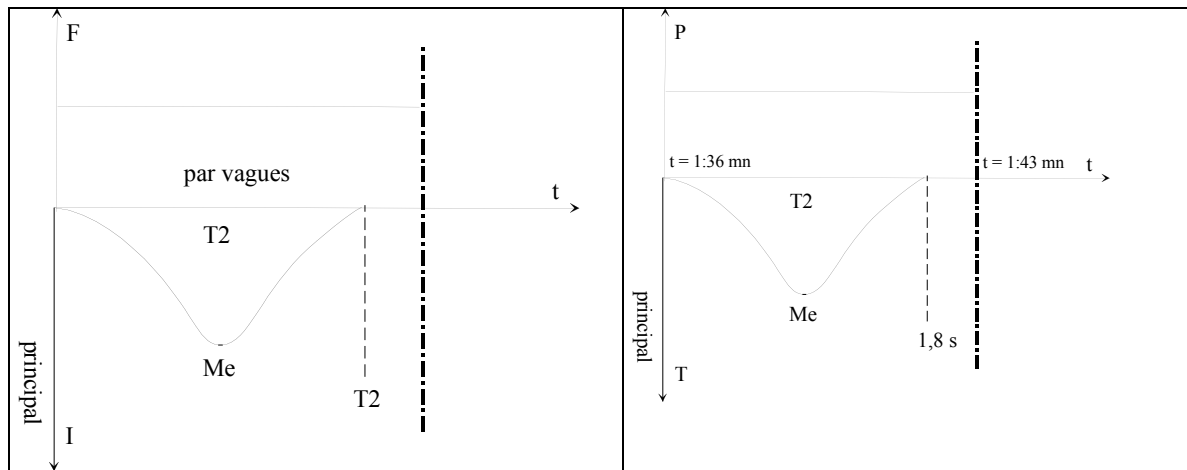


Figure 5 : MTP of the sound UST Par vagues (« By weaves) and MTP founded in a sequence of Rhythm 21 by Hans Richter (this analyse is unpublished)²

The model of MTP can also be used to construct patterns that are not UST.

The a-media concept

A-media hypermedia basically manage processes that are implemented in media and not media that are location of processes. The inversion of terms changes totally the conception of the product. In classical hypermedia (media based hypermedia), information is inscribed in media. In a-media conception, information is inscribed in processes. One may also say that in media based hypermedia information is space managed whereas in a-media based hypermedia information is time managed. For example, with natural language, media based hypermedia are constructed on a reading paradigm of writing whereas a-media based hypermedia are constructed on a reading paradigm of oral character.

One may also argue that media based hypermedia is based on a video conception of media: media are closed entities with a high ontological character (a written text, a photo,...) whereas in a-media hypermedia, media have a weak ontological character, they are flicking. Why? because the media based conception emerges from perceptive experiment of the real word in which media are manipulated as a whole, are perceived as elementary objects, stimuli of signifiers that cannot be broken; whereas the a-media conception emerges directly from the digital experiment in which media are no more objects but structures, containers which content is a set of properties that can change on the fly. For example, a picture is a container in programming, what manipulated properties are : position, width, image, colour, blend.... In fact, information is put in some properties, not in the container. This is why information can jump from a media to another by a correspondence of properties.

² in this sequence, different squares are changing of size on a black background without moving. T is the size of a square and P its position. In this work, a MTP can be constructed for each sequence by using only these 2 parameters. T plays the same role as I and P the same role as I. By using the description of the signified, this sequence can also be analysing as a "by weaves".

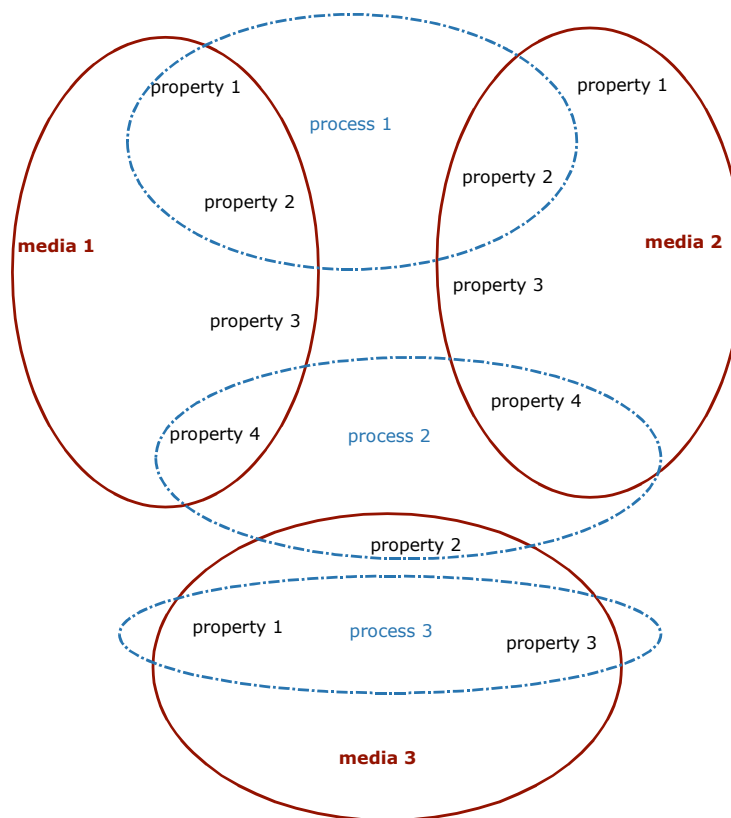


Figure 6 : relationships between media and processes in a a-media based hypermedia

If a process manages coherently properties of several media, it will produce at a certain level a coherent and elementary significant. In a-media logic, basic elements for reading are observed processes and not media: a given process can be implemented in several media. In a musical metaphor, processes would be the voices and media the instruments. In such a way, a medium is a container of the stimulus of the signifier of sign, a process is a stimulus of sign.

Let us remark that, in this schema (Figure 7), interactivity is not conceived in the same manner: in media conception, wreader directly acts on media (they are the manipulated information). The program is only thought as a background modality of processing, as a tool. The management of the work is causal: it remains on the level of media. It is for example the case in the hypertextual conception and gives rise to the notion of multimedia integration

In a-media conception, the management is a logical editing of events. These events are both internal and external. The external events are produced by wreaders and internal events are produced by processes themselves. The causality is now indirect and it is possible that it does not appear on media. The causality appears on processes, it is not governed by semiotics of media. The wreader³ (or internal events) indirectly acts on processes and not directly on the information inscribed in medias. This gives rise to two different effects: differed interactivity and media overlap.

³ The wreader is a reader of an hypermedia. She also writes the text during interactivity.

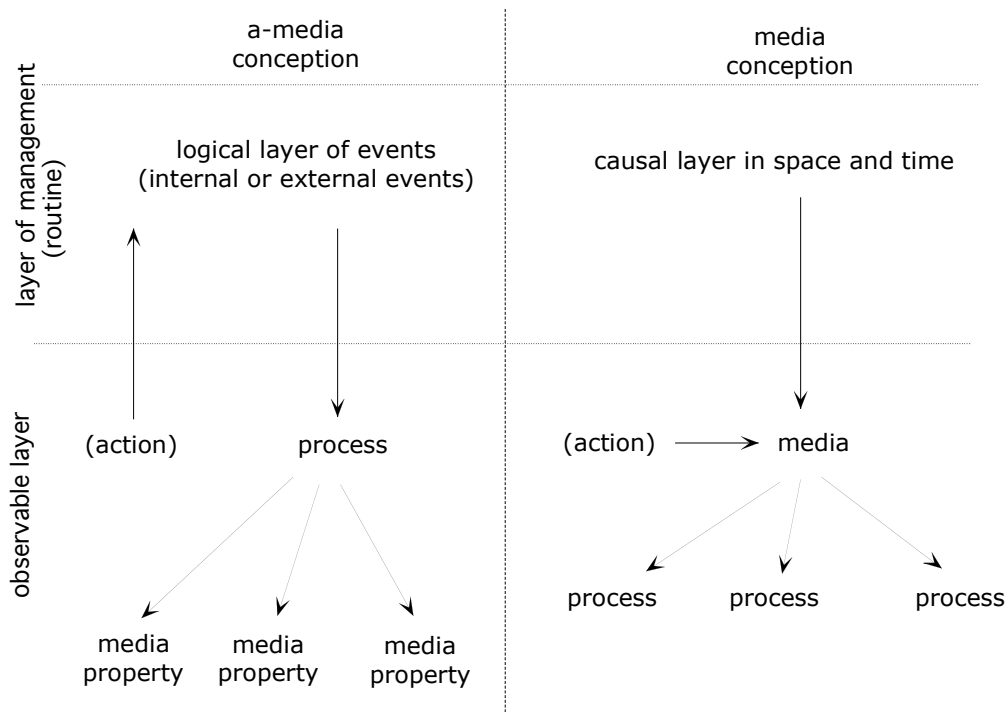


Figure 7 : comparison between a-media and media conceptions of the texte-à-voir⁴

Differed interactivity:

Differed interactivity occurs when a process is put back after its triggered event. It is possible when a logical layer manages several processes (centralised mode, cf chapter Horizontal editing of braids). This process does not give observable phenomena in the texte-à-voir. In this case, each individual observable process informs the main process when a break is possible. So, each observable process is itself managed by a non-observable logical layer that governs its coherence. This coherence can be classical coherence of meaning (and so it is media oriented) that preserves continuity in significance or temporal coherence (and so it is a-media oriented) that preserves continuity of visual dynamics. It can also be both when this information is made with passing a description of the state of the process in these two dimensions. Let us look at the routine structures on an abstract example with two processes (Figure 8). A main level of management only concerns the global scenario. Each observable process (P1 and P2) is also managed by an abstract logical level. The main level communicates with these abstract levels and not directly with the routines that construct the observable processes P1 and P2. There is a big difference between the routines of logical management and the routines of physical making. The first one runs continuously whereas routines that construct what the reader is seeing only run during the observable process. One can say that processes are not assembled in sequences as in video, but in layers. It is why I named this modality of edition “horizontal editing”.

In our example, the main process starts the logical level of the process P1 at time t_0 . At different times (t_1 , t_2 , t_4), P1 informs the main process that it can stop. The reader interacts at t_3 and the logical consequence of this action is to stop P1 and to begin P2. But t_3 is not a date allowed by P1 to stop. So, P1 will stop and P2

⁴ The texte-à-voir is the set of multimedia signs the program produces while running.



begin at the next authorisation sent by P1, here in t4. Interactivity is differed between t3 and t4 to assure an intentionality of coherence implemented in the logical management level of P1.

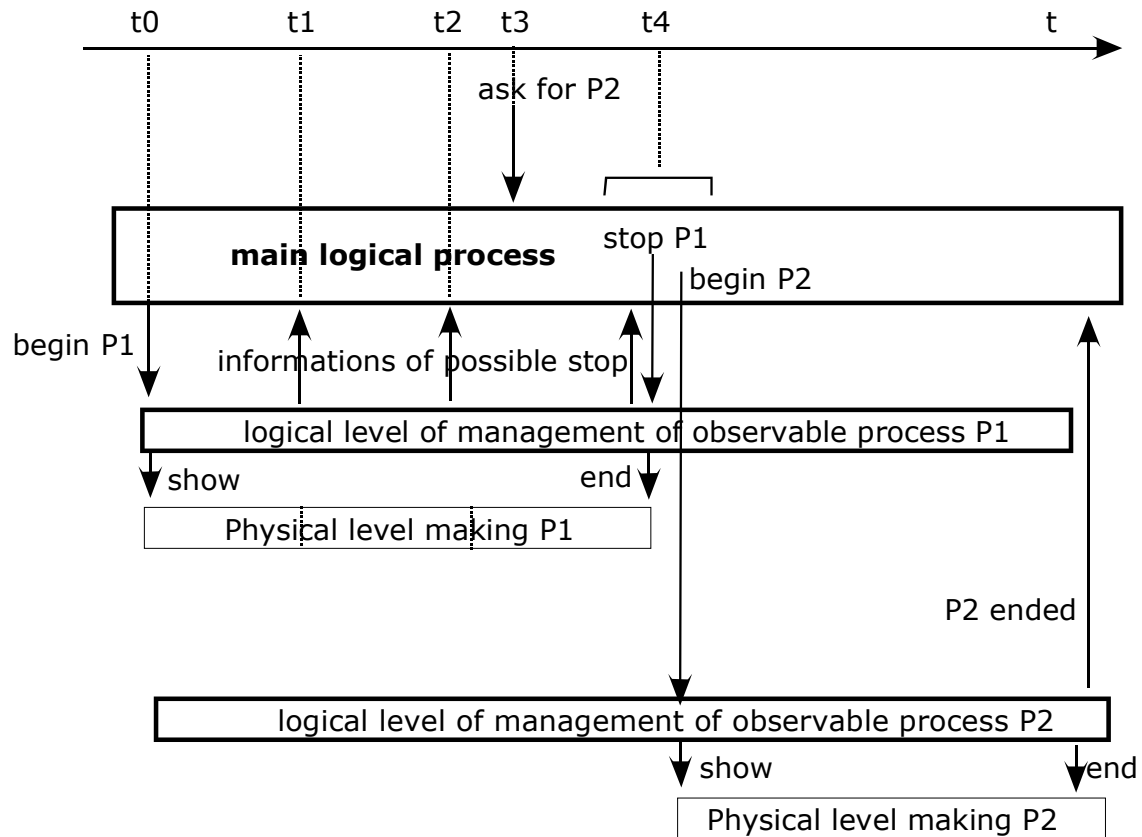


Figure 8 : horizontal editing in differed interactivity

Differed interactivity is used both with internal and external interactivity in *passage2*.

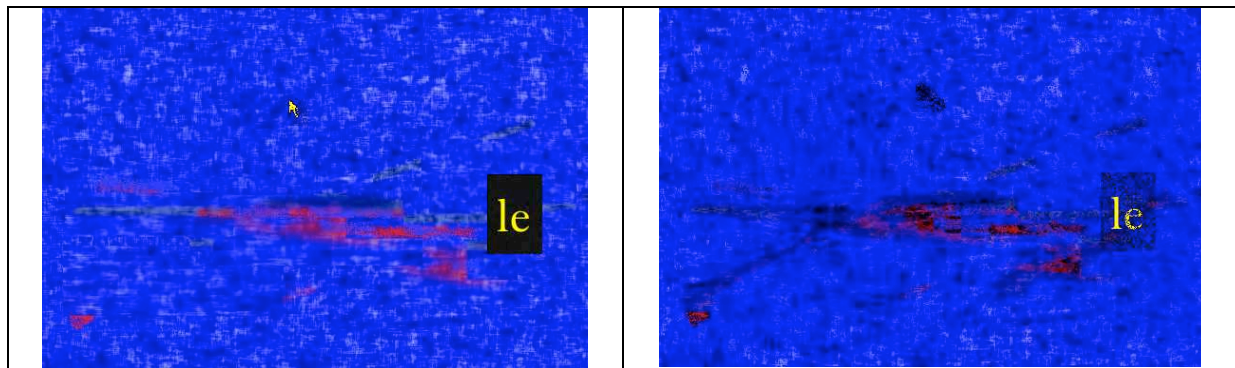


Figure 9 : differed interactivity in *passage2*. When the reader acts, the animation continues as he made nothing. Only the changing of the mouse cursor indicates that the program has taken into account this action

Media overlap:

Different processes can manage the same properties of a media (but not at the same time!) or different properties of a same media. In this situation, one have media overlap : information inscribed by a process at time is not the information the reader reads. This feature can give a new kind of intertextuality based on the concept of “braid”. A braid is a set of processes that constitutes the elementary layer of construction of the work. One can say that the work is a weave of braids, each of them constituting a complete poem. So, a braid is the basic material of construction. The reader cannot isolate these braids when reading because she only observes the result of their coupling, but the existence of these braids creates a high coherence in the work.

The review *poesie:numerique*⁵ has recently published the sequence pas2f1seq4 of *passage2* and some of its braids. One can verify that each braid constitutes a visual animated poem that could be published for itself and that these poems sometimes are and sometimes not, readable in the final sequence. At each time, braids can be coupled in three ways : in sequences (they appear one after the other as classical sequences), in parallel (they are playing at the same time without interference, cf Figure 10) and in overlap (they are playing at the same time but are media-coupled by acting on the same media. Cf. Figure 11). In this third case, braids cannot be reconstructed when reading because one perturbs the other. So, in this case, two different poetic realities exist in the work : one truly programmed, the braid, but that cannot be observed, and another observed by the reader and that is logically managed but not really programmed by lines of codes. It exists in the work an “intimate” domain for the reader and an intimate domain for the reader: the work for one is not the work for the other.

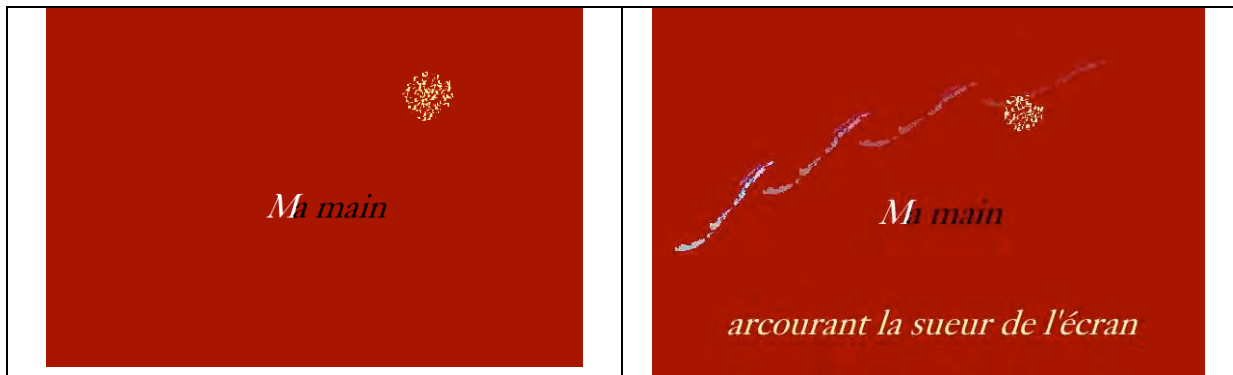


Figure 10 : screen capture of parallel coupling of braids in pas2f1seq4 : one braid (at left) and the result of parallel coupling with other braids the reader reads (at right)

⁵ <http://gherban.free.fr/seminaire/intro.htm>

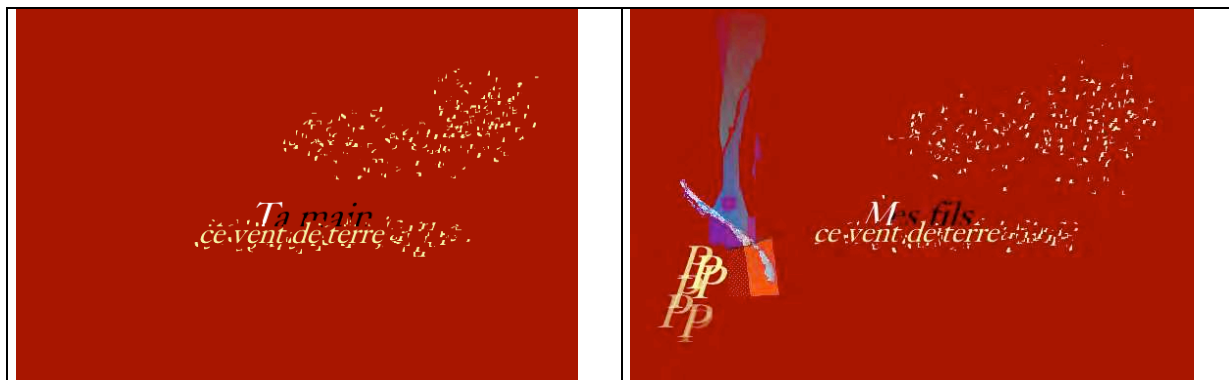


Figure 11 : screen capture of media coupling of the same braid later in the work. The braid is no more readable because it does not manage the property “string” of the text media “ma main” [my hand]. This property is modified by a process of another braid that changes the string in “mes fils” [my threads]. So, this text independently of the meaning it has in the poem, also speaks on the coupling.

Horizontal editing of braids

We saw that a braid is composite in a-media conception: one level concerns the physical construction of what is seen and heard, another concerns the logical management of this level and a third governs a global logic applied on processes. The second and third levels are location for specific aesthetic features that do not have direct correspondence in the observed processes. I called these features “inreadable” levels. They are only indexed by comparison of textes-à-voir in rereading. These inreadable levels are also indexed in the program by a set of messages between second and third levels.

Braids communicate together and can be managed at the very high level of the work by a common logical level of management. So, the works is managed in a centralised mode. They can also run continuously and manage locally themselves by exchanging messages. The work is then managed in a local mode.

A Braid uses only three types of routines: The first one is named “head of braid”. It programs the logic of the braid. The physical construction is cut in two different types of routines that do not have relationship because the head of braid manages the physical process. There are “effectors” and “media transducers”. An effector makes a calculus. It can be a complex program and, generally, uses timers. It send the calculated values to the head of brain and does not use them directly on a media property, even if it is destined to modify a media property. For instance, in pas2f2, an effector calculates a sequence of sounds but these sounds are not directly played, they are memorised in a variable of the head of brain of the sound generator and play only when the visual head of brain gives authorisation. In this case, the two braids are coupled by messages. A media transducer adapts a complex value to a set of media properties. Effectors and media transducers are optional, they exist only in complex braids, whereas the head of brain is necessary.

Braids in sequence can be coupled by value to assure the continuity of properties values. Parallel Braids can be totally independent or coupled by value, by effector or by message. The second mode can assure synchronism between them, the third mode assure aesthetic inreadable levels. Overlap braids are coupled by media.

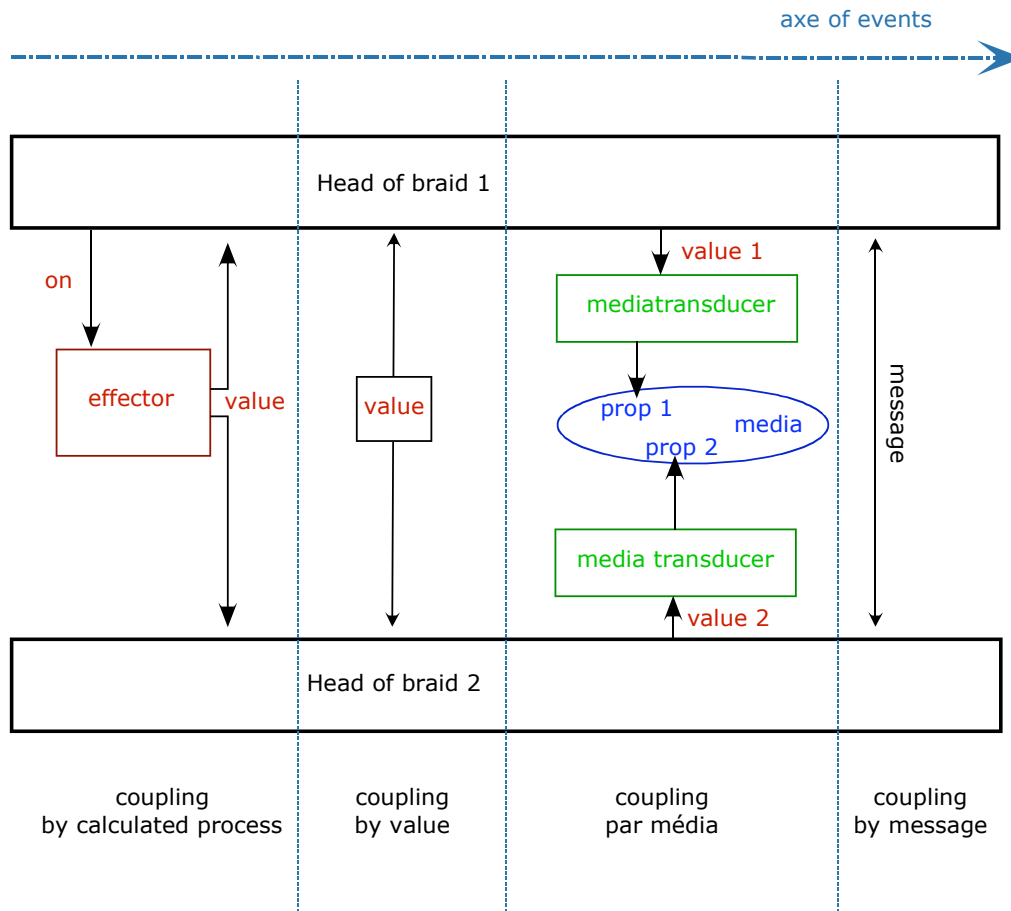


Figure 12 coupling of braids

Use of UST in artistic works: a-media clusters

A-media supposes that the coherence of processes can be perceived. If it is not the case, only disturbance in media is perceived and gives arbitrary non sense. The temporal coherence is the most natural level of coherence of an observable process. It is why USTs are good candidates for observable processes then enter in a-media hypermedia under the hypothesis one can manage the same MTP in different media.

The MTP can apply at the logical management level of the process and parametrizes the level constructing the physical observed process (physical level making in Figure 8) or at the main logical management of the processes in the braid (this level is named “head of braid”). The second solution is used when a MTP passes through different media by beginning in one and ending in another. In this case, the two physical processes must be coupling in parallel during a phase of the MTP or the reader does not perceived the equivalence between parameters there are managed by the MTP in the two media. The coupling must not begin at any time but only at the beginning of the phase of the MTP that precedes the absent or truncated last phase. If the MTP has only one phase, that is no constraint on the date but the parallel coupling seems to be necessary.

We do not know enough of the UST nature in visual to use them as a scientific tool. But the artistic intuition always precedes science and we have sufficient feeling with temporal semiotics to implement it in the visual. I made this by using the MTP model. This model is written in a graphical form that is easy to transform in

algorithms. I used recently this possibility to create visual generators that always seem to be synchronous and coherent with a sound file. Whatever visual solution the generator produces, the reader has the impression that music is specially designed for this visual.

To do this in recent sequences⁶ of the work *passage 2*, I first analysed the pieces of music in terms of UST. The only property one needs to know on these files is the phase of the MTP that is playing at every moment. One does not know the temporal detail of each sound parameter. So, one needs only an abstract information (the sequence of MTPs), times of changing of phases inside a MTP and times of changing of MTP.

After this analysis, I made visual behaviour that obeys to the same MTP, with changing at approximately the same dates (to within about 200 ms). So, constraints of synchronism between sound and visual are very weak and do not use measures in real time. Of course, one needs to make a correspondence between the sound parameters F and I and the visual parameters. We have certainly a large choice. I chose to use the luminance as visual equivalent of sound volume, that is an instinctive choice, and to use the chrominance as visual equivalent of the sound frequency. One can show that this choice sounds well for the UST present in these sound files. Let us observe that using the same MTP in visual and sound does not mean that there would exist an equivalence between a visual parameter and a sound parameter as artists thought last century when they made equivalent scales between sound frequency and colour. The temporal behaviour of the visual is not the mimetic translation of the sound temporal behaviour. There are no correspondences between frequency and colour: the frequency can go up while colour passes from red to blue or from blue to red. The only important thing is that they are both instances of the same MTP, that they produce the same temporal meaning. One can claim that in this case, visual and sound behaviours are temporal *synonymous*. It is this synonymy that generates the coherence. Experts in USTs of the MIM found that it produces a curious perceived effect one does not find in video type multimedia: visual and sound seem to have practically the same temporal behaviour but with a perceptive difference which cause is unknown. Looking more precisely to the details of these differences, they found some little mistakes in the programmed construct of the visual MTP, that is true.

So, using MTPs to manage coherence and dialogue between sound and visual produces a global impression of similarity and local impressions of difference. This is a much more interesting result in an aesthetic point of view than a classical term by term correspondence between sound parameters and visual parameters.

Two sequences of *fragments* use only each one braid and show the effect of using UST. They are each relative to a verbal form of the verb “to pass” (futur, conditionnel). Three processes play together in these sequences and they are well described by Figure 6. Process 1 is a MTP that acts on the chrominance and the luminance of the background picture (media 1) and on sound (media 2). This process is the “background cluster”: the managed properties of the sound and of the visual form a whole, an elementary semiotic level. The second layer of processes is the “surface cluster”. It concerns moving objects of the visual in relationship with the melodic property of the sound. In these two sequences, the moving object is the text. More precisely, this level concerns what Yves Jeanneret calls “the picture of the text” to distinguish it from the linguistic level of the text. The third cluster is not a-media. It is only made by the linguistic level of the text.

These clusters are interdependent and form a coherent whole: a braid. The surface cluster must have a temporal coherence with the background cluster. It acts as an expressive enunciation of the linguistic cluster,

⁶ Some of them have been published in (BOO, 2007)

and must be coherent with its significant. And the linguistic cluster may impose constraints on temporal behaviour. The significant of the text or its structure can limit the choice of possible UST or guide their arrangement. For example, the music Marcel Fremiot proposed for past was not suitable with the linguistic meaning of past and we changed it.

Conclusion

UST are useful to construct pertinent braids. At this state, I do not use temporal rhetoric because I need to experiment and learn more on transfer of UST from a media to another. The next step in research concerns this transfer and the learning of visual UST. It may exist specific visual UST if the number of parameters needed to describe and UST is more than 2, what we do not use until now.

In passage2, sound was not generated in real time. This model needs also to be developed in situation where sound generators communicate with visual and textual generators. Normally, the main abstract level may manage the dialogue between them. If this intuition is true, one can imagine multigenerators work without any physical capture. This way broadens the concept of descriptor invented by Jean-Pierre Balpe in expressive generators that are generators that do not necessarily create material but that develop expressive behaviour of a given material.

And last but not least, a-media conception is perhaps a first step in changing our modality of reading visual and multimedia events by breaking our video and picture conception of visual representations.

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Elements For An Art Of Rhetoric In Interactive Computer Art

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Abstract

In this contribution, I identify rhetorical figures that are specific to interactive writing : figures of manipulation (meaning gestual manipulation). It's a category on its own, along with figures of diction, construction, meaning and thought. In many computer art works, the artists use the figures of manipulation to introduce a loss of grasp.

What is emphasized in such figures is the coupling action/behavior, which could be considered as a basic unit in interactive writing. This coupling can be conceived independently from the medias it relies on. Thus, an a-media approach seems relevant when attempting to define an art of rhetoric in interactive writing.

Keywords: Interactive writing, rhetoric, figure, manipulation, a-media, loss of grasp.

Since Antiquity, the figures have made up a significant part of rhetoric, even though rhetoric should not be reduced to rhetorical figures. Several typologies of figures have been put forward. According to these typologies, figures are generally divided into four main categories¹ :

- diction (e.g. anagram and alliteration),
- construction (e.g. chiasmus and anacoluthon),
- meaning (tropes, e.g. metaphor and metonymy),
- thought (e.g. hyperbole and irony).

Interactive and multimedia writing calls upon certain existing figures, such as the metaphor and the metonymy. For instance, Stuart Moulthrop² and Jean Clement³ highlighted the way in which certain figures could be reinvested in hypertextual writing.

However, I make the assumption here that we can identify rhetorical figures specific to interactive writing : figures of manipulation. It's a category on its own, along with figures of diction, construction, meaning and thought. Which criteria allow them to be qualified as figures and how do they operate ? On the basis of a corpus of interactive computer art works, I wish to examine the meaning produced by these figures. To what extent is the expression "rhetoric of manipulation" adequate to define interactive writing?

1 – A rhetoric of manipulation

One can notice a recurring effect in hypermedia, both in websites and in CD-ROMs : the appearance/disappearance effect. The user rolls over a reactive zone with the cursor of the mouse. A text, an

¹ Stolz Claire, *Initiation à la stylistique*, Ellipses, Paris, 1999.

² Moulthrop S., « Reading for the Map: Metonymy and Metaphor in the Fiction of "Forking Paths" », in *Hypermedia and Literary Studies*, Paul Delany and George Landow (éd.), 1991, p.119-132.

³ Clément Jean, « Afternoon, a story, du narratif au poétique dans l'œuvre hypertextuelle », in *A:LITTÉRATURE*, numéro spécial des Cahiers du CIRCAV, Actes du colloque Nord Poésie et Ordinateur, CIRCAV-GERICO, Roubaix, 1994, <http://hypermedia.univ-paris8.fr/jean/articles/Afternoon.htm>

image, a video sequence appears, which disappears when the cursor leaves the reactive zone. The appearance/disappearance effect is here the result of the user's action. It is very often used for navigation elements : the user rolls over a button, an icon, and another form of this element appears (play on typography, colour, shade...). However this effect can also involve elements of content, not only elements devoted to navigation.

This appearance/disappearance effect is thus exploited in many digital works. But what is the meaning produced by appearance / disappearance ? How can it be considered as a figure ? The specialist in stylistics Georges Molinié claims that what defines figures is "*the absence of correspondence between the expressive system used to convey information and the information itself*", "*when the meaning produced exceeds the occurring syntax and vocabulary*."⁴ Let us examine some examples to analyze the meaning produced.

In the work called *Alter ego*, on the *Scriptura et caetera*⁵ website, this effect applies to the text. By rolling over a word with the cursor of the mouse, this word disappears and is replaced by another word (figure 1). When the cursor quits the reactive zone, this other word disappears and the first word reappears . The author explains the principle : "*Alter ego* is made up of two independent and complete sentences on top of one another . Each word shows and hides its *twin* word"⁶. In this very simple piece, this "reversible text in which each word shows and hides its double"⁷, the appearance/disappearance serves a play on duality.

Alter ego proposes two steps : the user *composes* the text by showing one word instead of another ("Zone n°1" in the interface), then he/she can discover the hidden side by showing the two sentences one beside the other ("Zone n°2" in the interface). If the appearance/disappearance is the basis of the combinatory play between the two sentences, it also allows the author to unveil the writing device. The author shows "the words hidden under the words".

⁴ Molinié Georges, *Dictionnaire de rhétorique*, "Les Usuels de Poche", Hachette, Paris, 1992.

⁵ Belisle Marie, *Scriptura et caetera*, 1998, <http://www.scripturae.com/>

⁶ <http://www.scripturae.com/> (translated by the author).

⁷ *Idem*.



Figure 1. *Scriptura et caetera*, by Marie Belisle.

*Days in a day*⁸ is another example of a work exploiting the appearance/disappearance effect, but applied to images this time. This work invites us to discover a day in the life of Mr. Brown, in an urban environment. The user has a map of the town which allows him or her to access various places and moments in the day of the character. In several pieces corresponding to different moments, rolling over an image or part of an image unveils *the other side*, a hidden reality. It is the case in the piece called “Miss Purple” (6.30pm in the character’s day, figure 2) : the roll over unveils the a woman’s naked body.

⁸ Calvez Pierrick, *Days in a day*, 2000, <http://www.daysinaday.com/>



Figure 2. *Days in a day : Appearance/disappearance by rolling over an image.*

In these two examples, the appearance/disappearance effect - responding to a rollover - provides another realm of possibility for a text or an image, giving the impression that there's depth lying under the digital surface, depth that can be explored. This figure can unveil the other side of things (a hidden reality) or unveil the creation process . It can also suggest a double meaning, a semantic depth whatever the semiotic form which is used (text, image, video).

However, even if the user has an impression of depth, it is merely an illusion, as Yves Jeanneret points out : *"In fact, nothing comes forward from the back of the screen. The only thing that changes is the fleeting state of light particles. A material phenomenon undetectable by our senses"*.⁹ There is no piling up of layers of pixels. Thus there is no real depth in the literal meaning, but merely an illusion of depth. However, this appearance/disappearance conveys an impression of depth and this is why one may speak of a figure. As I have already pointed out, Georges Molinié defines a figure by *"the absence of correspondence between the expressive system used to convey information and the information itself"*. Even if such a definition may seem narrow, the principle of a *"non-correspondence"* stands out : with the appearance /disappearance figure, there is no correspondence between the change in the state of light particles and the meaning produced (depth, unveiling of a hidden reality).

As I pointed out in the introduction, the prevailing typology of figures is the one that divides figures into 4 categories: figures of diction, construction, meaning and thought. Along with these categories , the figure of appearance/disappearance – as I defined it – could be qualified as a figure of manipulation. This

⁹ Jeanneret Yves, *Y a-t-il vraiment des technologies de l'information ?*, Editions universitaires du Septentrion, 2000 (translated by the author).



manipulation is closely related to the materiality of the text and of the interface, thus contributing to an aesthetic of materiality¹⁰.

Other figures may be related to this rhetoric of manipulation : the figure of substitution (a semiotic form is replaced by another one by rolling over or clicking), the figure of displacement (dragging and dropping a semiotic form). For example, on the anonymes.net¹¹ website, a cinetic work which relates the story of a couple, the user is encouraged to discover the young woman's dream of maternity by dragging and dropping the word "hope" on her belly, thus launching a video. The figure of displacement allows a journey, whether a shift in meaning or a stage in a narrative.

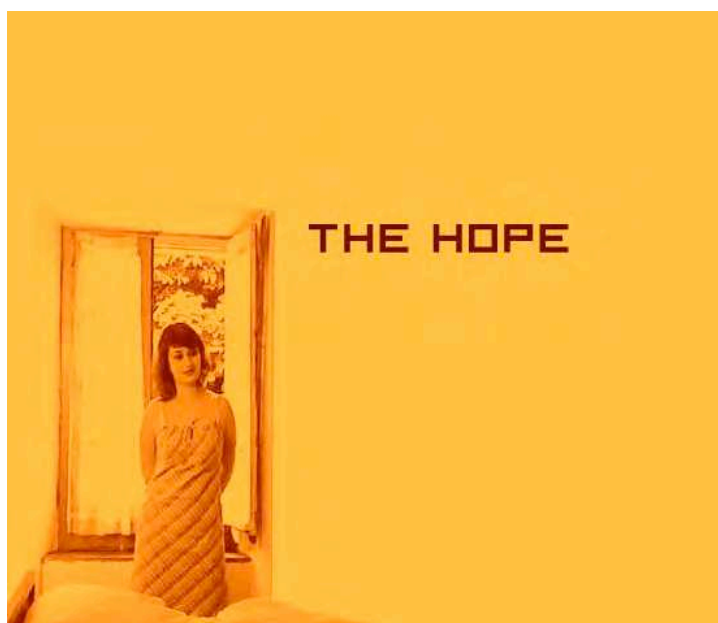


Figure 3. Dragging and dropping a semiotic form in anonymes.net.

Although figures of manipulation are everywhere to be found in interactive writing , they are not the only ones. There are other common figures of interactive writing, particularly in digital art. Philippe Bootz has shown that "inversion" should be considered as a figure of speech (inversion content / interface)¹². This type of figure makes it possible to play on the architecture whereas a figure like appearance/disappearance is more on the *surface level*. The figures of manipulation refer to the user's interaction with the interface. Yet, figures related to the architecture or to the network should be studied along with the figures of manipulation. Another category of figures could emerge, based on the introduction of data and not on manipulation. These

¹⁰ Bouchardon Serge (dir.), Broudoux Evelyne, Deseilligny Oriane and Ghitalla Franck, *Un laboratoire de littératures – Littérature numérique et Internet*, Bibliothèque Publique d'Information, Éditions du Centre Georges Pompidou, Paris, 2007.

¹¹ *Anonymes.net*, 2003, <http://www.anonymes.net/index.php>

¹² Bootz Philippe, « Adaptive generators and temporal semiotics », 2003, http://transitoireobs.free.fr/to/article.php3?id_article=22

figures can be found in collaborative works, but their study would exceed the frame of the present paper. However, in interactive works, figures of manipulation are currently the most frequent and this writing may be related to a *rhetoric of manipulation*.

2 – An a-media approach

As seen previously, the appearance/disappearance figure could apply to a fragment of text as well as to an image or a video sequence. This figure is common to various semiotic forms and can thus be partly approached regardless of the media¹³ it relies on. Thus, an *a-media* approach may be relevant when attempting to formalize a rhetoric of interactive writing.

This a-media approach, which focuses on process and not on media, is now explored by several researchers. Hervé Zénouda differentiates "multimodal" and "multimedia" : a "multimodal code takes into account the different characteristics of the modalities it involves while an a-media structure tries to identify the elements common to these various modalities"¹⁴.

This a-media approach originates in previous research works, such as the one led by the music and computer science laboratory in Marseille (MIM) on "*Temporal Semiotic Units*". The CD-ROM called *Temporal Semiotic Units* (TSUs)¹⁵ offers for instance a new tool for musical analysis. It is the result of a research on the unravelling organization of sound material in time, which helped to identify and to characterize temporal situations called *Temporal Semiotic Units*. These TSUs form a corpus of prototypic units that exist in every type of music. They can be used as a reference to approach the musical analysis through the time variable. According to this approach, a music piece is composed of different sequences (the TSUs) which organize the musical time. The researchers of the MIM have defined these TSUs (twenty in total), named and classified them : fall, stretching, impulse, heaviness... Developed at first to analyze électroacoustic music, TSUs are also efficient to analyze contemporary as well as classical, medieval or traditional music.

In 2004, the researcher Xavier Hautbois realized a cinetic visual sequence to experiment a sequence of visual TSUs (conceived from the characteristics of musical TSUs), leading to the conclusion that TSUs allow the description of time characteristics independently from the medias.

A research on the application of the TSUs to the multimedia is currently carried out through the realization of the computer art work *Passage 2* (following *Passage*¹⁶) by the artist Philippe Bootz and the composer Marcel Fremiot. Philippe Bootz theorizes his approach in a paper called "*Towards compelled and a-media multimedia*"¹⁷. He suggests a conception of "*multimedia as an interaction between autonomous objects endowed with behavior and not only an association of media. Such a definition can apply only if media can be broken up into objects and if the behavior of the various objects obeys a unique grammar which allows to build interactions.*" He emphasizes the notion of "behavior" of the different objects : "*The visual aspect of a*

¹³ The word "media" is here the equivalent of "semiotic form" (text, image, sound, video).

¹⁴ Zénouda Hervé, « Images et sons dans les hypermédiats », in *H2PTM'05*, Hermès, Paris, 2005 (translated by the author).

¹⁵ *Les Unités Sémiotiques Temporelles – Nouvelles clés pour l'écoute*, MIM, Marseille, 2002.

¹⁶ Bootz Philippe, *Passage*, CD-Rom, Alire 12, 2004.

¹⁷ Bootz Philippe, « Vers un multimédia contraint et a-média », journées d'études franco-canadiennes sur les écritures électroniques, 2002, http://transitoireobs.free.fr/to/article.php3?id_article=21 (translated by the author)

dynamic work is formed by what I call "horizontal editing" : the overlapping of autonomous and basically asynchronous objects. [...] Each object has a behavior, a dynamic."

However, concerning the figures of manipulation, it seems less relevant to emphasize the interactions of objects between each other than the interactions between these objects and the user.

Although an a-media approach seems adequate when it comes to defining an art of rhetoric in interactive writing, this approach cannot be the only one. Taking into account the semiotic characteristics of the various elements displayed on the screen is necessary. As Yves Jeanneret reminds us, *"far from being simple and homogeneous, this semiotic production is extremely complex and heterogeneous"*. We must beware of the digital "integration" myth. As Yves Jeanneret puts it : *« If the theme of immateriality erases the reality of the screen itself, the theme of integration flattens the complexity of the visual elements. Indeed, in the processing of information, integrating data is equivalent to boiling down the heterogeneity of support to the homogeneity of a binary code. But to associate medias means, in the building of a textual form, reconciling, linking up and combining heterogeneous cultural codes, while admitting this heterogeneity : other forms, other traditions, other regimes, other origins, other temporalities, etc »*¹⁸

Yves Jeanneret underlines that it is necessary *"to consider forms and media transformations created thanks to the computer (and often referred to as the "multimedia") as written forms and transformations of the writing space"*.¹⁹

Insofar as *"computerised media are homogeneous technical management systems of culturally heterogeneous signs"*, *"the writing-reading process is a confrontation between a technical unity and the necessity to rebuild cultural complexity"*.²⁰ This complexity is first of all the complexity of the relationships between the semiotic forms themselves.

Rather than integration, one should speak of *intersemiotisation*, which highlights the idea that the medias themselves are signs. Even if the precise analysis of this intersemiotisation cannot be ignored on the reception side, adopting an a-media approach is promising on the conception side.

Let us consider authoring tools. A web page created with the web editor *Dreamweaver*²¹ is presented as a collection of objects endowed with their own characteristics and behaviors. The main quality of *Dreamweaver* lies in the management of these behaviors ("Behavior" panel in the interface) which are linked to objects. A similar "Behavior" panel is available in the *Flash* software from the same editor *Adobe*. A behavior is meaningful when related to an action of the user. The coupling action/behavior could as a matter of fact be considered as a basic unit in interactive writing.

¹⁸ Idem, p.117-118.

¹⁹ Idem, p.109.

²⁰ Idem, p.118.

²¹ Software by *Adobe* company.

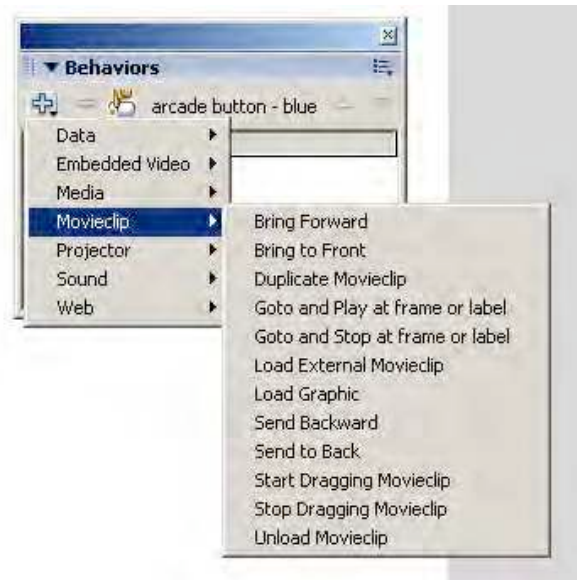


Figure 4. The « Behaviors » panel in the Flash software.

To go further, an authoring environment could be imagined in which the starting point would not be a media object anymore (as this is the case in the *Director*, *Flash* or *Dreamweaver* softwares) but a behavior (appearance/disappearance, substitution, displacement...) which could apply to any media object. Such an authoring environment would correspond to an a-media approach on the conception side.

The figures of manipulation rely more on the notion of behavior than on the notion of media. For instance, as stated before, the appearance/disappearance behavior – responding to an action by the user – expresses unveiling. Of course, this figure can have a more specific meaning depending on the context, but the general meaning (unveiling) is asserted, regardless of the media. Thus, an a-media approach may be relevant when attempting to define an art of rhetoric in interactive writing.

3 – The loss of grasp

As seen previously, the figures of manipulation are based on the control of certain elements by the user. In *The language of new media*²², Lev Manovich analyses the influence on the digital world of pre-existing cultural traditions. According to him, the digital language is constituted by the contribution of three cultural traditions : the printed page, the audiovisual culture and the control panel (e.g. the control panel on a car, plane or any other complex machine). If, for Manovich, the most influential tradition on the web is the audiovisual one, the tradition of the control panel is however very strong. While the audiovisual tradition refers to a way of controlling the flux, the control panel refers to the idea of control by the user. In software ergonomics, we can find complementarity between "guidance" and "explicit control"²³.

²² Manovich Lev, *The language of New Media*, MIT Press, Cambridge, 2001.

²³ Bastien Christian and Scapin Dominique, *Ergonomic Criteria for the Evaluation of Human-Computer Interfaces*, technical report n°156, INRIA, 1993.

Control of the user and control by the user are not only intimately linked, but their crossed relationships seem to be a specific mode of writing in digital works. Their constant co-presence results in a tension that produces interactivity. However, this very idea of tension is an answer to one question only : who/what manipulates ? The user or the technical system ? This level is that of a classical human-machine interface approach (HCI). In fact, even this question remains within an ergonomic approach while one should also consider an anthropological one. So the question is to know how the *world of the user* (or the supposed worlds of the user) is or is not taken into account. In *Experts and forgers*, Francis Chateauraynaud and Christian Bessy suggest a model of "grasp"²⁴. Grasp emerges from the meeting between markers - points of reference - (which depend on conventions), and habits (which are localized practices). According to the authors, one summons two kinds of elements to have a grasp on one's environment:

- elements based on conventions ;
- material elements to be found in the immediate environment.

It is these dual elements which characterize the concept of grasp.

Giving control to the user does not necessarily entail giving him grasp in a traditional anthropological meaning : the user doesn't always have the *frame* necessary for the grasp. At that point one sees two positions for the user:

- in control / under control ;
- with grasp / without grasp.

Conversely, the user can have less control and paradoxically more grasp. Instead of thinking in terms of the user being in or under control, one should think of the user having or not having grasp. Or rather it is a question of identifying the various possible combinations. Indeed, the user can be in control and either with or without grasp, just as the user can be under control and either with or without grasp.

For instance, on the web, full screen display and disactivation of the browser's functionalities²⁵ is an example of control by the system and of loss of grasp for the user. The user loses the points of reference of the browser's interface.

Now, preselected temporality²⁶, which is a form of control by the system is also a possible grasp for the user. Indeed, the user finds himself in a frame which he/she is accustomed to, that of the time flux to be found in audio-visual type works. This is the case in the cinetic works – often developed with the *Flash* software – which are played without any interaction opportunity for the user. For instance, in *My Google Body*²⁷, a human body is represented through pictures corresponding to the various parts of the body, these pictures being renewed at regular intervals. The program displays the results of the requests made automatically to *Google Images* concerning the word « head », « body », « arm », « hand », « leg » et « foot ». This work shows a graphic body in continuous and regular evolution.

²⁴ Chateauraynaud Francis and Bessy Christian, *Experts et faussaires. Pour une sociologie de la perception*, Editions Anne-Marie Métailié, Paris, 1995.

²⁵ E.g. « The 12 labors of the internet user », <http://www.the12labors.com/>, 2008.

²⁶ Let us compare the various ways of playing the time according to the media. The audiovisual media are very controlling : the duration of a film coincides with the viewer's flow of consciousness. On the contrary, the printed text is far less controlling : readers read texts at their own pace. With the digital medium, no preset pace is imposed to the user : the pace depends on the degree of interactivity present in the work. The user is alternatively controlling or controlled.

²⁷ Dalmon Gérard, *My google body*, 2004, <http://www.neogejo.com/googlebody/>

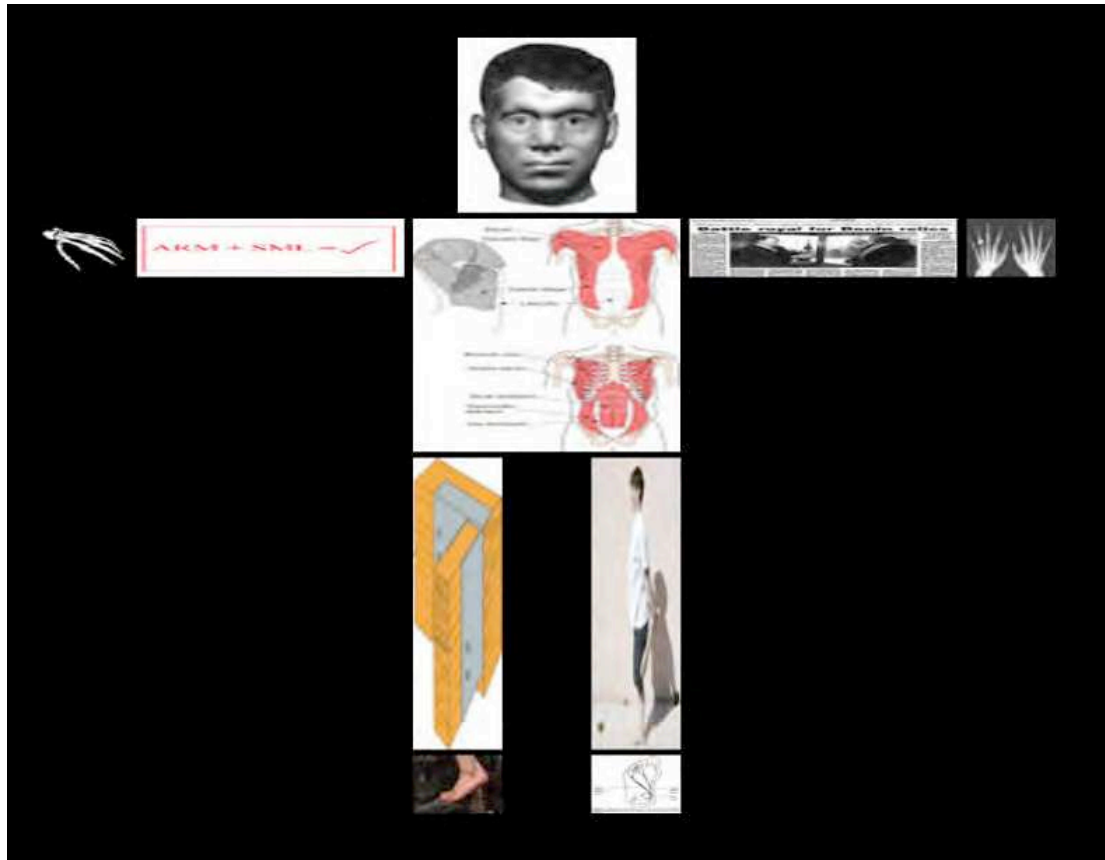


Figure 5. *My Google Body*, by Gérard Dalmon.

Just as interactive works rely on this constant play between a controlling and a controlled approach, they also rely on grasp and loss of grasp. The idea is to get the user involved and to destabilize him/her, so that he might possibly enjoy becoming disoriented and playing with the work.

Thus, very often, the loss of grasp is the basis of computer art works. 1997 is the year *Ceremony of innocence*²⁸ was created. It is a work made up of a succession of postcards from a painter and one of his admirers, those postcards being a series of interactive pictures. Each postcard is an enigma that the user has to solve by doing certain things. When the enigma is solved, the card turns round then and the user gets to read the message which is at the back of the card. The control of the user is obvious in the linear succession of the postcards (58 in total) that the painter and his admirer sent each other. Each card has two stages : an interactive picture (the front) and the text (the back of the card). For each interactive picture, the user is expected to do things in a predefined order. However, the whole CD-ROM is based on a play between grasp and loss of grasp. Let us take the example of the first postcard (figure 8) : after a while, the bird shown on the picture *eats* the cursor of the mouse.

²⁸ Mayhew Alex, *Ceremony of innocence*, CD-Rom, Real World et Ubisoft, 1997.

Immediately, the cursor disappears from the screen. At that point, one may think that the user is totally under control, since he/she can not use the mouse in the way he/she is used to. Yet, moving the mouse (whose cursor is invisible on the screen) still has an impact on the elements of the postcard. The functionality of the mouse is in fact not disactivated. One can observe a play with the loss of grasp. By losing the cursor of the mouse, the user has also lost the grasp which is a point of reference for him/her. Yet the user can now achieve the task expected from him/her. The card turns round finally and the text is read by the character who wrote the message. At that point, a slow pace is imposed on the user : that of reading aloud, which cannot be interrupted. Once again, the user is in a position of grasp.



Figure 6. The first postcard (recto and verso) of *Ceremony of innocence*.

As in *Ceremony of innocence*, numerous works exploit this strategy of the loss of grasp. *Don't touch me*²⁹, by Annie Abrahams, displays the photograph of a woman lying on a bed, as a voice starts telling a story³⁰. But if the user rolls the cursor of the mouse over the picture, a text immediately appears on the screen, expressing the woman's refusal (« don't touch me ») and she changes positions. The vocal tale stops immediately and restarts from the beginning. On the fourth attempt of *caress* with the mouse, the window closes up. This way, the user is made to reflect upon what an interactive gesture is and to think twice before interacting with the work (whether by clicking or rolling over). Interacting is thus staged and shown. Annie Abrahams forces us to be passive to become aware of the nature of the interactive gesture. In this work, interacting stops the narrative : narrativity and interactivity are here incompatible. The loss of grasp is characterized by the impossibility of acting.

²⁹ Abrahams Annie, *Don't touch me*, 2003, <http://www.bram.org/toucher/index.htm>

³⁰ This is the narrative of a dream that the artist had when she was a teenager.



Figure 7. *Don't touch me*, by Annie Abrahams.

In *Shredder*³¹, by Mark Napier, the internet user enters a website address : elements of the webpage (such as texts, pictures, links) appear on the screen in complete disorder mixed with the HTML source code. Along with the spatial deconstruction of the code, there is a play between the *form of recording* (the code) and the *form of restitution*.

In a book, the *form of recording* (the printed text) and the *form of restitution* are identical, whereas they are distinct on a digital medium. On this medium, the source code is not what the user sees on the screen : for one form of recording, several forms of restitution are possible because of the mediation of calculation. In *Shredder*, the form of recording and the form of restitution are mixed, and the result is different each time the user reloads the page. The links which appear are clickable. However, although the links allow the user to navigate from page to page, the pages are *unreadable*. Links are covered one by the other. The user has the impression to be in control, but the accumulation of links leads in fact to a loss of grasp. There is thus definitely a play between grasp and loss of grasp. The gestual manipulation turns into *manipulation* of the user by the artist.

³¹ Napier Mark, *Shredder*, 1998, <http://www.potatoland.org/shredder/>



Figure 8. The homepage of the CAC2008 seminar website revisited with Shredder, by Mark Napier.

Figures of manipulation could be expected to give more control to the user, but in many computer art works, the artists use these very figures to introduce a loss of grasp. This play on the loss of grasp invites the user to have a reflexive attitude towards his/her interactive practice. The rhetoric of interactive writing is an invitation to interact differently, to have another apprehension of interactivity.

Conclusion

Figures can be identified that are specific to interactive writing : the figures of manipulation. It's a category on its own, along with figures of diction, construction, meaning and thought. The figure of appearance/disappearance (responding to an action by the user) is a key figure of the *rhetoric of manipulation*.

The figures of manipulation lay the emphasis on the notion of behavior (the coupling action/behavior could as a matter of fact be considered as a basic unit in interactive writing), more than the notion of media (such as text, image, sound and video). A figure of manipulation can indeed apply to a fragment of text as well as to an image or a video sequence. This figure is common to various semiotic forms and can thus be partly approached regardless of the medias it relies on. Thus, an a-media approach may be relevant when attempting to formalize a rhetoric of interactive writing.

One could think that the figures of manipulation would offer more control to the user. In many interactive computer art works, the artists use these figures to introduce a loss of grasp. When manipulating, the user finds himself/herself being *manipulated* by the artist. From an ergonomic point of view, the interactive computer art works rely on a play on the tension between controlling and being controlled. From an anthropological point of view, they rely on a play on the tension between grasp and loss of grasp.

But even if the rhetoric of interactive writing is first and foremost a rhetoric of manipulation, this rhetoric is closely related to an aesthetics of materiality (materiality of text and interface).

Thus, beyond a treaty of rhetorical figures, what is needed is a theory of the materiality of the figures in interactive writing. The present contribution lies within the scope of this research project.

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ANNALENA

An increased narrative

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Narrative has occupied our thoughts throughout the ages; using speech, gesture, then text and later moving pictures, we have been trying to grab people's attention and immerse them in our imaginary universes. But the question a writer often asks is: how can I do better? Of course, the story comes first, followed by the way to relate it. From the very beginning, writers wanting to share their virtual worlds with an audience have thought about interactivity: gestures, silences, calls and other kinds of entreaties have been central to their art. One of the best ways to capture someone's imagination is through text by using a large palette of tones and styles, leaving enough room for individual imagination to do some work, building up scenes and giving body to characters and sound to dialogues. Conversely, cinema and TV have created another medium for a writer's universe to live by delegation in front of the spectators, with the help of scriptwriters, actors and other technicians.

Even though a computer is really no more than a simple viewing screen and was not conceived for reading texts (good old paper is still largely better for this purpose!), it can also open up new possibilities for narration. Interactivity is the biggest “bonus” with using a computer as it allows the user to choose what to do and where to go. So now, the key question is: what can all this bring to the art of narrative writing?

Since my previous works had focused independently on text, still and moving images or music, I have been trying to find a way to merge these elements into one project. Finally, thanks to multimedia techniques, the first result is “Annalena”.

“Annalena” is an interactive narrative piece of fiction that has been written from the creative point of view using text, animated pictures and multimedia ^[1] and from the research point of view, referring to studies carried out with the G-Sica Research Group about how people perceive multimedia worlds^[2].

The aim of “Annalena” is to explore connections between classic narrative literature (based upon Aristotle's model), multimedia and interactivity. The text keeps its central role and is completed by visuals and sound that use different perceptive channels.

The first level of conception has been partly based on work by authors interested in the relationship between the printed text and interaction (e.g. Members of OuLiPo ^[3] or South-American writer Julio Cortazar ^[4]). Other more recent work from French university writers has also been taken into consideration (e.g. Jean-Louis Boissier ^[5] and Monique Maza ^[6]).

“Annalena” started out as a short story written for a book project entitled “Feux de pierres” ^[7] containing a lot of narrative fiction taking place in cities around the world and inspired by photos taken “in situ”. The Annalena story is situated in Antibes (on the French Riviera) and is dedicated to the great painter Nicolas de Staël. The textual characteristics of the narrative are classic using temporal linearity, narration written from

the main character's point of view, and different moods concerning the arts, human feelings, mythology and non-fiction.

The adaptation of this short story for interactive narration focuses on 3 main questions:

- How much liberty can be given to the reader without losing the essence of narration?
- How can multimedia and interactivity be used to reinforce textual narration?
- What kind of balance can be found between the forms of “telling” and “showing”?

Story: “Annalena” is the story of a photographer, Pierre, whose destiny is disrupted by a double meeting: with Anna, a young hitch-hiker he picks up on his way to the French Riviera and with the works of painter Nicolas de Staël exhibited in the Castle-Museum in Antibes.

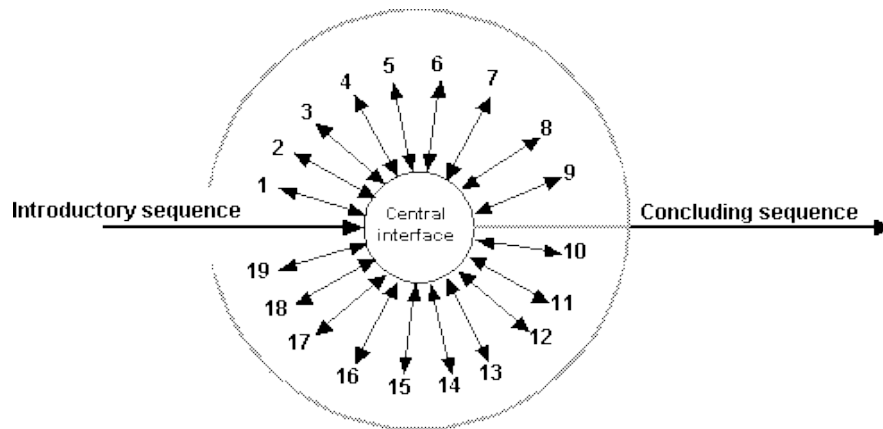
Immersed in Mediterranean light, Pierre hesitates between his own professional approach to photographic expression and exploring painting. Anna becomes the fleeting, elusive, unforeseeable and amused observer, who shows him her secret places, including the garden of love, but keeps details of her life a mystery.

Haunted by De Staël's pictorial research and tragic destiny in Antibes, Pierre tries to make Anna reveal who she is, but he makes the fatal mistake of trying to take a surprise photo of her and she disappears from his life. Disappointed by his painting, obsessed by his wish to find Anna again and distressed by De Staël's destiny, Pierre remains in Antibes, unable to do anything but wait, but for what?...

Themes: “Annalena” refers to the following themes:

- the impossible quest for the absolute (in art and love),
- a variation around the “go-between” myth,
- the tragic destiny of Nicolas de Staël and an indirect tribute to his work,
- multi-pictorial approaches: photography, painting, drawing, digital design,
- the town of Antibes, the old city, the “Fort Carré”

Scenario: the short story has been rewritten and segmented into 21 sections. The textual narration has been enriched by special atmosphere sequences. The access to beginning and concluding sequences are imposed to the reader, but the other 19 sequences can be accessed in any order, in spite of the time dependence of the narration. The concluding sequence can only be reached if all other sequences have been accessed. This kind of structure can be illustrated by the following diagram:



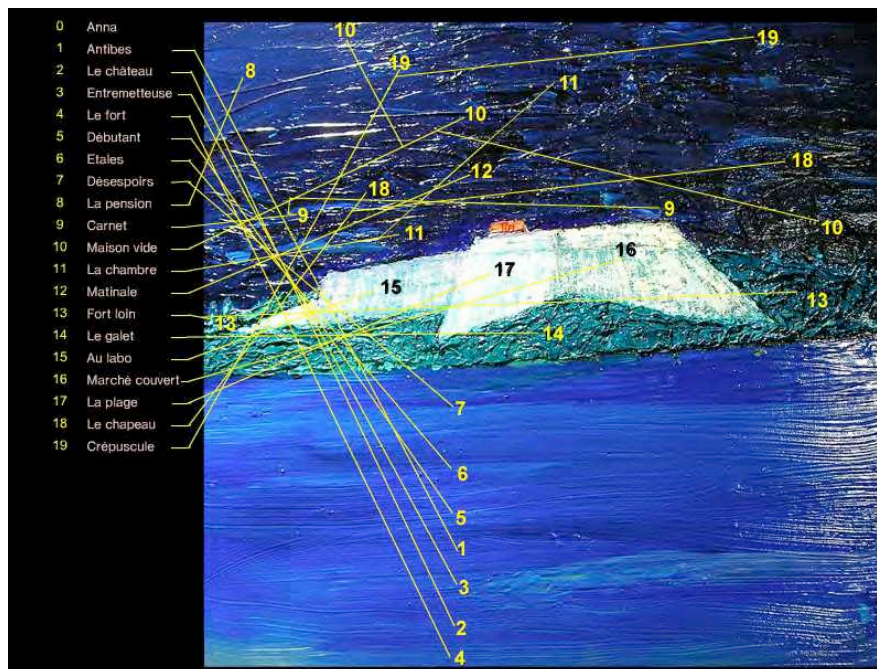
The sequences are ranked from 1 to 19, respecting the timeline, but each is structured as if the narrator was telling it on its own. Narrator and reader can be considered like two friends meeting from time to time. On each occasion, the narrator tells some kind of anecdote that should begin by “By the way, did I tell you about Annalena?” without trying to remember what had already been related. There are also certain special sequences that are not narrative, but are used to create atmosphere. (see further: “special styles”).

Presentation of sequences: the question was whether to give the reader an ordered, random or intuitive access to the sequences. Each is possible, but considering the variety of readers and respecting the purpose of the narrative, an intermediate selection was made using spatial repartition and natural inclination. This allows one reader to access the story through sequences corresponding to the beginning parts (without any previous knowledge), while another can begin by choosing sequences in any order. Both can then try to change their strategy if they want, but they will have to read 3 or 4 sequences before understanding the global spatial organisation. This can be understood thanks to the visual reminder of “already read” sequences, at the top left of the screen (see illustration below). And, it is worth repeating that this is not important to understand the whole story! First reading tests with inexperienced readers showed that they were not really perturbed by this kind of organisation.



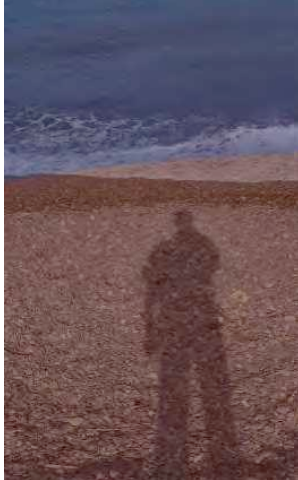
*Central interface with 3 already read sequences.
The painting begins to appear on the photo.*

Main interface: the central interface is an interactive photograph of the “Fort Carré” in Antibes. Each click on it reveals part of a painting of the same monument and gives access to a sequence. When a sequence has been viewed, its title is written on the left black part of the screen, respecting the predefined order given by the original story.



*Spatial repartition of sequences on achieved reading : the painting is complete.
Blinking red roof is the interactive zone for access to the concluding sequence*

Character approach: there are three main characters in the original text of “Annalena”, and each one has been especially customised.

The main character, Pierre, is the narrator. His presence is only textual and interactive. No audio voice has been associated with his words. Only his hand appears sometimes on the screen (this can also be considered as the reader's own hand), or his shadow. The reader is then able to keep a subjective identification process exactly as if he was reading the text.	
Anna, the female character, is physically present on the screen in a lot of sequences, but her face is never seen. All her words are spoken by an audio voice.	
The third character, Nicolas de Staël, is only suggested. The difficulty concerning this character, was to speak about him and his work without showing any pictures even though the story itself was elaborated around this idea. A way to get around this problem was to use sketches of some of Pierre's paintings from his notebook. This offers a good balance between the three characters, letting Pierre approach Nicolas through his work without degrading it, while also allowing Anna to play her role of “go-between”.	

Visual forms: many visual forms (line drawing, watercolor, oil painting, acrylic, vectorial drawing, photography, video, vectorial animation, frame by frame animation, inlayed animation and rotoscoping) have been used to illustrate Pierre's inner turmoil regarding photography and painting, and also to give a wider field of visual expression. Multimedia was used to serve these visual forms rather than impose a digital style.

Ways of narration: the most frequent means used for developing the narration consists in using screens with text, dialogues and pictures in an interactive way. Some punctuation has been obtained by mouse clicks, necessary when a relevant amount of text has to be read and synchronised with Anna's audio spoken dialogue. Generally, sequences are completed with animated images and/or sound sequences activated or controlled by interaction.

Special styles: three other specific styles are used in some sequences:

Poetic in two sequences. In the first ("Fort"), interactivity is used following the Oulipo way: an active mix of two poems depending on the position of the cursor. One of these poems is about photography and the other painting. The active mix between these two texts symbolises Pierre's wanderings. In the second ("Chambre") poetic sentences are developed in a visual way that refers to Guillaume Apollinaire's "calligrammes", and are dependent on mouse clicks.	
Dreamlike, in two other sequences ("Fort loin" and "Etales"). These sequences are purely non-interactive and can be considered as digressions, giving another interpretation of events in other sequences, like a dream. This is a way to give the narration some space in time and action and is also a kind of gap between reality and allegory.	
Purely visual, in two sequences too. One of these ("Antibes") is devoted to a photographic exploration of places in Antibes seen through Pierre's viewfinder, and the second, ("Carnet") is a spiral notebook containing sketches drawn by Pierre. Just as in the Poetic sequence "Fort", these two sequences are the visual extremes of Pierre's wanderings between photography and painting.	

The aim of these styles is to open the narrative to new dimensions, and give the reader different sensations.

Interactivity: In “Annalena” a mouse click is not just a common way to control the sequences and screens. Other ways of using interactivity have been explored aiming to increase the power of narration without transforming “Annalena” into a video game or just another “interactive geek”.

Touch transposition - e.g. in the sequence “La chambre”, the reader moves Pierre's hand along Anna's body.	
Contribution to narration – e.g. in the sequence “Au labo”, the interactive developing of a photograph reveals key information about Anna.	
Other forms of interactivity have also been used to serve the narration like drag-and-drop, point of view control, mouse over, attraction, repulsion, unmasking, simulation..., (control of lateral camera movement - see opposite).	

Some extreme cases have also been used:

- no interaction at all (in dreamlike sequences),
- asynchronous association between text and picture,
- textual and pictorial interactive transformation.

Again, the aim is not to lose the reader, but to make him work differently.

Future: A lot of questions are still waiting for answers, concerning how an audience would perceive such a creation:

- Is the use of multimedia and interactivity significant in such a piece of narrative fiction?
- Is the new relationship created between reader and story a natural one, or is it at least intuitive?
- How does the order of reading sequences change the reader's perception of the work?
- Is this kind of work restricted to a specific public only?

These questions are in accordance with a more fundamental one expressed by Marie-Laure Ryan [⁸], specialist in narratology: "What has the computer done for the word ?", and widerly for "Verbal art", i.e. Literature.

Another question concerns distribution, and the corresponding commercial product: Designed to be used "offline", what sort of market would be interested in "Annalena"?

A new "increased narrative" is now in production mixing text, sound, images and interactivity, but which also has new issues:

- managing several periods from 1913 to the present,
- a new central interface concept,
- Conciliating texts to be read and autonomous animated sequences on the same screen
- Deeper overlaps between the written text and spoken sentences,
- And more that have not revealed themselves yet!

I would like to thank the people who contributed to making "Annalena": Anik Coggins (Anna's voice, music, songs), Brigitte Bardou (Anna's silhouettes), and Alain Carré (male voice at the end).

[¹] short stories collection "Un et autres mécomptes" (Ed. du Choucas – 1997) – Animated movies "Temps vertical" (2001), "Jour de soleil à Pékin" (2002), "Boréale" (2003), "P.H.T." and "Pas d'Icare" (2004), "Octobre" and "Agenda 7" (2005), "Fort loin" (2006) – Multimedia creations "Poésie en boîte" (1998), "Ménologe parnassien" (2000), "Chaos 2.2" (2005) based on works by Solweig von Kleist. Some of these works can be seen on the web site www.lisiere.com

[²] "An exhibition within an exhibition: how do the public go from reality to virtual?" - Ghislaine Chabert, Daniel Bouillot - IAEA 2006

[³] Consider French Poet Raymond Queneau and his "Cent mille milliards de poèmes" who is the most spectacular example with his ten pages cut into 14 horizontal strips. See also a novel: "La vie mode d'emploi" by Georges Pérec (Hachette 1978 – Prix Médicis). The 99 chapters of this book are organised and can be read in various orders, just as the knight polygraphy in a chess game.

[⁴] Julio Cortazar proposed ways of reading "Marelle" in 155 chapters (Gallimard – 1966).

[⁵] Jean-Louis Boissier (Ciren – Univ. Paris VIII) created "Moments" based on texts from French philosopher and writer Jean-Jacques Rousseau (Ed. Gallimard – 2000)

[⁶] Monique Maza (Univ. Jean Monnet – Saint-Etienne) made a series of "Usimages" associating texts, pictures and interactivity about the French town of Lyon and its history.

[⁷] Some extracts of "Feux de pierres" can be seen on the web site www.lisiere.com/feux

[⁸] Marie-Laure Ryan is an independent scholar, author of "Narrative as Virtual Reality" (John Hopkins University Press - 2001) and editor of "Narrative across Media" (University of Nebraska Press – 2004)

Digital material supplied for CAC.2 edition: “Slacknesses”

This is one of the non-interactive dreamlike sequences of “Annalena” adapted to screening. It is 1’ 34” long and have been realized with Flash.

Voice and music: Anik Coggins. Graphics, sounds, animations and direction: Daniel Bouillot. Official selection in Annecy International Animated Film Festival (2006).

Collaborative Design – Source of Inspiration for Designers

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Abstract

Design is a multi-criteria, multi-disciplinary, multi-person activity which integrates and gives effect to decisions achieved over the spectrum of professional interests in design. Collaborative design becomes an important paradigm for the next generation of intelligent computer aided design systems.

The purpose of this paper is to present new ways for cooperative design interaction across several process: process of collaboration among designers, designers and computer aided design systems, designers and computer aided design systems and agent systems, and agent systems themselves.

Keywords: CAD, collaboration, emergence, computer animation

1 Introduction

This paper is motivated by two research areas of equally great importance: collaboration and emergence in design. Computer tools to support design have been developed for a single designer working by himself/herself. However, design is not acted upon by one person, it is a multi-criteria, multi-disciplinary, multi-person activity which integrates and gives effect to decisions achieved over the spectrum of professional interests in design.

This involves a new paradigm in which designers need to collaborate with each other using a computational medium, and the general approach has been to break design tasks into units which represent individual tasks and are intrinsically collaborative. Research in artificial intelligence and especially intelligent agents may assist in collaborative design. Agents may contain knowledge about the players, tasks, CAD applications. Technological advances in communication networks, have opened up

One important aspect of this new paradigm when using a graphical object as a unit of communication is emergence. A graphical object displays emergence when its parts or features are combined. Additional unexpected features result, making it possible to detect new shapes and relations in the drawing that were not intentionally created.

2 Design, Collaboration, Communication, and Emergence

2.1 Collaboration

Collaboration occurs when two or more players may have common, overlapping or individual goals. The period of working together may involve the development of a design artefact (hence co-operation) or may involve discussions which advance individual goals. Collaboration does not require continuous cooperation

or continuous communication. Periods of individual work may still be of benefit to the collaborative efforts. Other aspects of collaboration include closer collaboration, that is, the physical proximity which a highly accurate predictor for collaboration can focus activity which refers to occasions when individuals plan and work closely on a shared task. Collaboration also demands that individuals share, exchange and maintain information for four reasons: tasks decomposition, gathering relevant expertise, pooling of different expertises and building shared goals. For a design based collaborative activity, several tasks bear deadlines and their allocation to group members to take them on is necessary; and also because:

- Different tasks require a specialised expertise; different design specialists are assembled to handle different aspects of the problem,
- Individual members have limited perspectives or opinions on problems.

By convening groups a larger set of ideas, wisdom, and judgement can be pooled. They are more likely to agree to a decision or a plan if they have participated in or just observed the process that led to it. Newcomers to a group work can be exposed to learn a range of perspectives by observing and/or participating in groups working on a problem.

2.2 Communication

Design is a communicative activity in which individuals are called upon to decipher one another's world. For instance, the early synthesising of concept solutions may take place in the context of "decipherisation" within a design team. Collaborative design becomes an important paradigm for the next generation of intelligent computer aided design systems. It will be conducted in many forms among several designers and will require the support of advanced communication facilities beyond the "passive" transformation of data and messages. In a collaborative design environment, a unit of communication (a visual object) among designers is the transfer of a message from one designer (a sender) to another (a receiver). The aim of such communication is to provide the receiver with some information or to have the receiver take certain actions. Reference to an act of communication is made to a drawing that conveys one meaning to the sender and, probably, a different one to the receiver.

2.3 Emergence

Design is not quantified as a 'description' of what it is, it is an exploration of what it might be. Design is a matter of the hand, the eye, the knowledge and the intentions relating to the actions of the Computer Aided Design (CAD) system. CAD systems have offered support for the hand. Nevertheless, creative design does not only depend on the Coup de Main but on the Coup d'Oeil. The Coup d'Oeil is the main motivation of this paper because designers working on the same representation see (or might see) different things. It is in this case where emergence comes into play. There is also the importance of a drawing as a creative act, and upon the recognition of 'emergent' forms that arise from the combination of other forms and are not themselves explicitly drawn. In this respect, emergence is the concept of implicit structure arising from other, explicit structure, and is a matter not simply of pattern recognition but of pattern definition by the designer during the evolution of problem requirements and solution concepts. Emergence is shown to be a key concept, fundamental to computational models of creative thinking. Emergence also concerns behaviour, and function. Behaviour is the effect of an artefact with its environment. Function is the purpose of the artefact. The functions of a design are its actions in some context which is composed of some environmental constraints and human goals. The functions of a design are determined by its behaviour, structure and existing environments and human goals. Behaviours are expressed as the expected responses of a design in the design context and are determined by the structure of the design. The structure of a design is its spatial configuration which is determined by its elements and the spatial relations among elements. Hence we can

have an emergent function for a given fixed structure. References are made, here, to the relationship between emergence and creativity. This paper recognises the importance of such relation which is still at its early days. Exploring computational theory of emergence - that is change in structure, behaviour, and function which is the essence of creative computer generated design.

3. Intuition, Insight and Intent. (3 x I)

There can be no 'creative' design without Intuition, Insight and Intent. Without the 3I's, the design will be limited to formulaic solution. Is it possible not to speak of 3xI when there is collaboration across disciplines and technologies? The behaviour of collaborates is expansive and inclusive.

3.1 Cooperative Design Interaction

This section presents new ways for cooperative design interaction across several processes - process of collaboration among designers; designers and computer aided design systems, computer aided design systems with agent systems, and agent systems themselves.

3.2 Collaboration among designer and computer system

Nowadays, computers offer new possibilities to support creativity of artists. One of them is computer animation. Artists create paintings which belong to the *static discrete design space*. They are used to look at and evaluate elements of the space. In the context of computer animation these elements can be treated as *key frames* of animation. Computer animation enables one to generate *in-between frames*, which are new paintings obtained in an automatic way. The consequence of applying animation is a new design space called *dynamic continuous design space*. The new space contains both initial paintings and transitions from one painting to the other.

Visual evaluation of changing paintings is different, as not only single key frames of animation are evaluated but also transition from one painting to the other makes the designer perceive some new features, for example, emergent shape. Thus, the animation gives us a more meaningful description of successive stages of art creativity.

3.3 Creating Art with Collaboration - Artist X Technology.

Case Study: Creating methodology and the theory of 3 x I.

Modern scanners and graphics capabilities are the new microscopes - aiding artistic, aesthetic, creative process. For this example, a small mixed media painting measuring only 12cmX 12cm scanned at 2400 dpi provides a way to expand information the eye cannot see. This experimental, technical approach is fuelled by Intuition, Intent and Insight. The interesting results are hoped for and indeed confidently expected by the Artist. The desire to express 'something' and everything' is a powerful enough driver to employ new tools. We are of and in The Modern Age. Technology is a way of life. Technology is in some part, Nature. The emergent expression is a fusion of resourcefulness and acceptance.



Fig. 1
12cm square original paintings, mixed media



Fig. 2

A fragment of the scanned work is cropped and saved as a new emergent design and reworked using graphics program....

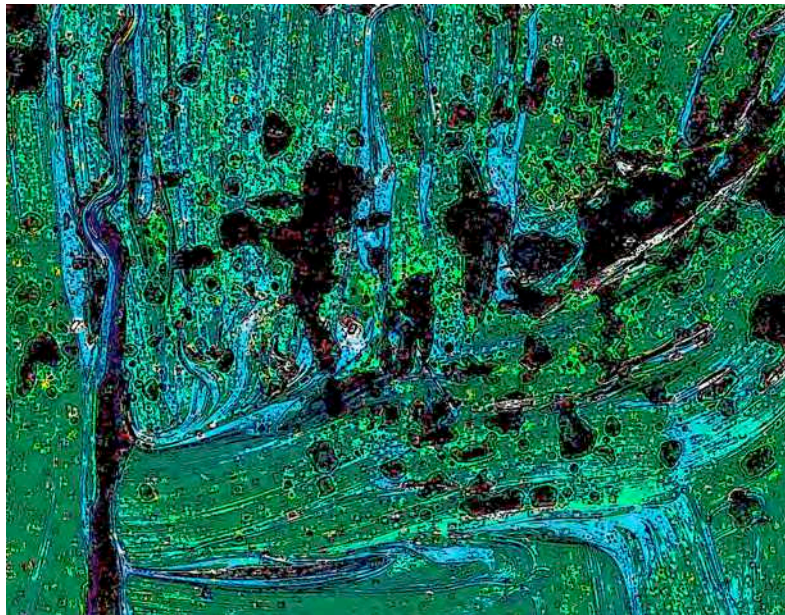


Fig. 3

The yield for new work can be almost inexhaustible as new permutations emerge.

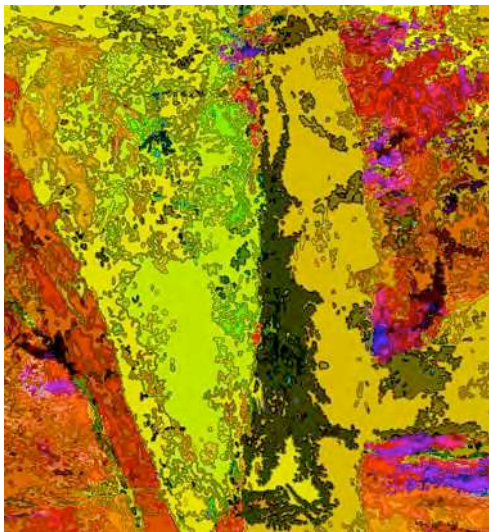


Fig. 4



Fig. 5

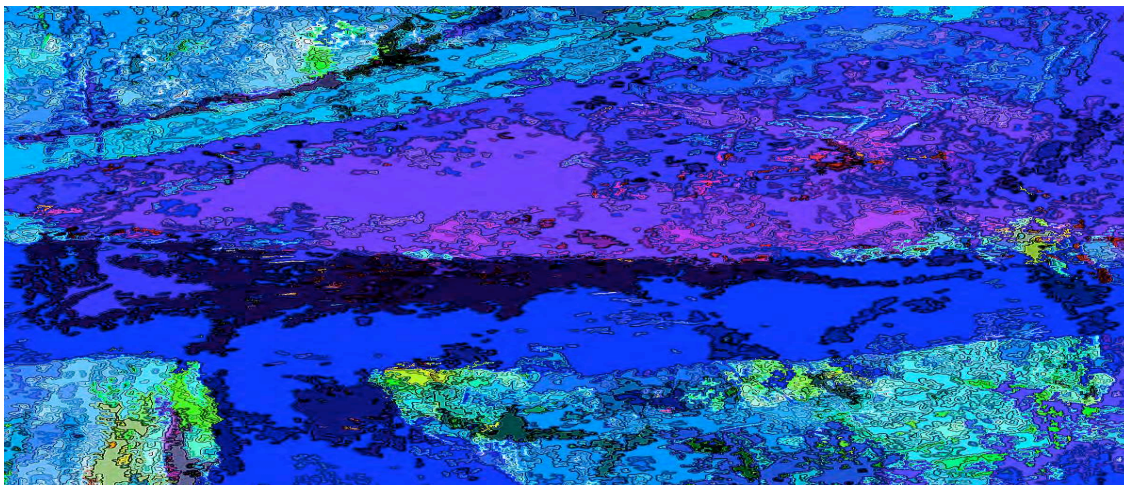


Fig. 6

What is also interesting is the new parallels and inspiration that each fusion-work generates - for example, similarities to geological survey maps have been noticed in the works highlighted. (Figs.1 -6).

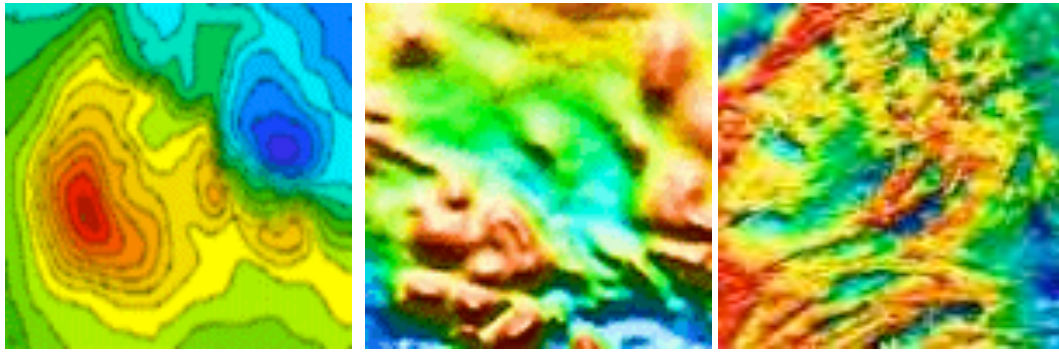


Fig. 7



Fig. 8

The concept of using new technology to explore the boundaries between art and science can be seen in the work of Dr Helen D Megaw. (1907-2002) - a British Crystallographer, who saw aesthetic promise through the lens of her microscope. Her Inspiration, Insight and Intent, led her to contact industrial companies to discuss new possibilities in commerce. These emergent Fusion-works became designs for lace and fabric and much more. Yve Christie visited The V & A Museum in London and was given access to the archives by Eva White, The Archivist. Some of these were the correspondence with Industrial companies and Dr Megaw. Christie saw and photographed Megaw's hand-drawn designs, for example, the structure of Insulin was worked into new emergent pattern. (*The Science of Expression*, Christie, Y GSA 2000).

3.4 Collaboration among Designer and Agents

Let us consider an example of creating by designer periodic patterns – rosettes with the use of the generative system named *shape grammar*. The system consists of rules defined by the designer for generating an appropriate class of patterns. Adopting a shape grammar enables to visualize on-line the ongoing design process, discover emergent shapes and introduces them into the process. Agents are responsible for pointing the most promising design steps, which are likely to lead to creative design solutions. The environment is inspected with the help of two agent assistants: *inquisitive (i-agent)* and *sage (s-agent)*.

Applying the initial design rules shown in Fig. 8 (A). the designer obtains an early rosette design with one emergent shape (hole) (Fig. 8(A,D1)). The i-agent localises emergent element on the scene and determines the shapes which constitute them. Then, on the basis of its experience and knowledge, it generates the first rule to represent emergent phenomena explicitly in the design structure (Fig.8 B1) and the second rule to replace the emergent shape (Fig.8 B2). Finally, it proposes these rules to the s-agent.

The s-agent evaluates the rules proposed by the i-agent and rules which are already

Part of the shape grammar by applying them to the current generation and verifying whether the obtained solution is valid, i.e., it checks whether the generated design is still a rosette. If the gained result passes the examination, the agent introduces some modifications to the emergent rules in such a way that they do not

break the design constraints. While changing the rules the s-agent applies the same similarity transformation to every single shape which takes part in creating the emergent shape (Fig. 8(C1,C2)). Finally, the s-agent advises the designer to select the sequence of rules which is the most interesting in its opinion as the next step of the present generation. Taking into account only a few new rules the s-agent is able to generate various creative solutions which may be regarded interesting and plausible by the designer (Fig. 8(D2-D5)).

We are now part of a New Age. How can we quantify emergent art? It is generally understood by Artists that most Intuition, Insight and Intent pre-existed in some form. When we look to the future we are informed by the past.

Archaeologists have unearthed the oldest works of art in the world – two slivers of rock on which Stone Age artists etched symbolic patterns about 77,000 years ago.

The rock art, found in a cave in South Africa, is twice as old as Stone Age cave paintings in southern France and demonstrates that humans living at this time possessed "modern" patterns of thought.

Scientists believe that the cross-hatched engravings were carefully etched on to the red ochre stones, which are a form of pigmented iron ore that had been prepared by rubbing to create a smooth surface. Stone Age societies used red ochre symbolically as a body paint, and possibly also for skin protection and for tanning hides, but this is the first known example of the ochre being used to depict art.

Christopher Henshilwood, professor of archaeology at Bergen University in Norway, led the team that made the discovery at the Blombos cave, 180 miles east of Cape Town. He believes the stones show a representation of conventions to express mutually understood concepts. "They may have been constructed with symbolic intent, the meaning of which is now unknown," Professor Henshilwood said.

"These finds demonstrate that ochre used in the middle Stone Age was not exclusively utilitarian and, arguably, the transmission and sharing of the meaning of the engravings relied on syntactical language."

"To try to explain what the representations stand for is unfortunately beyond our capacity at the moment. But do they indicate a modern brain? I think the answer is yes.

"The surface of the ochre has been very carefully prepared," the professor added.

"This is almost certainly not a doodle. They are symbolic."

The 2in-long rocks were excavated in 1999 and 2000 but their existence is only now being published in the journal Science, after two independent dating studies. "This shows the people in southern Africa were behaviorally modern 70,000 years ago,"

Professor Henshilwood added.

This article by Steve Connor, Science Editor for The Independent (Friday, 11 January 2002) is further evidence that we have been and always will be inspired by technology. Creating the Intent to self-expression informed through Insight and Intuition.



Fig. 9 Blombos cave Ochre

Bibliography

Figs 1-6. Original works -Yve Christie, 2007

Fig 7.



Fig. 8 - Ewa Grabska, Grażyna Łelusarczyk, Michał Szapak “Animation in Art Design” JS Gero (ed.), Design Computing and Cognition’, Kluwer Academic Publishers, Netherlands, 2004, pp.317-335.

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Fig. 9. www.bradshawfoundation.com

Blombos article by Steve Connor, Science Editor for The Independent (Friday, 11 January 2002) *The Science of Expression*, Christie, Y GSA 2000

Art And Science: Two Defining Parameters Of Western Art From The Renaissance To The Digital Age

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Five centuries after the change of paradigm that ushered in the Modern age, a defining moment when art and science embarked on an inseparable conjunction in the creative processes of western thought and action, similar questions arise when new technology intrudes into the area of art. Walter Benjamin has highlighted this unease in one of the most representative works on the connection between art and technology, *The Work of Art in the Age of its Technological Reproducibility*, when a new technical and technological innovation makes its “appearance” such as the photographic camera:

“Before the arrival of the cinema, much time and effort was wasted on considering the question whether photography was art or not –without having asked the question previously referred as to whether the global nature of art had not been transformed by the discovery of photography–; subsequently theorists of the cinema soon took up the question again in an equally superficial fashion.” (Benjamin, 2003, p.63).

The words of Walter Benjamin deserve consideration in two aspects. Firstly, why yet again this unease between artists and creators? It would appear as if science, mathematics, technology and all those subjects whose ultimate aim is to systematise our understanding of reality escapes us, stealing something of the free exercise of the creative imagination of artists with regard to their creative processes and the creations that arise from this.

But let us consider for a moment how these revolutionary changes have come about in the relationship between art, science, the technical and technology. If from a general perspective we compare the artistic transformations and the creative processes from the first paradigm change referred to above, right up to the modern day, we observe that this process has accelerated dramatically with the passage of the centuries. From the Later Medieval Period to the Renaissance, when the period of change commenced initially with small variations, through to the Modernists and continuing right up to the artistic works of our own day, the speed of transformations has *been increasing*, achieving a rhythm similar to the movements of the slow camera in the video graphics of Bill Viola in his latest work, *The Passions*, up to the dramatic dizziness of a video shot through a fast camera.

In this sense it is interesting to reflect on the observation of David Hockney outlined in his work *Secret Knowledge* when he constructs what he terms the *Big wall*, in which he collects together and exhibits the principal works of western art, covering approximately five hundred years. He notes:

“My *Big wall* allowed me to see in a broad perspective what historians of art have identified for so long as an ever greater tendency towards naturalism from the fifteenth to the nineteenth century.

But what became immediately evident, surrounded by so many images, was that this was not a gradual process: optical vision arrived suddenly and was at once coherent and complete” (Hockney, 2002, p.51).

Later on he compares four works separated by a period of 130 years and indicates that the jump was spectacular, “modernity” in pictures arrived without any gradual process of development unlike the gradual process that had proceeded it. The introduction of the use of optical devices has brought about important changes in today’s paintings. These optical devices are now to be understood as technological means, the fruit of new scientific understanding in optics, applied to the conquest of Nature in art and a means to satisfying our desire to grasp reality.

From then on, as I have indicated, a process that accelerated was begun that has never been repeated in such a fashion since. The appearance of the camera obscura began a path that culminated in the invention of the photographic camera that for many theorists and artists, represented a watershed for art and provoked questions that are still with us. The fact is that even today there continue to appear essays that question the nature of photography. In 2005, the researcher Laura González Flores published a book with the title *Painting or photography two different mediums?* The permanent arrival of new technology that characterises the age we live in, with so much potential for artistic creativity and the potential to engage creative processes, forces the twentieth-first century artist and audience alike to pose the question as to the artist’s function in an artistic environment that is in a state of continual flux. From now on these questions permanently appear in every forum to do with art and the theory of art. The concept of Art, artistic activity itself and the parameters that define computer and digital technology are in a constant process of conceptual readjustment with respect to the inter-relationship of art and science. Forcing the creator as much as the participating observer to redefine the means and aims of art, the means and aims of science and technology, and to redefine their new position in this new age dominated by the binary code.

The fact that the representation of reality was systematized with perspective and the use of the camera obscura, mechanised itself with photographic camera and cinematographer, as well as creating a reality starting with an electronic signal that amounts to digital art leads one to ask a question as to the category of Art derived from such means? The concept of Art finds itself in a continual process of redefinition.

Considering the redefinition of the concept of Art focuses our attention on the second question that we can extract from the quotation with which this article commenced. That is to say, to what extent can advances in science together with technical and technological innovations as is the case, for example, with photography, have the capacity to bring about changes in artistic creativity and perspective. From my point of view, this question, does not mean that the influence of technology on creative processes was the main trigger behind these changes as one might conclude from the words of Benjamin when he indicates that artists must ask themselves whether the arrival of photography had not changed “the global character of art” (idem). In other words was the technical and technological innovation of the camera the destabilising element that brought about the revolution of Modernist artists? It is generally accepted that the arrival of photography and the reproducibility of what had up to then been the task of painters, was the principal driving force behind the avant-garde movement from one point of view. But this is to attribute to it an excessive

amount of responsibility at the same time from a reductionist interpretation and from a western perspective.

Hockney recognises that technical and technological questions have a direct influence on the nature of his works, but later on states: “The sudden change that could be seen suggested to me a technical innovation rather than a new way of looking...”(idem.) On the basis of this statement we can draw some conclusions concerning the series of steps that can assist and help us understand how creative processes and transformations in outlook are brought about by technical and technological methods. Hockney speaks about his prior unease, of a previous intention to arrive at a desirable end, that is to say, of disassociation from observation and technical innovation, the fact that it occurred without the exclusive necessity to have given the other. To be precise, the creator finds the direction he is looking for. The search is determined by an infinite chain of elements that together make up the great web of what amounts to a new theory of knowledge, and is interlinked with cultural, social, political, economic questions and with the intentions and individualities of the creators themselves. All this will be what will determine the importance of the technical and of technological devices in this new way of seeing things.

The creative processes are linked to the securing of a series of goals, to the products that they intend to create and the nature itself of these creations, and it is this that determines the measure of the transforming capacity of scientific and technological innovations that these ones will produce those ones. Likewise creative processes are connected to the individualities and the interactions with the environment that has given rise to them.

So things stand and after this overview that we have undertaken, from the beginning of the process of the art-science relationship in the Renaissance up to those digital products which we call digital art, we can establish one mark of reference to evaluate the nature of these products. From one side, I propose to analyse the question from the perspective of the creative processes that are involved in art, science and technology and from the other side the aims and methods of each.

When we give consideration to the relationship between art, science and technology starting with the new dialectic created by digital art, one must come to terms with the question of defining the field of concern of the humanities and the sciences, in other words, the task is to resolve the location in one field of knowledge or the other. Pau Alsina, in his recent publication entitled *Art, science and technology*¹ poses this question in the epigraph *Towards a third culture?* In which he highlights the publications of the scientist Charles Pierce Show who confirms the separation into two distinct areas of knowledge, the humanities and the sciences. But to talk about a precise line that delimits the two areas of knowledge it is necessary to provide a concrete definition of Art and Science. These concepts arrive defined from their proper contexts and to discuss them is beyond the scope of this article. So let us address the issue from another perspective.

It has been stated on numerous occasions that the Renaissance was a defining moment when diverse areas of knowledge came together, but to understand the real significance this fusion it is essential to define its real nature. Art and science in the Renaissance never separated themselves into independent areas of knowledge. However the questions under consideration will change

¹ Pau Alsina, *Art, science and technology*, ed. UOC, Barcelona, 2007

significance if we are prepared to change focus to a point that transcends the purely cultural. The creative processes and the means of knowledge of artists and scientists, sought to seek a path above the merely cultural, commencing in the Renaissance that we may trace up to the present. As Gombrich says in his essay *Art and illusion*: “This continual search, this blessed discontent, is what constitutes that which has broadened the western mind since the Renaissance, and it permeates our art no less than our science. Because it is not only the scientist of the likes of Camper who is capable of examining the outline and verifying the truth. From Leonardo, at least all great artists have done the same, consciously or unconsciously” (Gombrich, 1997, p.148). It is from this perspective, from the creative processes of this one and that one where we can find the nexus of union as it has been termed by various authors between the two cultures. These points of union finally arrive at a position that defines what constitutes the western mind since the Renaissance. Firstly to respond to the true rational of art, and afterwards, in Modernist History, in this new mark of abstraction and subjectivity, to endeavour to create a science of aesthetic response. In this sense, the words of Kemp are particularly relevant: “One can legitimately describe the new ideas as a new form of the ‘science of art’, but it was a form that radically changed the focus of attention, from the optical science of things seen in the natural world to the interior of the human mind”²

I do not see here from this perspective, a clear and defined delimitation between the humanities and sciences, this is more akin to having the end within itself, an abstraction that has sense from a theoretical point of view. I do not think that from our starting point, the Renaissance any distinction of this sort has been handed down. What it is possible to affirm is that there have been periods of greater rapprochement or separation than others. This specialization, to a certain extent, is necessary when we have to come to terms with a vast quantity of knowledge and that there is much to absorb, for example, as was the case with Renaissance man. All this is much easier to understand, if we take the example of new technologies, in the field of which we are all too aware of our inability to grasp the latest developments and advances.

On the other hand, this “division” of knowledge and specialization is not to be viewed as incompatible with a globalisation of the same, because the reality is that what we can share are trends, means and manners of coming to terms with knowledge. It would be very useful for the researcher, for example, to make use of intuition and imagination and for the artist to take advantage of more rational and scientific means to administer part of their creative endeavour. This is a tendency that all can embrace and in such a way that the natural manner forms part of what it is to be a scientist and an artist.

Now we can make a step forward if we try to face the nature of the relation between art and science from the perspective previously outlined with regard to the aims and objectives of both. It can be argued that before we can meaningfully discuss these aims and objectives it is necessary to first define what amounts to Art and Science, but these concepts acquire their true significance in the context in which they are framed. And as it is not a question with which we are concerned with in this article and as such is outside our aims, we can perhaps risk stating that in the framework of digital culture what we understand today as a digital artist will not have, or it will be very difficult that he could possess the same knowledge as a computer scientist or programmer. Or

² Martin Kemp, *The science of art. Optics in western art from Brunelleschi to Seurat*, ed. Akal, Madrid, 2000, p. 275.

maybe he has this knowledge, if the programmer dedicates his know how to artistic activity or if we talk about artists such as Bill Viola, who bases a large part of their artistic activity in the careful investigation of technology changing and transforming it in the process and putting it to the service of their art. What will make a difference inevitably, will be the goals followed by both and these will be what determines the capacity for transformation of the technological means in those and at the same time in their creative processes, as well as the individuality of each character.

This influence and the transforming capacity of new technology on the creative processes and on the work of artists will be still more relative, if we attend to the conquest of the free imagination that the creators achieved in Modernism. The fact that the artists struggle to achieve their independence, as with the sample that abandoned the Academy inspired by the creators of Modernism, is not a desire exclusive to all of them. This unease has begun and has started to show itself curiously from the same moment in which scientific, empirical and systematising parameters started to form a part of artistic activity, in other words since the Renaissance: "Corresponding to artists of true intuition, Donatello and Masaccio, broadening mental objectives to enable new methods to become accessible. In a certain sense, this entire study has been concerned with the legacy of his intuition, in accordance with successive generations of artists have adjusted the parameters of art in such a fashion to open up their respective essays to the different currents flowing from the science of optics"³

We are now in a position to conclude that the relation between art, science and technology has been an essential process to understand, since Modernity, and the construction of the Western image and we can conclude that depending on the position from which we view the problem this relation may seem narrower or wider. But the causes and motivations that can lead us to a possible explanation of the transformations in outlook and of the definition of Art itself, do not possess a single direction nor a single unique element that generates change. The intention of the creators is linked to their contexts, to their new social and cultural space, and of course to the nature of new theories in the field of science and to the technological contributions that result therefrom, by this means we can help create a more complete map of all that contributes to the concept of Art and the creative processes in which it has its origin.

³ Martin Kemp, *The science of art, Optics in western art from Brunelleschi to Seurat*, ed. Akal, Madrid, 2000, p.355.



45 letters to Magnussons before the spring...

Annabel Castro-Meagher

UNAM, ILCE, CENTRO Diseño – Cine – Televisión

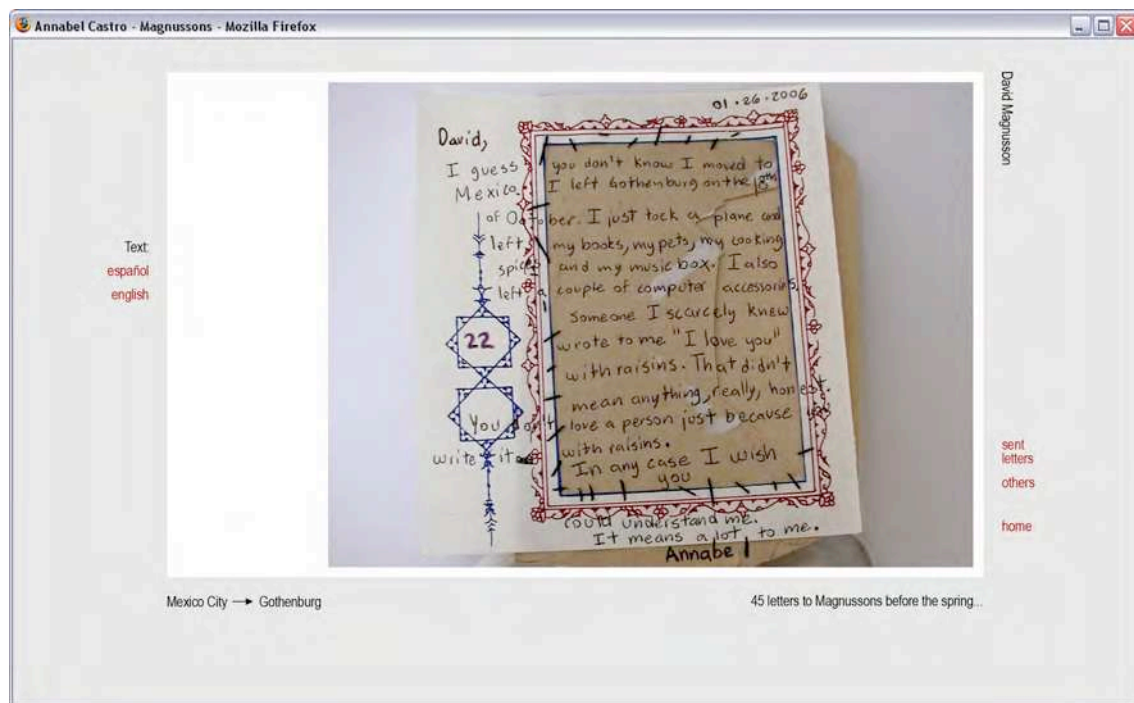
annabel.castro@gmail.com

Technique employed: digital photography, html and jpeg files

Technical material used in production: handwritten letters, envelopes and postal stamps.

Presentation support: The work can be shown on a computer or projected.

Project URL: <http://magnusson.ilce.edu.mx>



Description of artwork

With analogies to spam, I question the use of public data for intrusions into private realms by collecting names and addresses of random individuals extracted from the web, and using the data to contact them privately with intimate, hand-written letters. I then present the communication on a website – returning the physical documentation to the virtual sphere. On the website, I entered the names of each person contacted, the date a letter was mailed to them, and a summary of the letter. With a click, viewers are able to see photographs of the letters before they were posted, a map of the receiver's home, and an aerial view of the location. The recipients entered the communication 'contract' by opening the envelopes they received, and by visiting the web address mailed to them a year later. Using a physical, personal and perhaps obsolete medium, I connect the virtual stream of information to real space and people. The work questions the uses of

our virtual designations, who has power over those designations, and how such designations define us in the real world.

I started the project during the winter of 2005 – 2006 as an exploration of how the letter functions as a personal communicative tool in our contemporary mediated scenario. Spam has trained us to expect to receive emails from unknown senders all over the world, princes from Africa addressing you in a personal tone asking for money, or expressing their willingness to invest, pharmacies from everywhere wanting to better your sex life, calling you by your personal name, entering the inbox of an email address you never gave them. What happens if this type of mail from somewhere else in the world addressed to you personally arrives in physical form to your home's inbox and it's not selling you something?

Now days the hand written letter has gained more presence, it's not the result of a click, an algorithm; you have to draw the shape of each word, fold the paper, close the envelope, drop it in the post office, stamp it, and wait for days until it reaches its overseas destination. The sender is portrayed by the traces constructing the words, the chosen paper with its dirt or cleanness. The correspondent touched it all over, tiny particles of its sweat, dirt, and grease live in such a missive; particles from abroad that the receiver will touch while reading or throwing it away.

Who was so determined to let me know what's written on this note, why me, who is this person? Those are questions that spam rarely generates. "Who has that determination and is willing to invest and put all that effort into having the possibility of being listened to by me? These questions become disturbing and unclear in the case of non-selling analog-spam.

The international airmail is different from email also in the sense that it is sealed by two governments, by the post offices of two different countries. It becomes an official paper that states the correspondent tried to reach the receiver to let her know so and so. My interest was in creating these performances for a single person through the use of the letter as an action tool.

Afterwards I decided to explore the virtual capabilities of this difficulty to explain analog events through the construction of a website. What happens when this year old episode of your private life becomes public? When you find a photograph on the web of this object that belongs or belonged to you, linked to your name, to an aerial picture of your home located in your neighborhood and its map. You now have a context you didn't ask for.

I wanted the letter event to be a year old before the virtual occurrence, to give it time to belong to each person's past. On the 21st of March of 2007 I sent personal postcards with the address to the web page to the 51 Swedes. Each letter on the website becomes a public document of the private epistolary event between each Magnusson and me.

If they decided to visit the webpage they noticed that 45 of them form a group of people named Magnusson, the majority. The remaining 6 are united by not being part of the Magnussons, they have their non-belonging characteristic in common. All communities have majority and minority groups that can be created by context. I wanted to portray this tension which is important when questioning what public and private domains are.

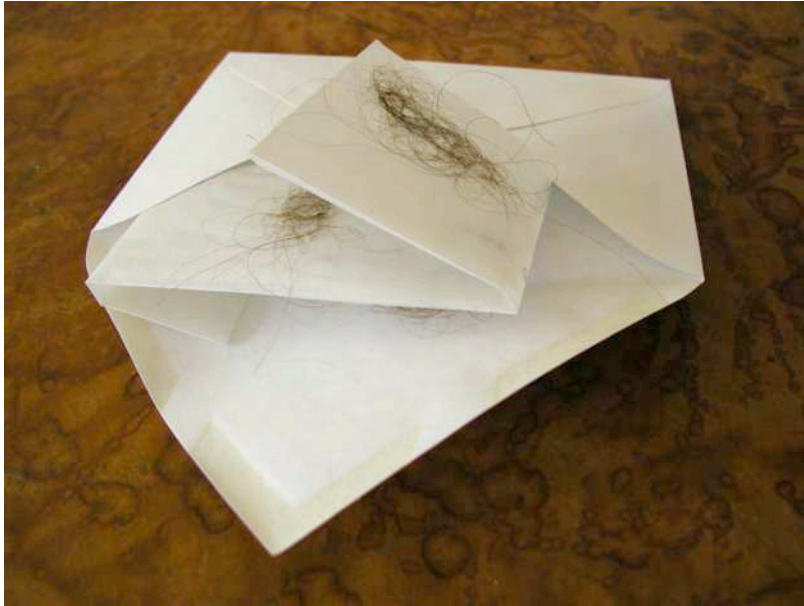
These 51 persons live within a small area, at no more than a 35 minute distance by tram, they should be able to recognize the locations where the others live, it's a small city and the addresses are in well known areas for a Gothenburg citizen.

I decided to write to people named Magnusson because it's a very common name in Sweden but not the most common one. I wanted it to be a family name that any Swede could identify with. I decided to write to people with the same last name because it implies there is a bond somewhere in the family tree, no matter how far back. In this way the receivers also enter the private domain of the others in the group, they are uncomfortably close: they could knock on each others doors if they wanted to. The same name forces you to wonder, at least for a second, if you are closely related.

51 people were involved in a performance for a single person, and when viewing the webpage they were part of a collective happening, whether they interact with the others or not. Internet visitors can also relate to the project, feel like the sender or the receiver, and question themselves of what is public and private in and out of the net.

With the existence of the webpage the virtual configuration of those I wrote to was altered and it now has a tie to mine. If you lookup their names on a search engine you'll find them linked to the net.art work. The virtual designates things from the real world: can the designation take over the designated; who decides how to designate things, you and us?





The Strength Of Classical Art In The Charm Of Digital Image

Beatriz Chemor Ávila

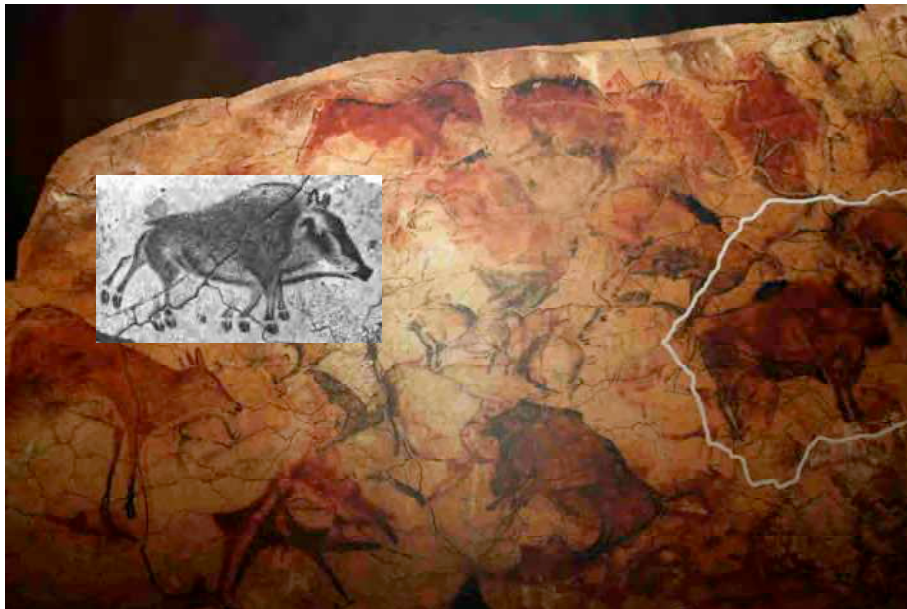
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"The girl fixed-line contours profile her lover on the wall in the light of a candle"

The gradual spread of digital image and permanence of our iconosfera have solidified significantly in recent years, thanks to the need of many styles of computer images, the use of screens and new styles of relationship between individuals and Media, a new phase towards analog and interactive between man and machine in the field of production and digital iconic.

In ancient times men was looking for the representation of their environment through the flat images without sound or movement, but in the caves of Altamira in Spain was found in a cave paintings representation of a bison with eight legs simulating the movement of body, the intention was simply stating a fact of life in the life of primitive man where the paintings were focused on the "mimetización" of him and the expression of his experience in the world.



Composition by Javier Millán Augudo.

The need in creating the images has changed its purpose and where we can establish parallel worlds that are not part of reality but who may experience as part of it. Throughout history the man reproduced in different ways their nature, ranging from those already mentioned cave paintings through classical painting and photography or cinema to get to digital art. As mentioned **Roman Gubern** in his book "From bison to virtual reality", or digital image synthesis is born with an eye without body "and thus the journey culminates historical image seeking autonomy absolute liberation of the weight and impositions of reality, in a process of "desrealización" culminating in a virtual world.

However, despite the fact that the intention of the man to represent his world virtually as an imitation of their unique reality the concept of this representation has changed and the possibility of a world or synchronous parallel is an alternative to the expression of his imagination carried a more complex reality and lived.

The digital art arises from the experience of man with the fine arts and various technological means, the combination of these two elements which gave the mid-sixties began to use the term "art à l'ordinateur" or "computer art". Although the media has changed analogue to digital finally the intent is the expression of the individual with their environment. It is important to note that new form of expression of art through the digital media continues its essence in painting, the first manifestation of the virtual image of man.

The virtual representation of man, as we have already mentioned, comes from that first exhibition in the cave paintings, however virtual representation of man's life which includes their feelings, their nature and their need for permanence are established based on the concept of the painting as an artistic manifestation. The man across the various arts such as music or dance etc., succeeded to integrate the world as understood. In this article we will talk only of the painting as an approximation and introduction of the importance of this as a substantial base of digital art considering that the first intelligence that the human being was developed intelligence visual noticeable in the first instance, after the color and finally moving.

Significantly the study of the origin of the painting, the elements used in this and the concept of the shadow in the visual arts. Being familiar with the concepts that gave substance to what is digital art and art history are in colour, line and sombran give us the opportunity to understand more fundamentally everything is represented on the screens of our digital era, ultimately mark the virtual world which is part of a fact essential for our times.

The origin of the painting, primeval basis of digital art is not very specific, yet myths about this painting ranging from the Egyptians to the Greeks everyone agrees that the origin of this was to circumscribe with contour lines of the shadow of the man on a canvas, (omnes umbra lineis circunducta hominis), in this first stage is trying to reproduce "unidimensionalmente" man with a screening of his figure on a flat surface.

The story notes that Pliny the Elder through the myth of women of Corinth masterfully explains how human beings through the need to stay forever and translate her being, her sense and history invents, as a first step, painting , stating this fact with the myth of the daughter of Butades potters Sición in Corinto, "the younger set with the contour lines of the profile of her lover on the wall in the light of a candle to not forget and keep it as if he . " In this first story would derive the origin of the plastic, as a second phase of the virtual representation of men.



STOICHITA, Victor I. *“Breve historia de la sombra”* Ed. Siruela. Madrid. 2006

Plinio the Older tells how when the lover of the couple dies, the potter decides to apply clay pottery on the picture, which gave relief, and made to toughen this fire clay pottery with other figures. It is said that this first highlight was retained in Corinth, in the temple of the nymphs¹. With this need, not only to maintain the contour of the person but to move to a more realistic picture, what emerges is the bidimensional in art.

As mentioned Victor I. Stoichita², these two stories shows that the origin of the plastic representation as a whole is referred to the primitive stage of the shadows. Legend has both the Egyptians and the Greeks have come to painting through the shade. For Plinio the origin of the creation of pictorial art is not based on direct observation of the human body without fixing the projection of its shadow, we can already say that it would speak of a virtual representation of the image of the man from the projection of the concept of a figure through the need to move closer to its actual appearance.

Although the idea of virtual reality was not conceptualized as such ancient cultures as applied intuitively. Plinio tells us that the shadow reduces the volume of the surface, or there is a transposition and reduction of nature. But the concept of two-dimensional projection already applied Egyptians and Greeks in their profiles absolute (1400) this is the product of the projection excludes the “*escorzo*”³ involved and conventions such as the appearance of the shoulder of the fund at the same level that the shoulder of the foreground, or the representation of the face in profile with an eye when you are facing.

The story recounts that the Italian writer is a convergence of artistic mythology explaining the ways in which the man had put on the canvas flat *bidimensionalidad* that makes them play with the vision of man, creating

² Ibidem

³ Escorzo: term used to refer to a body in an oblique position or perpendicular to visually men.

spaces that reveal a kind of movement in history it is narrated through the game of monochrome and levels. One example is the painting of black figures on a red background, which relies on the legend of the shadows to explain the dimensions of the man in his real world.

But the figure of the shadows, as the major element of visual storytelling, step into the background when artists replaced the stereotype of the flat projection by the modeling and at that time the concept of the shadow has grown from generating image of the medium expression, while still present through the lines that defined.

The man who lived in the old city knew the need to transcend through the images and managed using the resources mentioned, but the intention was to create such permanence in time and space, the colors used for this purpose, plans and the shadows as elements of narration. Modern man still satisfy this tradition through the creation of virtual spaces that give significance to their lives today, but although the first is the intention to stay, the needs are different. The old man wanted to tell her story so that the modern world knows, the man uses modern teaching old man, but their need is based not only on the significance but in the experience of this virtual world; fulfilling this objective through of the technological resources that use the same principle of the old man: colors, lines and shadows adding the three-dimensional world, where the figures are moving and can be moved through this virtual world at different parallel worlds.



Dofus a massively multiplayer role-playing game developed and published by Ankama Games

The camouflaging of the image and life of man through resources ranging from the projected image on the wall until the shadow of a parallel life virtually projected on the canvas of an electronic display is given from this desire of man by transcending using both classical mythology as the experience of the collective unconscious of their society. As I said **Georges Méliès** “Everything is necessary to give the appearance of



truth to things forever fictitious”.

Just as the man had to look at the reality and know deep for the form, the man in the digital age need to know the paintings, manuscripts and art in order to interpret classic, mean and create fundamentally new era in this virtual, so that its work not only with the digital format that programs such as Maya, Blender 3D or give, but having the support that only intellectual knowledge of the art of ancient and modern culture can give. Let us not lose sight of the fact that the new culture of digital imaging is that technology is not a reproduction but of production and that gives men the freedom of the imagination as one that ever gave the painter, who in his principles fixed his image on the wall.



Second Life is a 3-D virtual world entirely created by its Residents. Since opening to the public in 2003 by Linden Lab it has grown explosively and today is inhabited by millions of Residents from around the globe.

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12. <http://www.dofus.us/>

These People from Elsewhere

David Crawford

Gothenburg University, Sweden

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Credits of people who participated in the production: the audio in this video (11:50) was recorded by W.B. Smith and archived by Grant Cameron.

Technique employed: software, hardware, programing language and any other technical material used in the production;

Flash (ActionScript), Audion, Standard PC

Presentation support: technical material required for exhibition;

Space: 5 square meters

Hardware: PC or Mac computer, DLP or LCD projector, speakers

Operation:

On a PC:

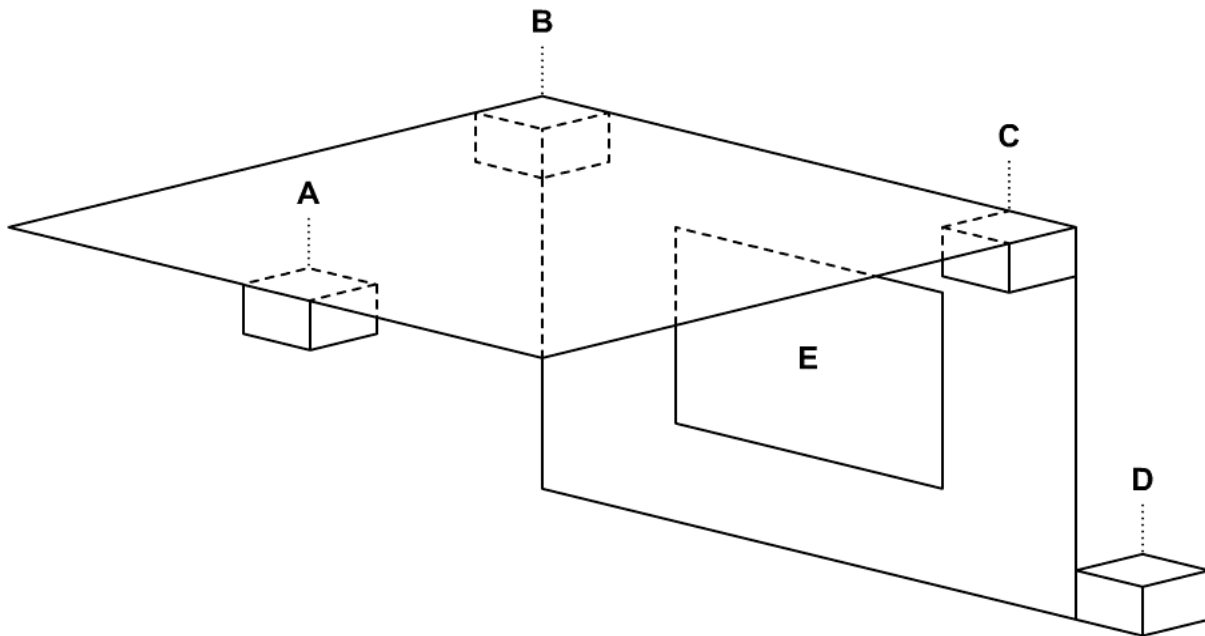
1. Copy 'people.exe' to hard drive
2. Turn off any screensavers
3. Turn off any energy saving (sleep) functions
4. Turn up computer volume
5. Double-click 'people.exe'
6. Wait 10 seconds
7. Move cursor off-screen
8. Check for signal to projector and speakers
9. Press Ctrl-Q to exit

On a Mac:

1. Copy 'people_mac' to hard drive
2. Turn off any screensavers
3. Turn off any energy saving (sleep) functions
4. Turn up computer volume
5. Double-click 'people_mac'
6. Wait 10 seconds
7. Move cursor off-screen
8. Check for signal to projector and speakers
9. Press Cmd-Q to exit

Layout diagram:

A = projector; B,C = speakers; D = computer; E = projection



Description of artwork

Wilbert Smith directed Project Magnet, the Canadian government's official investigation into flying saucers. The project ran from 1950-1954 and included the establishment of a flying saucer observatory near Ottawa that housed equipment for detecting magnetic fluctuations in the atmosphere. There on 8 August 1954, Smith's instruments displayed signals that led him to believe that he had detected a flying saucer.

"[t]he deflection in the line [drawn by an electronically operated pen] was greater and more pronounced than we have seen even when a large aircraft has passed overhead. I ran outside to see what might be in the sky. The overcast was down to a thousand feet, so that whatever it was that caused the sharp variation was concealed behind the clouds. We must now ask ourselves what it could have been." —Wilbert B. Smith

Images of the artwork:





Propositions For A Time Based Method For Description, Analysis, And Design Of Computer Art

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Introduction

One of the most noticeable characteristics of Computer Art is its capacity to process, represent, and present equally various media (texts, sounds, still and moving images) and, in some cases, to submit them to possible alterations resulting from interaction with the environment. This dimension of community by which Computer Art is generated has to be taken into account when trying to analyze its various expressions. Methods for description, analysis, and design that focus primarily on the media used in Computer Art provide only a means to seize the observable aspects of these expressions or some of their possible actualizations. When attempting to deal with the whole of these expressions, these methods result in very complex and hardly usable representations. On the other hand, methods encompassing, since the very beginning of their formalization, the dimensions common to the media are more apt to achieve such heuristic representations. Time is one of these dimensions independent to media and more apt to cope with interactivity and generativity, as important, if not fundamental, components of Computer Art. Methods based on the temporal dimensions of the various components of Computer Art (program, interface, users, authors, networks, actions, virtual and actual environments) have to be defined, experimented, evaluated and discussed. This paper will present two projects produced in the Arts and Technology Program in the University of Texas at Dallas that have necessitated the shift from a medium based approach to a time based approach.

The first project explores the possible use of concepts of temporal reasoning as they were developed in the field of Artificial Intelligence for the design of the sound track and of interactive versions of a silent movie.

The second project is an ongoing project using the same concepts to design the soundscape and musicscape of virtual environments.

Limits of a media based methods for description, analysis, and design of Computer Art

A media based method for description, analysis and design of art in general is a method that refers primarily to the medium as the reference for these tasks. The units used to analyze the work of art are strictly compatible with the capacities of inscription or of encoding of the medium and derived from these capacities. This type of method belongs to a general system of representation of art as an exchange involving three separated entities: the author, the work of art, and the public forming a temporal dipole past-present in which the author and the work of art are located in the past and the public in the present. The medium, in this type of representation, is the primary vector for a unidirectional exchange between the author and the public, between the past and the present, the emission and the reception. This system implies the achievement of the work of art together with the univocality of its reception. The openness brought to this system towards the middle of the twentieth century by the recognition of the reception as an action, or a process, susceptible to affect the perceived content of a work of art has had important though strictly local consequences on this system. Important, because the dipole past-present was augmented of the third dimension of the future and

thus transformed into a tripole. Local, because the implied future is solely that of the recipient: the medium does not allow the process of interpretation to alter it, the medium is not meant to record the modifications resulting from this process.

Future is included but as a *weak* pole subject to fugacity and facing the *hard* permanence of the medium. This imbalance of the tripole was certainly the condition for the emergence in the sixties of expressions that directly questioned or threatened the medium: Living Theater, Fluxus's happenings and performances. It has also been a strong motivation for imagining a possible plasticity of the medium that the digital medium successfully achieved. Plasticity is not versatility but includes it as the condition for the variousness of forms and appearances that this medium is able to convey. This plasticity has to be defined as a dynamic system in which the work of art is inscribed in the past as a virtual object whose actualization is defined and organized by an author, a program, an environment, the actions of a public, together or individually. Thus, the description and analysis of artistic expressions relying on the plasticity of digital medium should rely on the temporal relations involving the author, the program, the user, the interface, the virtual and actual environments, and eventually the resulting output as it is displayed by and through various media: sounds, images, texts, movements...

Not only should this type of description be applied to Computer Art but it should also be applied to former artistic expressions such as Cinema, Literature, and Music so to make possible the use of a set of consistent and coherent descriptions of new hybrid expressions.

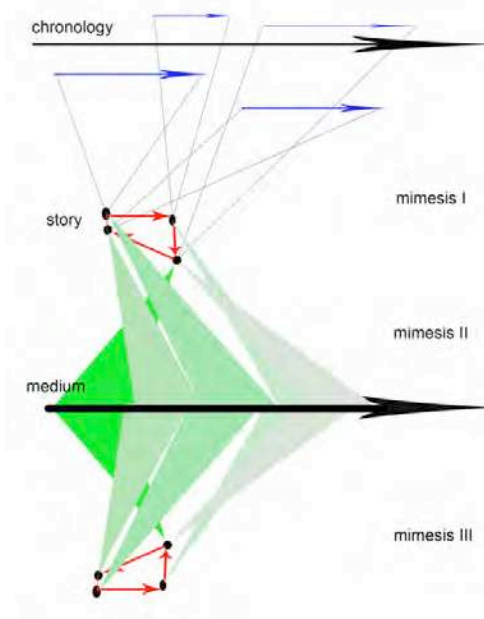
In the same way that Cinema, as a new artistic expression, has influenced literature and its analysis, or in the same way that photography has influenced painting and its analysis, Computer Art will in its turn influence its predecessors not only because these predecessors, such as Cinema, Literature, and Music use digital medium and technologies, but because new concepts, relations, questions, interactions, and aesthetic as well as sociological dispositions have emerged from the development of Computer Art. How are we able to describe all of the dimensions of films such as "The Pillow book" or "The Tulse Luper Suitcases", by Peter Greenaway, or "Time Code", by Mike Figgis, or "Babel", by Guillermo Arriaga among many others with the only resources of traditional movie analysis? Are not there new parameters to be taken in account that a purely medium based analysis does not reveal? How are we able to fully describe and analyze the many dimensions (simultaneity, synchronicity, contrapuntal use of text, images, music, and sounds...) of time involved in these movies and their representations with the only resource of a medium based analysis?

Limits of medium based analysis of Cinema:

In cinema, a medium based analysis tends to use the *shot* as a unit on which establishing its investigations. The film is first divided into large units referring to unity of action, situation, or space, each of these sequences or scenes being then subdivided into what are considered to be the minimal unit of a film: the shot, or a certain amount of still images between two splices. This point of view on a film is certainly efficient and provides one with useful information on how the narrative processes, such as the representation of the continuity of reality through the discontinuity of filming, are handled. The main order of the film seen through this system is that of the succession, as the main dimension of Time is in this case that of its actual present.

Considering a film as a narrative system, it is necessary to encompass in this consideration the several moments and operations of the narrative process. Referring to the analysis of narrative systems as defined by Paul Ricoeur in *Time and Narrative*¹, three moments are always involved and contribute equally to the achievement of a narrative: the first moment, called by Ricoeur Mimesis I, or pre-configuration, is the moment of the extraction of the events and phenomena out of the pragmatic order of the chronological succession and their organization according to the theme of the narrative into a timeless and abstract dimension. The events and phenomena are here, in this stage of the narrative process, pure events connected together into the semantic network of the story. The dimension of Time involved at this level is that of Virtuality: events and phenomena have occurred already in the system (or in the model) and at the same time have not occurred yet in the actualization of the story.

The second moment, called Mimesis II, or configuration, is the moment of the reorganization of these events and phenomena according to the order of the narrative succession. The story can start at any point of the virtual dimension of time and organize the succession of the events in any of the two directions: chronological or ante-chronological. This is also the moment when a narrative duration is assigned to these events and phenomena. This is the moment of the actualization of the story: events and phenomena become words, sentences, shots and sequences.



The third moment, called Mimesis III, or re-figuration, is the moment of the interpretation of the story by the reader or the viewer. In this moment, the actualized events and phenomena are projected again into the

¹ Paul Ricoeur, *Time and Narrative*, Volumes 1-3, trans. Kathleen Blamey and David Pellauer (Chicago and London: University of Chicago Press, 1984 -1988).

abstract dimension of Time and organized in this timeless dimension as pure events. Mimesis III closes the loop of the narrative by returning the events into a state similar to the one processed by Mimesis I. The re-configured system results of the superimposition of the system of the medium (as organized by Mimesis II) onto the actual system of the reader or of the viewer.

A medium based analysis of cinema focuses essentially on Mimesis II and all the poetic operations dealing with order and duration: rhythm, tempo, succession, causal connections, tension, The natural and obvious connection of the medium to a previously existing reality (fictional or real) tends also to mask or to elude the operations performed in Mimesis I of extraction of the events and phenomena out of their original temporal substratum. The medium-based analysis reaches the pre-configured system, or model and is subsequently unable to give access to the system or to the model before this pre-figuration.

Advantages of time-based methods for description, analysis, and design of Computer Art

A time-based analysis of Cinema would be a type of analysis in which the events and phenomena, represented through the temporal linear system of shots and sequences, would be reconnected to the former state of related events in the timeless symbolic dimension of the story prevailing in Mimesis I and then sent back to the previous state of the world, or of the system, before the operations of pre-configuration performed by Mimesis I. Such an analysis suggests questioning together the system or model in its state before Mimesis I, the order of the system as encoded by Mimesis I, and the form of its representation as organized by Mimesis II.

A time-based method for description, analysis and design of art is a method that considers equally the two extremities of the global process of digital expression, such as a computer simulation: on one extremity, temporal objects are perceived by the user; on the other extremity, a system or a model in which these temporal objects exist as phenomena is described, abstracted, and formalized by a program.

“The simulation on a computer is the existence of a real process, having effects. The process exists and is. The effects are perceived. There is creation of a relationship between the process and the spectator, through the effects and their perception, the actions and the reactions.

This peculiar relation to time makes the computer a medium of creation differing radically from its passive predecessors. The creation of autonomous systems existing in time and in relation to their environment, using arbitrarily malleable algorithms, rules and models allows us to consider our own condition of behavioral and interactive being. Time becomes matter. The spectator - or the performer - is involved in his flesh, here and now. The artwork on computer becomes partner.”²

A time-based method tends to seize the wholeness of a system prior to its divisions imposed by the possible representations through a given medium.

Jean-Pierre Balpe defining the main concepts of Computer Art stated that the matter of Computer Art is a “concept-matter”. It is possible to identify this concept-matter to memory as Henry Bergson opposes matter to memory. The matter of Computer Art is Memory. Hence, the matter of Computer Art should be defined as Time in its dimension of *pure duration*, as the only support of Simultaneity.

² Antoine Schmitt, 3rd draft for a *Manifesto of the Artwork on Computer*, November 23rd 2003, http://transitoireobs.free.fr/to/article.php3?id_article=8

Necessary temporal concepts to be defined

So to be able to develop a consistent time-based method it is necessary to establish and use a consistent vocabulary and set of concepts to define temporal objects. The domain of Artificial Intelligence has proven its ability to provide such concepts in its attempts to define together a world or a system and its possible changes. Most of the following definitions are borrowed from Allen's "Temporal Logic of Intervals"³ which has proved to be the temporal formalization that could be more easily transferred into this type of projects.

- *Objects* together with *agents* are the main components of a world or of a system. They are defined by a set of *properties*, true at one instant, along a period, or all along the existence of the object.
- Properties are supposed to be *homogenous*, which means that they refer to strictly identical qualities for the objects or the agents in each and every moment where they are true.
- Such an ensemble of objects and properties defines a *state* of the world or of the system.
- *Events* are the causes of the change of one or more properties of one or more objects.
- Events can be *triggered* (it occurs only if provoked by one agent or the world or the system itself with highly predictable consequences), *definite* (it definitely occurs no matter the actions of an agent), or spontaneous (unexpected).
- *Actions* are the result of the interaction of agents with the world or the system.
- *Agents* are the entities performing the actions; they can be autonomous, programmed, and external to the system or the world, or internal to it.
- A *process* is the combination or repetition of actions.
- A *Period* is the time associated with an event or a property that holds during this amount of time.
- A *Moment* is a period that does not contain or overlap another period.
- An *Interval* is a period that can contain or overlap another period.
- A *Time-point* is a construction that defines the beginning or ending of a period.

A limited set of relations describes the possible interactions between periods:

- *Meets*: the period *m* meets the period *n*, if there is no time between them and if *m* does not overlap *n*. Or *n* begins when *m* finishes. Meets (*m*, *n*)
- *Before*: *m* is before *n* if the end of *m* is previous to the beginning of *n*. Before (*m*, *n*)
- *Overlaps*: *m* overlaps *n*, if *m* starts before *n* and finishes before *n*. Overlaps (*m*, *n*)
- *Starts*: *m* starts *n*, if *m* and *n* start at the same time and *n* finishes sooner
- *During*: *m* is during *n*, if *m* starts after *n* and finishes before *n*. During (*m*, *n*)
- *Finishes*: *m* finishes *n*, if *m* starts after *n* and *m* and *n* finish at the same time. Finishes (*m*, *n*)
- *Equal*: *m* and *n* are equal if they start and finish at the same time.

Using these formal relations between intervals can also help differentiating two situations in time: *simultaneity* and *synchronicity*.

Two actions are simultaneous when they occur at the same time in two different intervals *m* and *n*, with During (*m*, *n*) or During (*n*, *m*) and $m \neq n$. These intervals are the amount of time in which the direct effects (changes) implied by these actions are visible. It exist a third interval, *p*, and a fourth interval, *r*, in which respectively, an action has been performed generating the splitting of time interval *p*, an event occurs motivating the merging of *m* and *n* into *r*. The action associated with *p* is analyzed as a *separation*. The

³ Allen, J. & G. Ferguson (1994). Actions and Events in Interval Temporal Logic. *Journal of Logic and Computation* 4: 531–579.

global effect provided by this construction is that of a tension. Two simultaneous actions can have strictly equal durations, or start at the same time or finish at the same time with different durations. Simultaneity occurs when two (or more) agents perform, at the same time, actions whose effects are perceivable into two (or more) distinct periods and when a third resulting effect is perceivable in a posterior period. In general, simultaneity will be the cause of a splitting of time.

Two actions are synchronous when they occur at the same time on the same interval m ; they generate two sub-periods of this interval n , and p , with: During (m, n) and During (m, p) and Starts (n, p) or Finishes (n, p) . Two synchronous actions can have convergent or divergent effects in their respective sub-periods. Synchronicity occurs when two (or more agents) perform actions whose effects are perceivable into two (or more) sub-periods of a period in which the conjunction of these convergent or divergent effects is directly perceivable.

Description of the first project

Description of the project:

This project has been developed within a graduate class of Sound design for Movies. The main goal of this project was to address the issue of the use of digital technologies applied to audiovisual heritage. Adding sound and music to a silent movie was one of the aspects of this project together with the possibility to create new versions or new ways to discover, analyze, understand or appreciate a silent movie. The chosen movie for this experiment was “Warning Shadows” by Arthur Robison. Two main reasons dictated this choice: this silent movie was designed without the use of intertitles, and the whole story takes place in an easily modelisable environment (a castle).

The first step of the project was a medium-based linear analysis of the movie. The units used for this analysis were the shots. The result of this analysis was a database containing all the shots of the movie, accessible by their description (starting point, ending point, duration, size, characters present in the shot, camera angle, light, movement, action...)

The next step was to define the possible uses for this database. One of the main uses was the reorganization of the movie according to various criteria: for example, displaying all of the close-ups of one of the characters, displaying all the actions taking place in one of the locations.

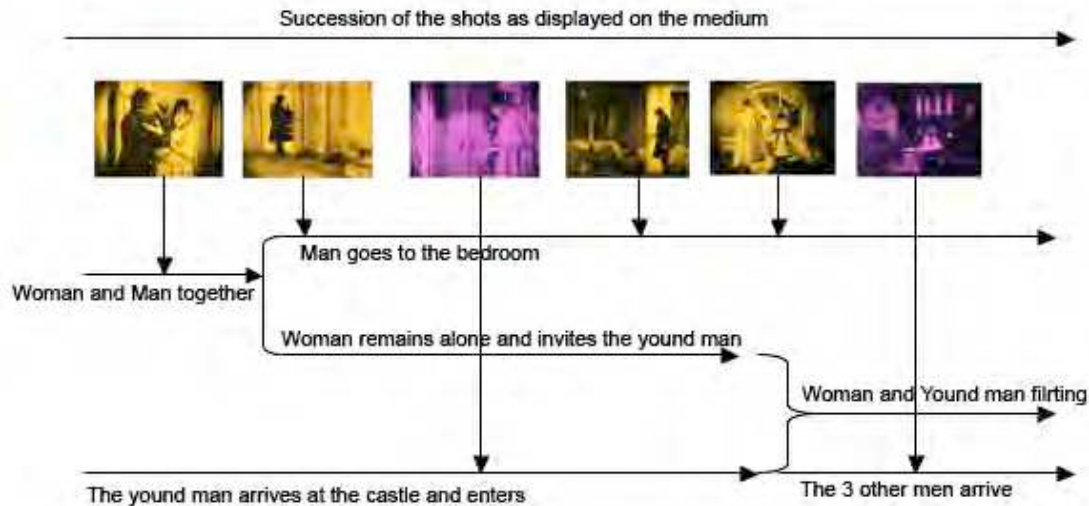
At this stage of the project, one of the interfaces proposed the following options: extraction out of the database the shots sharing one or several properties; the presentation of the result was a textual list of shots, each of them being accessible and viewable by a click on its label; the concatenation of the resulting shots and its presentation in a continuous sequence.

This media-based analysis of the movie was certainly efficient but was not sufficient to achieve the original goals for the following reasons:

-The observation of the medium does not show one of the most important temporal relations involved in the organization of the movie: simultaneity. The medium translates simultaneity as a succession and further on constrains the possible representations in a linear framework.

-The observation limited to the visible or “on-screen” part of the movie leads to defining units that are incomplete and cannot be used to analyze the temporal relations of the movie.

-Almost all the actions and processes involved in a movie last longer than their visible representations: they start before the beginning of the shots and ends after their ending. They are perceived as wholes because of the constant use by the viewer of the movie of his/her memory and capacity to anticipate. Designing sounds and music for a movie must reflect this wholeness and support memory and anticipation.



For these reasons, the third step of the project dealt essentially with the off-screen and the question of “Meanwhile”.

As shown above, all the visible actions were projected on the axis of their own continuity, encompassing their natural beginning and ending. In this projection, the actions were connected with time intervals, representing a continuity of action, a continuity of state, or a continuity of change. A special interest was, at this stage, devoted to the moments of separation, or to the moments in which the splitting of time necessary to the emergence of simultaneity occurred. This first temporal mapping of the actions revealed these moments of tension: how and when they appear and how and when they are resolved. Tension clearly appeared here as the result of a separation. Every time the main stream of Time splits into two or more streams, a tension occurs.

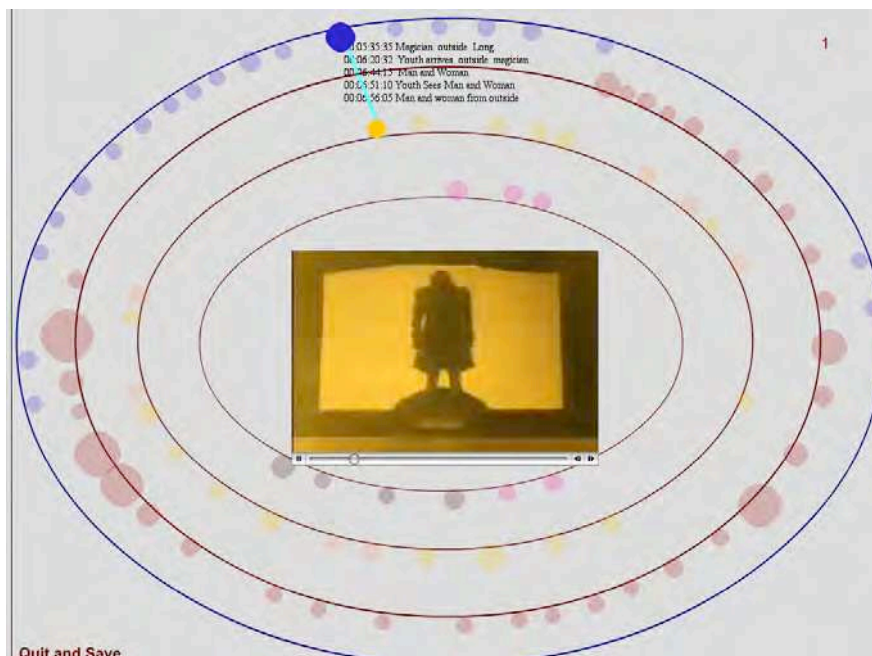
It is at this level that the concepts of temporal reasoning were introduced in the analysis of the movie and in the design of its sound track and of the possible interactive versions. The movie, instead of being defined as a succession of shots, was now defined as a system, or as a spatio-temporal system involving agents, actions, events and processes, and intervals organized and interacting accordingly to the consistency of the story. This representation of the movie opens the viewing of the movie to different possibilities resulting of the actualization by the sound of the simultaneous actions. One could decide to view the story from one fixed location from which it was possible to hear the actions taking place in the other rooms of the castle. One could decide to focus on the presence of one of the characters...

The result of this analysis is a map of the movie on which the temporal relations between the agents, objects, intervals, and actions are visible. Three systems were used to design the sound track for the movie: one relying on the agents, or the characters of the story, another one relying on the objects, or the locations in which the story unfolds, and the last one organizing the relations between the two previous ones.

The actual time span of the movie (the actual duration of the story) was evaluated to be equivalent to one night from the sunset to sunrise. This original duration compared to the duration of the movie itself was used to evaluate the global ratio of compression applied to the actual time of the story (this ratio was used then to program the evolution of the soundscape of the village, from the stillness of night to the activity of the morning), and to identify the duration of the ellipses.

The natural topology of the diegetic space of the movie helped us designing the system dealing with the rooms or spaces. The story takes place in a medieval castle build in the center of a village. The different rooms of the castle communicate at different levels with the outside. The five main locations of the movie are: the village or the court of the castle, the servants lobby located downstairs, the dining and ball room, the bedroom, and the study. For each of these locations, a program was designed that calculated its sonic state at each moment of the movie, according to the Time, the presence of certain agents in the room and their activity, and the presence of agents in adjacent rooms and their activity. The first map, shown below, represents with concentric ellipses the five locations of the movie. On each curve, the dots represent the scenes with a variable size according to its duration.

The second program dealt with the agents: the five main characters of the story (the Man, the Woman, the Young Lover, the Three invited guests, the servants) were described by the set of their possible actions at each moment of the movie.



The third program managed the synchronization of the two previous ones and was in charge of the consistency of the sonic events according to the unfolding of the story. One of the final outputs of this project was a performance during which each of the characters of the movie was “sonified” by a student according to this system.

Three types of sonic events were constantly present:

- Events triggered by the program and synchronized by the medium (when an action performed by an agent is visible on screen, the sound effect associated to this action was played by the program).
- Definitive events resulting of the change of the environment (the sun rises, the village wakes up...)
- Spontaneous events were generated by the interpretation of each student of his/her character.

The final mixing of these several sound sources was free and depended on the interpretation. The prevalence was not necessarily given to the sound effects or to the sounds synchronized with the visible sections of actions. A more contrapuntal relation was searched that let the simultaneity of the events be more perceivable.

Description of the second project

The framework of this project is the virtual environment Second Life ® and the issue of designing sounds and music for this type of environment with the general goal to foster the feeling of immersiveness. Immersiveness within a virtual environment is defined here as *the condition or state that envelops the individual (player) to the extent that he/she accepts and actively participates in the suspension of disbelief for long durations*. An immersive environment must contain or present elements that provide the user with a *sense of being* that is appropriate to the scenario, and with the ultimate goal of engaging the player or the user to the extent that he/she wants to return to, repeat, or extend the experience.

This sense of being strongly relates to a perception of Time and of duration that can only be provided by the use of sounds and music. The feeling of suspension of time generally experienced by users of virtual environments is immensely enhanced by the stillness of these environments. The most common solution widely applied to cope with this situation is the use of streaming music. A place in the virtual environment is identified with a fixed style of music.

The first motivation for designing interactive soundscape and musicscapes for virtual environments was to preserve and to foster the initial qualities of virtual environments that are defined by its global plasticity. The representation of a virtual environment we intend to foster with such a project is that of an experimental interactive space by which users possibly question their relations to the actual world and within this actual world. The concern for the use of Musak in virtual environments and the desire to design interactive soundscapes is intended to further address many related issues in the actual world, such as:

- Sound ecology and in general, the relation we have in our lives with sounds, noises, and music, and the concern for what has been identified as sound pollution.
- Music education and the necessity for imagining new ways of teaching music that not only give access to the necessary expertise of new technologies but that relates also to the invention of new musical forms of expression inspired by these technologies.
- Interpersonal communication and exchanges and the need for using digital technologies not only as a substitute to the actual presence but as its possible extension.

The music composition process is an exercise in dedoublement, and an avenue for the concretization of intertextuality through audiation. Existing approaches to music composition for digital interactive game environments assume story, and an audience visually engaged in that story. Within virtual environments such as Second Life*, pre-existing story is non-existent, but audience is present and story is emerging spontaneously through interaction. Music composers for virtual environments are creating for an audience that continually evolves but with whom the user interacts on two levels. This tiered audience consists of the user, the user-as-avatar and those with whom the avatar interacts. Our knowledge about one of the tiers is basically unknown, and will continue to be unknown because it is randomly assembled. How can we design music for the increasing dynamism of these technical systems? It is reasonable that sound and music form the basis for the avatar*s identity, initiating the avatar*s introduction into the environment and informing the resulting future interaction.

It appeared also that the main temporal relation between actions and agents in virtual environments was a relation of synchronicity that does not provide users with a functional perception of time other than in synchronic reference to his/her own actual time. All the effects of synchronized actions being perceivable in time period encompassing equally the present of the user and the present of the avatar, without any references to a possible past or future. Only the introduction of simultaneity in virtual environments can generate tensions and increase the immersiveness. Interactive soundscapes and muscscapes and the tuning appear to be the most effective ways to introduce simultaneity into the virtual environments by performing the splitting of the time of the avatar into three temporal streams or three levels of perception of the changes.

These three levels in the perception of possible changes in the soundscape or muscscapes have been identified as the following:

Local: the change is perceived by the sole user or avatar.

Regional: the change is perceived by the avatar and by avatars present at the same time within a certain distance.

Global: the change is perceived by all the avatars present in the environment at the same time with variations of the change according to the various locations of each avatar.

Associated with these three levels for the perception of the changes are three types of actions or of events: the local range of perception is affected only by the presence, location, displacement of an avatar within the environment, and the settings of the sounds decided by the user; the regional range of perception is affected by actions performed by the avatar on objects, or on other avatars present in the environment, by relatively autonomous objects, and by the tuning; the global range is affected only by changes occurring in the environment itself and resulting of definite actions such as the passing of time, or of the convergence of multiple actions.

These three levels help us also defining two categories of sounds, the first one is the set of sounds characteristic of the environment that can only be modified by local or global actions, the second one is the set of sounds that can only be modified or generated by regional actions, this includes the sounds characteristic of the presence of avatars and resulting of their movements, the sounds resulting of communication between avatars, and the sounds resulting of actions upon objects present in this location.

Within the first set of sounds, we have decided that the local actions on the sounds were limited to variations of intensity according to the distance to the various sound sources; the global actions can have any effect on the resulting sound.

Within the second set of sounds, we have identified two types of actions: discrete actions meant to decide on a type of sound to emit and of the moment of its emission, and continuous actions meant to modulate and modify continuously some of the characteristics of a sound during its emission.

The *settings* are defined as permanent changes applied to the sound at the local level.

The *tuning* is defined as a spontaneous change applied to a sound at the regional level and resulting of an interaction between avatars, avatars and objects, and, or avatars and the environment.

The above categories of actions, changes and sounds are summarized in the following table.

Perception	Entities	Actions	Sounds	Types of actions
Local	Avatar	Presence, location	Environment	Continuous and applied to the intensity
Regional	Avatars	Actions on objects or towards other avatars	Presence, movement, communication, sound effects	Discrete and continuous applied to various characteristics of the sounds
Global	All the avatars	Definite actions of the environment or massively converging actions	Environment	Discrete and continuous applied to various characteristics of the sounds

The following ten steps describe the method that is been used for the development of this project. These ten steps have been planned and designed within the common framework and objective to designing the temporal and sonic description of a virtual environment.

1: Deciding on a set of sounds related to the identity of the island. These sounds are described as definite sounds whose occurrences are entirely predictable. The resulting soundscape is relatively independent of the location of the user within the environment (a change of location slightly modulates this soundscape by readjusting the intensity of its components) but is strongly dependent on the moment of his/her exploration of the environment. This disposition is taken to ensure the consistency and permanence of time within the given environment: the inner time of the virtual environment has to have perceivable effects on its visual and sonic manifestations. The function of this first layer of sounds is to inform the user with the general ambience of the environment. This first step has been performed in reference to the work of R. Murray Schaffer, *The Soundscape*⁴ that has immensely inspired this entire project.

⁴ R. Murray Schaffer, *The Soundscape, The Tuning Of The World*, Destiny Books, October 1, 1993.

- 2: Creating non-interactive muscscapes using these sounds and related to different moments, morning, noon, afternoon, and night.
- 3: Analyzing these muscscapes in terms of relations between the sounds. What sounds can be played together, at what respective intensity, what sound can precede or follow what other sound, with what effect, what duration is necessary between a certain sound and another...The output for this step is a set of score reflecting these temporal relations between the sounds. The information provided by this set of scores will be further used to organize the tuning between avatars and between avatars and the environment (step 6).
- 4: Associating these properties to the sounds used in the compositions, and defining sound objects with autonomous behaviors deducted from this analysis and including them in a program generating the muscscapes.
- 5: Deciding on a set of sounds characteristic of the presence and of basic movements of an avatar (arriving in the environment, leaving the environment, standing, flying up and down, walking, looking around, seating...). One of the main constraints here was to create sounds that will interact with the sounds of the environment (tuning) but not interfere with them or mask them. The other constraint was to imagine sounds that could relate to the personality of an avatar and remain perceivable as the sound of any avatar. A system similar to the one used to define the visual aspect of an avatar had to be defined.
- 6: Adding to the description of the autonomous sounds of the muscscapes behaviors managing their relations with the sounds of the avatars (tuning).
- 7: Analyzing the feedback between the sound of the environment and the sound of the avatar in terms of modification of the sounds of the avatar.
- 8: Including these interactions in the design of the sound of the avatar.
- 9: Defining sonic relations and interactions between the avatar and the environment: syntonia, tuning, synchronization.
- 10: Defining sonic relations and interactions between two avatars: syntonia, tuning, synchronization.

Further developments

The second project should be achieved by the end of the Spring 08 semester. We hope that some the outputs of this project could be transposed, questioned, and possibly validated by their use in various others applications.

The Arts and Technology Program at The University of Texas at Dallas is involved in several other applications related to the use of virtual environments for simulation of various types of actual environments and can possibly provide an experimental terrain for this.

One of the ongoing projects is the design of a virtual space dedicated to the exploration of sound and music. The three dimensions of the virtual space will be used to explore dimensions of sound rarely or partially questioned such as: timber, texture, or grain.

Another one is the design of a narrative virtual space with an ability to generate different versions of a myth according to the ways users explore this space.

Conclusion

These two projects demonstrate that methods of temporal formalization can be efficiently used to describe, analyze, and design computer-based audiovisual expressions. I am aware that it is necessary to develop other projects using these methods in order to improve upon them and to possibly define a general theoretical framework for this type of projects. I am equally aware that other dimensions of the temporal organization in Computer Art, such as the dimension of the perception of temporal structures and forms, must to be taken in account.

Seeing Things: Ghosts in the Machine

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The Einstein's Brain Project is a collaborative group of artists and scientists who have been working together for the past nine years. The aim of the group is the visualization of the biological state of the body through the fabrication of environments, simulations and installations. The project has developed numerous systems and installations using analog or digital interfaces to direct the output of the human body to virtual environments that are constantly being altered through feedback from a participant's biological body. The core of the Einstein's Brain Project is a discursive space that engages with ideas about the constructed body in the world and about its digital cybernetic and post-human forms.

Recent advancements in technology, computing science and medicine have opened up new possibilities of representation for the artist, who can now use novel and surprising ways of imaging the body in ways that question our traditional notions of world, mind and body. The interdisciplinary nature of this investigation has forced artists to recognize the necessity of deep collaboration with practitioners of other disciplines, such as medicine and computer science, in order to create, develop and use the new languages and technologies of bodily representation in sophisticated ways. The Project proposes new interdisciplinary and collaborative methods, using art as one just one mode of inquiry, to create more comprehensive and total versions of the body, to explore and develop novel forms arising out of interdisciplinary collaboration.

The recent work of the Einstein's Brain Project, and its development of generative systems, reference the ideas inherent in EVP (Electronic Voice Phenomenon) to examine ways in which we construct worlds, and bodies in worlds, through pareidolia, (a psychological phenomenon involving a vague and random stimulus - often an image or sound - being perceived as significant), apophenia (the seeing of connections where there are none) and the recognition of pattern and form.

William J Mitchell speculates that the emergence of digital imaging has forced us

*"... to adopt a far more wary and more vigilant interpretive stance - much as recent philosophy and literary theory have shaken our faith in the ultimate grounding of written texts on external reference, alerted us to the endless self-referentiality of symbolic constructions, and confronted us with the inherent instabilities and indeterminacies of verbal meaning."*¹

Mitchell is cautioning us about the uncertainty of the values we can assign to the photographic, and the complexities of image production and visual truth in the digital era, or as he remarks, the idea of *"...photographic documents as truthful reports about things in the real world."*

¹ Mitchell William J. *The Reconfigured Eye: Visual Truth in the Post-Photographic Era* MIT Press, Cambridge, 1994)

"...as we enter the post-photographic era, we must face once again the ineradicable fragility of our ontological distinctions between the imaginary and the real, and the tragic elusiveness of the Cartesian dream."

...the photographic falsifier holds up not a mirror to the world but a looking glass through which the observing subject is slyly invited to step, like Alice, into a place where things are different--where facts seem indistinguishable from falsehoods and fictions and where immanent paradox continually threatens to undermine established certainties. To grasp precisely how this can be so, we must consider not only how photographs and pseudo-photographs are made, but also how they are used--how their potential uses are established, how they are appropriated and exchanged, how they are combined with words and other pictures and made to play roles in narratives, and how they may have the effect of creating beliefs and desires.²

Jonathan Crary suggests this is as new model of vision:

"The rapid development in little more than a decade of a vast array of computer graphics techniques is part of a sweeping reconfiguration of relations between an observing subject and modes of representation that effectively nullifies most of the culturally established meanings of the terms observer and representation. The formalization and diffusion of computer-generated imagery heralds the ubiquitous implantation of fabricated visual 'spaces' radically different from the mimetic capacities of film, photography, and television."³

Virilio thinks of these as the products of vision machines and what he calls sightless vision, and considers digital forms of representation leading to the division of representation and perception:

"Now that they are preparing the way for the automation of perception, for the innovation of artificial vision, delegating the analysis of objective reality to a machine, it might be appropriate to have another look at the nature of the virtual image. This is the formation of optical imagery with no apparent base, no permanency beyond that of mental or instrumental visual memory. Today it is impossible to talk about the development of the audiovisual without also talking about the development of virtual imagery and its influence on human behaviour, or without pointing to the new industrialization of vision, to the growth of a veritable market in synthetic perception and all the ethical questions this entails. This should be considered not only in relation to control of surveillance, and the attendant persecution mania, but also primarily in relation to the philosophical question of the splitting of viewpoint, the sharing of perception of the environment between the animate (the living subject) and the inanimate (the object, the seeing machine)."⁴

The recent work of the Einstein's Brain Project uses these divisions between subject and object, between animate and inanimate, the notion of fabricated space, and the conflation of fact and fiction, to raise questions about what it is to recognize a pattern and how and what meaning can accrue.

In the Sound of Silence (2007) two projectors project images onto the walls of a room. Audio fills the room. One projection shows video static overlaid with text, the other shows black and white images of what appear to be blurry and indistinct images of human faces. Ambient noise fills the space. Just at the threshold of

² Ibid

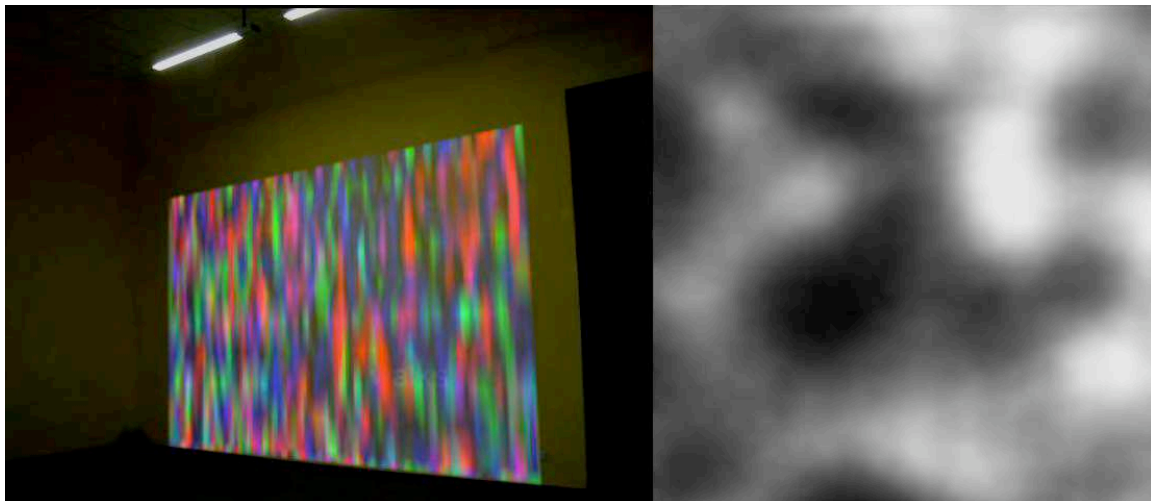
³ Crary, J. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*, MIT Press, Cambridge, 1990

⁴ Virilio, Paul, *The Vision Machine*, Indiana University Press, Bloomington, 1994

recognition can be heard what appear to be human speech in different languages.

A CCD camera is turned on, but enclosed in a light tight box. It records no image and receives no light. Its input is adjusted with maximum gain and brightness to reveal the video noise inherent in the system. This noise forms the optical equivalent of audio noise and is used in a similar way to provide a medium that can be modified by external forces to produce images and sounds. The video noise is mapped to audio by sampling pixels in a QuickTime matrix and using the values to manipulate a stream of white noise. Voice recognition software parses the modulated noise and translates any sufficiently voice-like sounds into its nearest vocal equivalent, which is sent to the screen as text and rendered into audio by speech synthesizers into Italian, German, English or Spanish.

Face tracking algorithms using a cascade of Haar classifiers scan each video frame and look for any combination of pixels that form the basic characteristics of a human face. These are areas that can be loosely characterized as eyes, nose and mouth with a sufficient degree of symmetry. When the software finds such a combination of pixels and symmetry the area is zoomed to full screen, its contrast and brightness adjusted, blurred and desaturated to clarify the found images.



The Sounds of Silence, 2007

The images produced are only occasionally reminiscent of human faces. More often than not the images produced are recognized as indeterminate organic forms with a suggestion of volume and space, but fail to resolve themselves into anything recognizable. But occasionally, images are produced that are strikingly like a face, although in actuality containing only the barest possibility of being so.

This work uses the ideas found in Electronic Voice Phenomenon (EVP) to explore ideas about the construction of a world delineated by presence and absence, and pattern and randomness.

EVP is the recording of errant noises or voices that have no explainable or physical source of origin. These recordings are made when the recorder is alone, or under controlled circumstances. Most often white or pink noise is used as a medium that is acted upon by other electromagnetic forces. This electromagnetic medium produces wave forms that are, occasionally, like human speech. It has been argued that the voices are simply subjective interpretations - that we tend to hear voices in random patterns of sound, in the way we recognize

forms in random visual patterns. For others, the voices are genuinely mysterious, opening up the possibility of communication with the dead. Spirit communication through electronic recording dates back to the 1940s. Originally called *Raudive Voices*, after parapsychologist Konstantin Raudive, these kinds of recordings were renamed “electronic voice phenomena”

In this installation the computer does the hard work of analyzing a complex visual field data, but the task of meaning making is left to the observer. The algorithms find face images in the video field that barely meet the requirements of a facial arrangement. The structuring of these pixels as faces, consisting only of blobs and indeterminate grain, is left to the observer.

Seeing, representation and interpretation of external phenomena has never been a matter of objectivity. Seeing is a complex activity and the perception of visual forms, aesthetic experience and cognitive interpretation are more at home with the aleatory, the misperceived and phenomena of indeterminacy than with the notion of the world as a fixed reality. It is these that drive the Sound of Silence.

Gerald Edelman describes what he calls primary consciousness as:

*“... the state of being mentally aware of things in the world, of having mental images in the present. But it is not accompanied by any sense of [being] a person with a past and a future...In contrast, higher-order consciousness involves the recognition by a thinking subject of his or her own acts and affections, It embodies a model of the personal, and the past and future as well as the present...It is what we as humans have in addition to primary consciousness.”*⁵

Past and present predict a future predicated on subjective experience. Past experiences are related to new events, but are not necessarily rooted in cause and effect, nor are they inevitably related to the external world. They are based on what has had value or meaning in the past. One of the brain’s abilities is to predict future events⁶.

The Global Consciousness Project (GCP)⁷, originating from Princeton, uses random number generators to predict the future. The results seem to predict major global events some time in advance of their occurrence. The brain is different. It constantly predicts what is likely to happen, and in doing so predicts huge numbers of possible futures. Some are likely most are not, but none are disposed off until the need for action, and some may even remain as past images of the future. What we begin to build is a picture of the brain as a device for generating and interpreting the possible.

⁵ Edelman Gerald M. and Tononi Giulio, *A Universe of Consciousness: How Matter Becomes Imagination*, Basic Books, New York, 2000

⁶ Professor Dick Bierman, at the University of Amsterdam suggests that in order to accommodate psi phenomena we might have to propose new types of realities, intermediate between the subjective but hardly deniable reality of consciousness and objective physical reality. His work on pre-sentiment, the apparent anomalous activation of bodily arousal preceding emotional events, suggests the body’s ability to sense the future.

⁷ <http://noosphere.princeton.edu/fristwall.page.html> “A global network of electronic devices produces continuous random data sequences. Subtle patterns in the data are linked with events that cause shared thoughts and emotions in millions of people. The results challenge common ideas about the world, but independent analyses confirm the unexpected patterns, and also indicate that they cannot be attributed to ordinary physical forces or electromagnetic fields.”

*"A phenomenon of pure representation, such relativism is always at work in the appearance of events, of things as they happen, precisely because we always have to make a subjective leap in order to recognize the shapes, objects and scenes we are witness to."*⁸

The brain's natural tendency is to see pattern in randomness, in an attempt to predict the future. If a pattern can be detected early enough its next iteration can be forecast. The human brain is constantly seeking patterns in its environment. The body/mind is built to recognize meaning and significance. Our ability for making sense comes from patterns of successful and failed perception and action, and it is this prior knowledge that forms the basis of our predicting capacity, our imagination. The body/mind is driven to make meaning, and in a world where we seek meaning, we are surrounded by signs and omens.

Psychologist George Wolford has examined the tendency of people to find patterns in random sequences, even when they are told that the sequences are random.

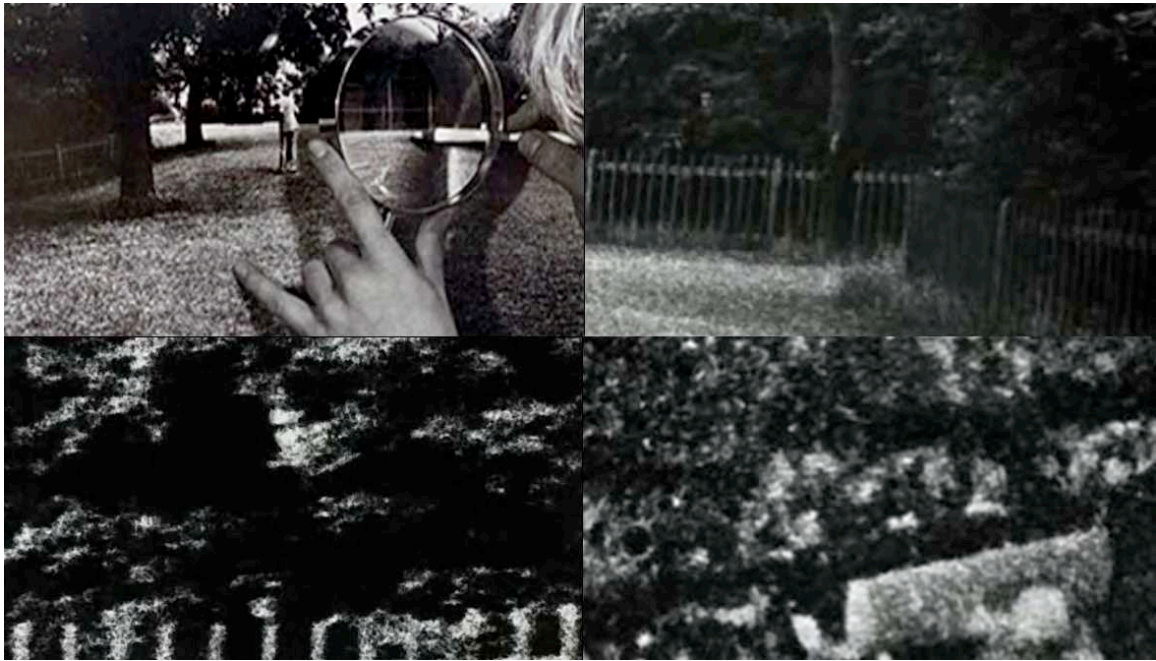
*"There appears to be a module in the left hemisphere of the brain that drives humans to search for patterns and to see causal relationships, even when none exist. ...The interpreter drives us to believe that 'I can figure this out.'"*⁹

Sounds of Silence is a generative, closed system. Random noise from a CCD camera is analyzed for patterns. An algorithm looks for patterns that match the basic geometry and physiognomy of the human face. What it actually finds are pixels on a screen forming blobs and patches of colour that have no actual relation to a real world face. They have no indexical relation to an object. They are not images of people, but another kind of image loaded with meaning, which arises accidentally, but irresistibly, from the hybrid interaction between machine and body. To all intents and purposes when these patches of pixels look like faces, they are images of faces. That such obscure images resolve themselves into faces without conscious effort, and that remain even when attending closely to them, suggests that it is paradoxically their lack of objective meaning that generates their form. It is the very ambiguity and indeterminacy of the images that allows the brain to reconfigure them as indexical.

In Antonioni's film *Blowup* (1966), the central character, a fashion photographer takes some photographs of a lover's rendezvous. The negatives reveal what seems to be evidence of a murder. A succession of increasingly big enlargements reveals what appears to be a body and a gun.

⁸ Virilio, Paul, *The Vision Machine*, Indiana University Press, Bloomington, 1994

⁹ As quoted in Money Magazine, Zweig, Jason, *The Trouble With Humans Why rats and pigeons might make better investors than people do*. November 2000. See also Wolford, G.L., Miller, M. B. & Gazzaniga, M. *The left hemisphere's role in hypothesis formation. Journal of Neuroscience*, Volume 20, 2000,

Antonioni's Blowup 1966

The photographer

*"... sees something (or maybe not) while photographing in a London park. The swinging world recedes as Thomas becomes morbidly obsessed by the possibility he has in fact photographed a murder. Is that a body under the bushes? If not, what, then? The title's meaning becomes clear as Thomas repeatedly enlarges, studies, and reworks his negatives to locate the proof for something, any evidence of a possible occurrence that seems, as his obsession grows, to become increasingly elusive. Subsequently, the film becomes, in part, a meditation on the very nature of reality and how we deform the natural with interpretations and inflexions....any observed happening (however neutral or scientific the act of observation) is altered by the mere presence of the observer. Observation is thus never a neutral or abstract process. Certainly if there is a central informing principle to the narrative matrix of Blowup it is this: that no phenomenon is pure unto itself – especially when human emotions come into play, let alone consideration like guilt, obsession and, finally, fear."*¹⁰

The black and white prints, enlarged to the point of blobs of grain are indecipherable. And yet they are compellingly open to interpretation. What exactly do the photographs index – a lover's tryst, a park, a murder, or are they merely misread? Cultural and biological compulsions form these blobs into patterns that are more and more recognizable – and in turn more and more believable. A recursive loop is formed – the more believable the images are the more they look like the subject's desires. They operate as multi-dimensional ink blots – maps of future and past memories.

¹⁰ Dawson, Jonathon, Blowup, Senses of Cinema, January 2006,
<http://www.sensesofcinema.com/contents/cteq/05/34/blowup.html>, accessed March 2006

*Antonioni brings to the surface that tantalizing semiotic opacity of which all of the visual arts partake but which so infrequently gets articulated. What is more, the film flaunts the contingencies of visual hermeneutics, it emphasizes the inter-relations of photography, corporeality, decomposition, and death, and, most obviously, it configures the instability, the limits, of photography's truth. The complex presence of the film's corpse pinpoints this perennial interpretive dilemma: "we are certain that we see it, but we cannot be certain that what we see is real."*¹¹

An ambiguous image gives rise to multiple interpretations. As we negotiate the world, we model the world by mapping our sensations to our perception of the external world. This map is dynamic and as we acquire new information, the mapping changes, suggesting that perception, like Antonioni's photographer discovered, is a matter of belief.

Asbjørn Grønstad describes Blowup as delineating:

*"...what we perhaps somewhat conservatively would want to claim is a decisive attribute of the photographic, namely, the aleatory. This concept, I would argue, is closely connected with what the French call l'insolite; that is, a curious, incongruous element within a given totality. Both the aleatory and the incongruous-with reference to the photograph-are redolent of the punctum, though not entirely in a Barthesian sense. As you will remember, the punctum is the second "theme" that Barthes finds in the photograph and is that aspect which transcends the "unconcerned desire" of the studium to "pierce" the viewer. Though the idea of the punctum has been largely over-discussed by now, it may nevertheless be worthwhile succinctly to review its basic tenets as described in Camera Lucida (1980). Barthes himself appears to put forth an affectionist point of view with regard to the punctum, which he conceptualizes in terms of for instance a wound, a prick, a mark, a sting, or a cut. The punctum, he says, is a detail "which attracts or distresses me," hence, it is a phenomenon the possibility of which hinges on its emotional impact on the viewer. But the existential mode of the punctum is aleatoric. It is, as Barthes writes, something that simply "happened to be there," something "offered by chance and for nothing," much like the blurry outline of the dead body in Thomas's photograph."*¹²

Seeing is a dynamic, evolutionary and aleatory process - the eye evolves through and by the demands being placed upon it. The eye is properly seen as an outcropping of the brain, so the application of technology to enhance vision not only changes the way the world is perceived, but also the way it can be perceived, represented and understood. It changes what can be perceived. Harnessing lenses or microscopes as visual aids can be thought of as an example of cyborg vision, the technological enhancement of the body and natural behavior.

Within the realm of historic art there exist visual images which are not characterized by high definition or mimetic exactness, but function on the apparent deficiency of exactitude. The particular skills of painters like Rembrandt and Goya, and the followers of their loosely expressive style, as well as those artist who paint impressions are the immediate transformation of material into image. This only happens at a distance. In some opposition to Antonioni's blowups, upon close examination the object of representation disappears. This

¹¹ Grønstad, Asbjørn Anatomy of a Murder: Bazin, Barthes, Blow-Up, The Film Journal, 2004, <http://www.thefilmjournal.com/issue9/blow-up.html> accessed January 2008

¹² Ibid

gradual deconfiguration of the image was pursued extensively in the late nineteenth century and in the first decades of the twentieth century.

Like maps, paintings are highly coded. An observer needs to fill in the missing details or experience or they will lose their way. This is the case with every category of image. Seeing is an active and collaborative practice and it requires conjecture and supposition.

*“Every picture is a picture of the body. Every work of visual art is a representation of the body. To say this is to say that we see bodies even where there are none, and that the creation of a form is to some degree also the creation of a body. And if a splash of paint or a ruled grid can be a picture of a body--or the denial of a body--then there must be a desire at work, perhaps among the most primal desires of all; we prefer to have bodies in front of us, or in our hands, and if we cannot have them, we continue to see them as after-images or ghosts. This is a beautiful and complicated subject, the way our eyes continue to look out at the most diverse kinds of things and bring back echoes of bodies.”*¹³

It is this very lack of body that characterizes an image. An image has no depth, no dimension at all, without a surface on which to cling. It exemplifies the absent body. This friction between absent and present bodies and dematerialized images makes us see the body in the most abandoned and empty of spaces, seeing ghosts where there are none.

N. Katherine Hayles explains:

*“The contemporary pressure toward dematerialization, understood as an epistemic shift toward pattern/randomness and away from presence/absence, affects human and textual bodies on two levels at once, as a change in the body (the material substrate) and a change in the message (the codes of representation).”*¹⁴

This suggests a new category of subjectivity, an embodied hybrid of human and machine, that privileges pattern, and its opposite noise, over the material and moves between the material and the immaterial. A new body acknowledges the absent. This body is biologically developed to see pattern and grant it significance in its dynamic mental model of its world. This is why degraded images can be recognized, why patterns can be seen in clouds, or in the noise of a television tuned to a dead channel. And it is why indeterminate images, patterns emerging from noise, can and must be reconfigured as images of things.

“... if you cast your glance on any walls dirty with such stains or walls made up of rock formations of different types. If you have to invent some scenes, you will be able to discover them there in diverse forms, in diverse landscapes, adorned with mountains, rivers, rocks, trees, extensive plains, valleys, and hills. You can even see different battle scenes and movements made up of unusual figures, faces with strange expressions, and myriad things which you can transform into a complete and proper form constituting part of similar walls and rocks. ...look into these stains on walls, the ashes from the fire, the clouds, the mud, or other similar places. If these are well contemplated, you will find fantastic inventions that awaken the genius of the

¹³ Elkins James. *Pictures of the Body: Pain and Metamorphosis*, Chicago: University of Chicago Press, 2002

¹⁴ Hayles, N. Katherine, *Virtual Bodies and Flickering Signifiers*, October, Vol. 66, Autumn, MIT Press, Cambridge, 1993

*painter to new inventions, such as compositions of battles, animals, and men, as well as diverse composition of landscapes, and monstrous things, as devils and the like. ...*¹⁵

Signs, marks and visible pattern have never constituted the totality of visual art works. There are always aspects of images that are invisible. There are gaps, discontinuities and ruptures in every image, such as a lack of continuity of space, incompleteness of form, figural discrepancies, omission of detail. The mere perception of painted images requires a great deal of completion on behalf of the observer.

The brain has a remarkable capacity for dealing with this incompleteness and filling in the gaps. V.S. Ramachandran and Sandra Blakeslee say,

“... the human visual system has an astonishing ability to make educated guesses based on the fragmentary and evanescent images dancing in the eyeballs.

*... the filling in is not just some odd quirk of the visual system that had evolved for the sole purpose of dealing with the blind spot. Rather, it appears to be a manifestation of a very general ability to construct surfaces and bridge gaps that might be otherwise distracting in an image – the same ability, in fact, that allows you to see a rabbit behind a picket fence as a complete rabbit, not a sliced-up one”.*¹⁶

In extreme cases, this ability to function in the absence of a complete picture is remarkable. In studies of *blindsight* (the ability to respond appropriately to visual inputs while lacking the feeling of having seen them), patients who are effectively blind can carry out tasks which appear to be impossible without sight. Individuals can reach out and grasp an object, accurately describe whether a stick is vertical or horizontal, or even slide an object a narrow slot. According to Ramachandran the explanation for this phenomenon is that visual information travels along two pathways in the brain. If only one is damaged, a patient may lose the ability to see an object, but still be aware of its location and orientation. This example suggests that while there is a terminal threshold beyond which a stimulus is no longer detected, we can and do respond to stimuli of which we are not conscious.

There are also areas of the brain that process information through conjecture that work on the basis of assumption or hidden knowledge about the world. It is this last process that brings us back to the sounds and images in *Sounds of Silence*.

When this work was first shown it was installed in Rosario, province of Santa Fe, Argentina.

On March 24, 1976, the Argentine military overthrew President Isabel Peron and remained in power until 1983. Local police departments were put under military control. The military government detained, tortured, disappeared and killed anyone who was suspected of being ‘subversive’.

There were 14,000 political prisoners. Another 30,000 people were kidnapped by government agents. The Centro Popular de la Memoria (People's Memorial Center) is a former illegal detention center in Rosario. It was used by the provincial police between 1976 and 1979 to hold people with no formal charges and torture

¹⁵ Leonardo Da Vinci, *A Treatise on Painting*, Adamant Media Corporation, 2001

¹⁶ Ramachandran, V.S., and Blakeslee, Sandra, *Phantoms in the Brain: Probing the Mysteries of the Human Mind*, Quill William Morrow, 1998

them, under the pretense of fighting radical left-wing political subversion and terrorism. There is evidence of its use as a detention center since 1976 and until 1979. It was informally termed El Pozo: The Pit.

The Sound of Silence was installed in a room directly above The Pit.



The Sounds of Silence Rosario, Argentina, 2007

Naturally enough the images and sounds that observers saw in the random noise from the camera related directly to the horrors inflicted on those incarcerated in El Pozo. The random noise was interpreted in the context of the lost and invisible bodies that had been incarcerated. Such contextual imagining is not unusual – works of art are never autonomous, but always part of a contextual continuum. Another installation occurred at a mental hospital in Trieste, Italy. Here the noise was characterized differently and different sounds and images emerged from the work.

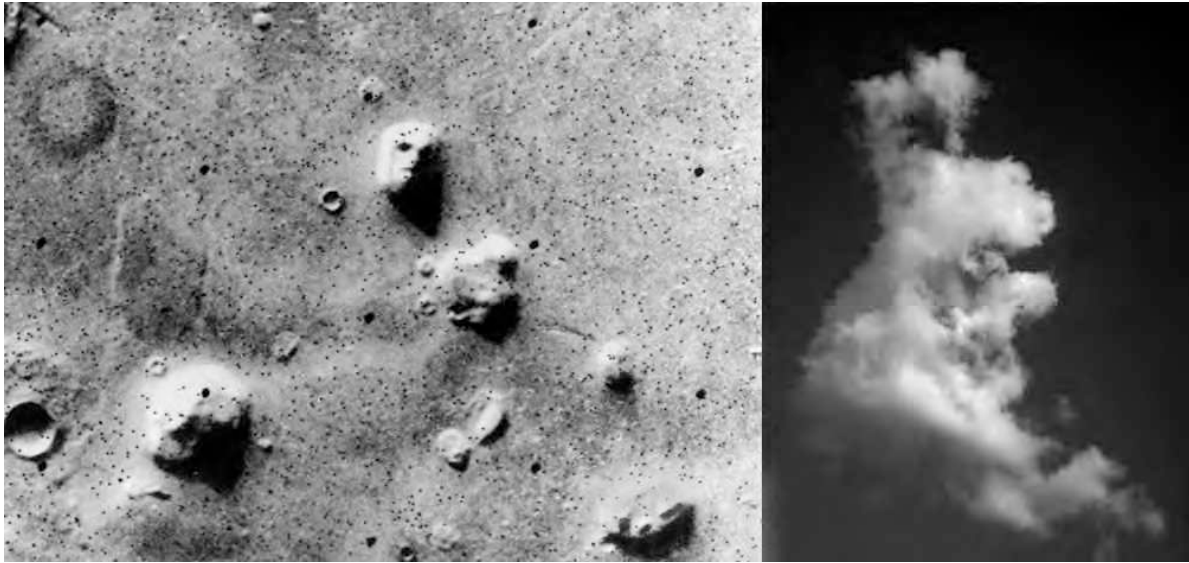
The overlaying of information on the work brings us back to the central issues of recognition and reality in Antonioni's blowup. Can we believe our eyes? The unavoidable textual and contextual redefinition of the subjective dictates not only what we look for, but also what we find. Such recursion leads us to imagine a world where we can see only what we believe, and can only see what we expect to see. This is a world of infinite thinness and limited dimension. Half-seen, half-lived.

It these beliefs and expectations that fuel the conspiracy theories and images of the celebrity dead that are the daily substance of the tabloids. The phenomenon of seeing relationships and pattern where there is none is properly described by the terms apophenia and pareidolia, and together they drive the interpretative dynamic in Sounds of Silence.

Apophenia is the tendency to see connections between seemingly unrelated objects or ideas. August Strindberg details the over-interpretation of a chance encounter that characterizes apophenia's sense that things more meaningful than they are,

*'There on the ground I found two dry twigs, broken off by the wind. They were shaped like the Greek letter for "P" and "y"... [I]t struck me that [they] must be an abbreviation of the name Popoffsky. Now I was sure it was he who was persecuting me, and that the Powers wanted to open my eyes to my danger.'*¹⁷

Pareidolia is a type of illusion or misperception involving an indeterminate or vague stimulus which is perceived as clearly being something. Well known examples have been natural rock formation on Mars that was seen as a face, or the seeing of animals in clouds.



Left: Pareidolia – The Face on Mars. Right: Pareidolia – Bunny

While apophenia and pareidolia may be the engines of Sounds of Silence the forms that emerge suggest something else. Neither the images nor the sounds in Sounds of Silence have an indexical relation to reality as does a photograph or a recording. They emerge from the random flickerings of pixels on a screen. They have no substance nor form other than the chance interactions and collisions of one another. If they are to be thought of as faces and voices then they hint at an immaterial body that exists in the interstice between machine and body that exists in patterns and information flows.

“Pattern tends to overwhelm presence, marking a new kind of immateriality which does not depend on spirituality or even consciousness, only on information.

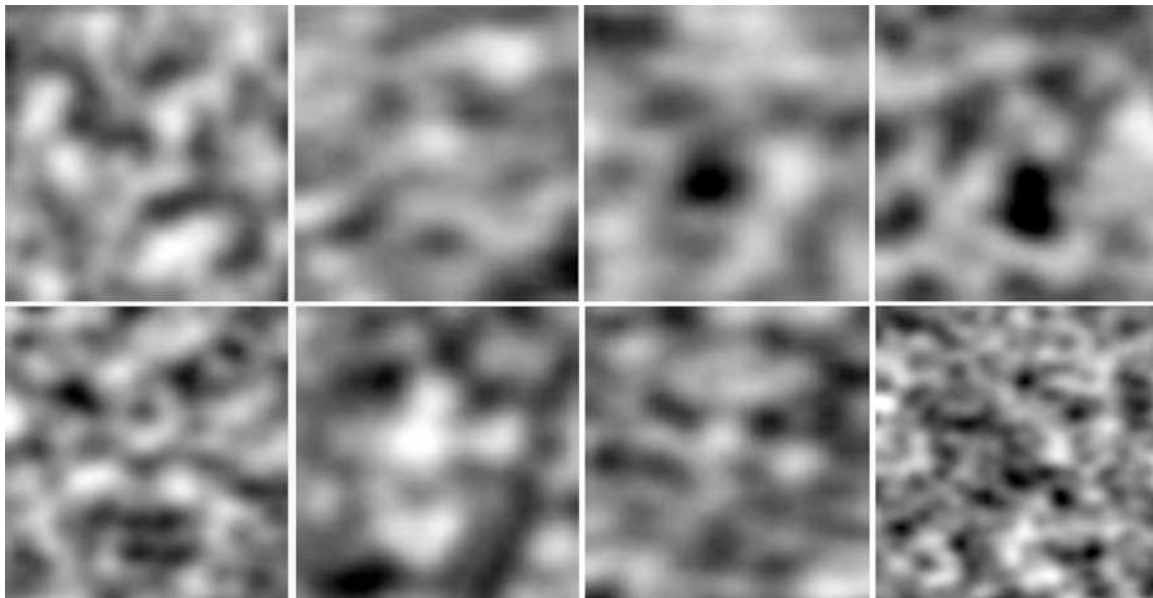
...even though information provides the basis for much of contemporary society, it is never present in itself. ...In information theoretic terms, information is conceptually distinct from the markers that embody it, for example newsprint or electromagnetic waves. It is a pattern rather than a presence, defined by the probability distribution of the coding elements comprising the message. If information is pattern, then non-information should be the absence of pattern, that is, randomness. This commonsense expectation ran into unexpected complications when certain developments within information theory implied that information

¹⁷ Strindberg, August (Author), Eklund, Torsten (Editor), Sandbach, Mary (Translator) *Inferno / From an Occult Diary*, Penguin Books, 1988

could be equated with randomness as well as with pattern. Identifying information with both pattern and randomness proved to be a powerful paradox, leading to the realization that in some instances, an infusion of noise into a system can cause it to reorganize at a higher level of complexity. Within such a system, pattern and randomness are bound together in a complex dialectic that makes them not so much opposites as complements or supplements to one another. Each helps to define the other; each contributes to the flow of information through the system.”¹⁸

Generated in the interstice between subject and object, they are data made incorporeal flesh through the dematerializing fusion of body and machine. These are true ghosts in the machine – images born out of pattern and randomness. They are true images of the absent body. Thought of this way the work moves away from ideas about apophenia and pareidolia to suggest that real information is contained within the random noise of the work, that is always on the point of becoming. Existing not out of

“...a reliance on interpretive presence for the formation of content, but rather in the immanent state of information without audience -- the metamorphosis into the absence of an unidentifiable body that nevertheless seems, for all intents and purposes, to still exist despite its unidentifiability.”¹⁹



Images from Sounds of Silence

The Project's recent interest is in systems of meaning making that rely on pattern recognition, the reconfigured body, and the problematized relationship between meaning and the meaningful. The development of meaning in the Projects work is dependent on an increasingly, yet seemingly infinite, complex recursive and recombinant loop between meaning made and meaning found. In this loop the external and internal worlds are blurrily indistinct, each acting upon the other in the construction of a new self/space forever suspended at the point of becoming. The effort to restabilize the self in this world where

¹⁸ Hayles, N. Katherine, *Virtual Bodies and Flickering Signifiers*, October, Vol. 66, Autumn, 1993

¹⁹ Hiebert, Ted. Unpublished in conversation with Alan Dunning and Paul Woodrow. Vancouver. 2003.

everything is in play, is questioned and negotiable, is unavoidably revelatory and reproblematises current and preceding models of authenticity and resistance.

Using the coincidences of science, culture, technology and art, the Project examines the fundamentally contingent nature of meaning. The work of the Project has grown out of an interest in bodies in motion, worlds in flux, and in the endlessly recombinant texts and forms of our worlds, and out of an interest in the seen and unseen, the half perceived and misperceived things at the limits of our perception and in the reanimation of the lost bodies and past events that constitute this invisible world. The world is not entirely what it appears to be and that the surface of the visible world needs only to be lightly scratched to reveal the invisible worlds above and below.



MeMyselfAndI

Blanka Earhart
Independent Artist
4blanka@gmail.com

Additional participant: Jeffrey Earhart

Technique employed: PHP and HTML

Presentation support: computer, computer screen, Internet connection

Description of Artwork

The common understanding of human romance with the cyberspace is that through the new medium we are reaching out to each other. Can we talk about actual connection though when the interface built by us to supposedly facilitate this connectivity is exaggerated, a bit doctored, missing details that one choses to hide or otherwise completely made up? The representations of a single person scattered through the world wide web are under no obligation to present congruent information. These apparitions are not a transposition of the true self open for frank exchange with another human being. Rather, they serve as shields and partial unveilings communicating first and foremost an intensity. This phenomenon parallels Baudrillard's view of media in terms of intensity circuits that instead of carrying a message, transform all input into code. In using the Internet we don't communicate but rather amplify ourselves.

MeMyselfAndI is a project conceived as a means of creating a complex yet autonomous unit of representation in the midst of intertwined sea of relationships that is the Internet. The project is concerned with its own inter workings and blurring the line between subject and object characteristics of its constituting parts. MeMyselfAndI is a social networking website where the only person allowed to join it is the artist herself. The profiles are maintained daily by the artist who is logged randomly by the computer into one of the accounts. The members are able to communicate among themselves via internal message system, write blogs and post comments. They can potentially form clicks, become best friends or online nemesis displaying a full range of social behaviors. Whenever the artist feels so inspired, she adds a new profile to the network thus multiplying and fracturing the system further. In essence, it is an online puppet theater performed by the artist for the entertainment and voyeuristic pleasure of the audience. The outside public is able to communicate with the members of the social network via email and leave comments on the website itself.

In thus conceived environment, the artist is able to amplify and multiply her reflection infinitely. The fracturing of the psyche and its enumeration present today on the web acts as a broken mirror reflecting persons through their net representations (photos, videos, writing, interactions and associations). It also propagates the reflections infinitely through sheer enumeration (number of views, links, and citations) presenting pieces of information in ever new and different contexts. By keeping the website exclusive for presentation of only herself, the artist creates a loop that doesn't allow the diffusion of her representation. Instead, it builds up, expending inwards, creating a mega person emanating through confusion of the profiles and intensity.

An important feature of MeMyselfAndI is the built in ability of the profiles to communicate with each other. Despite the content being obtained from one individual, her continuous subjectivity is split up into numerous parts that can assume the role of either a subject or an object in a conversation. This device renders the profiles into objects discontinuous from the agency acting on them – the artist. Similar disassociation of oneself from his/her image has been invoked in the myth of Narcissus. According to McLuhan, the source of the hero's desperation was not the fact that he fell in love with himself but his inability to recognize himself in the reflection, and his perception of self as a stranger.¹ Respectively, the artist has to assume a third person position in order to communicate with the rest of the members. She sets herself outside of her own subjectivity and in this gesture disowns a part of her representation. The insistence on the third person position competes with the sense of the self speaking directly to the viewer and demystifies the illusion of objective frankness.

Likewise, Baudrillard's view of Narcissus leaves no option for assertion of continuity by the original self. He conceives of “digital narcissus, who is going to slide along the trajectory of a death drive and sink in his own image.”² MeMyselfAndI similarly dissolves the once coherent self into a multiplicity of images, opinions, points of view and recollections. The scattered content is organized anew in emerging personalities of the profiles. In this sense, the website not only dismantles the source subject but provides a constructive environment for the formation of a new entities. Each profile is a partial image of the original source. While disowned by the source, a profile tries to assume its own identity. This process happens in the face of sheer repetition and similarity of the material. As it is the case with DNA code and human reproduction the different profiles inherit the patterns of the source subject and spring into life as daughter-like entities.

The whole world around us has grown faster and louder. Extreme experiences not only became increasingly accessible but they invade our privacy and impose the outside on us. The electronic technology is all-pervasive and serves as the permeable cell wall between the private and the public. The mechanically advanced machines such as cars, trains and airplanes heighten our experience of space and provide avatars for our grandiose self-perception. Confronted with that intensity we push back colonizing the circuitry with our intense and intimate representations. As a byproduct, this barrage of self-exposure lends a human element to otherwise technological landscape. Perhaps it is our main mode of operation when confronted with something foreign: fetishise it and populate it with self. MeMyselfAndI is a virtual place where the subjective self went supernova. This appropriating in its original aim gesture gave birth to semi autonomous entities: the profiles alienated from their source and struggling for their own boundaries.

Notes:

1. Marshall McLuhan, *Understanding Media: The Extensions of Man*, The MIT Press, 1994, p. 42
2. Jean Baudrillard, *Seduction*, Palgrave Macmillan, 1991, p. 166.



MEMYSELFANDI

Home Search Invite Help Login

Welcome to MeMyselfAndI! Please look around and browse through the profiles. You are welcome to leave messages on members' blogs, photo albums and main profile pages. For more information about the MeMyselfAndI project click here.

Member Login

Email:
 Password:
☐ Remember Me
 Login

Network Statistics

- Members: 7 members
- Friendships: 14 friends
- Comments: 2 comments

Newest Members

7Blanka 6Blanka 5Blanka 4Blanka 3Blanka

Most Popular Members

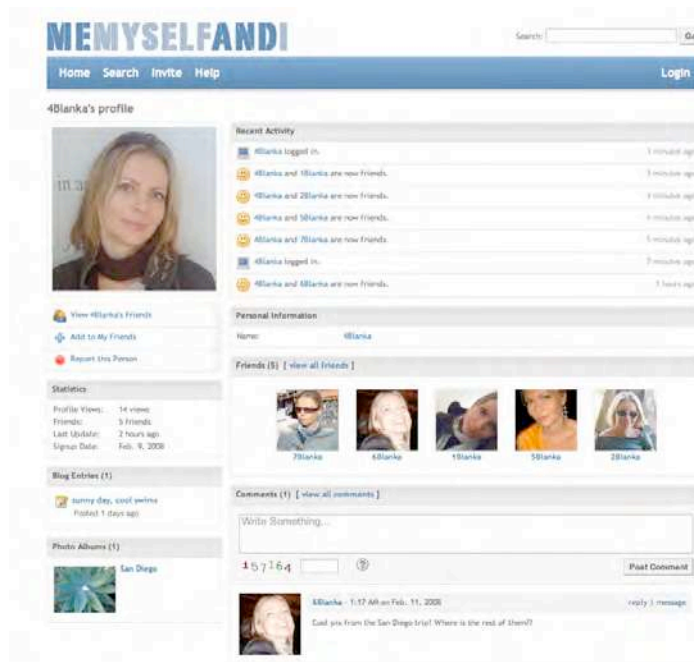
6Blanka 7Blanka 7Blanka 3Blanka 1Blanka

5 friends 3 friends 2 friends 1 friend 1 friend

Members Last Logged In

7Blanka 5Blanka 4Blanka 3Blanka 2Blanka

Home page



MEMYSELFANDI

Home Search Invite Help Login

4Blanka's profile



[View 4Blanka's Friends](#)
[Add to My Friends](#)
[Report this Person](#)

Statistics

Profile Views: 14 views
 Friends: 5 friends
 Last Update: 2 hours ago
 Signup Date: Feb. 9, 2008

Blog Entries (1)

 sunny day, cool swim
 Posted 1 days ago

Photo Albums (1)

 San Diego

Recent Activity

- 4Blanka logged in. 1 minute ago
- 4Blanka and 1Blanka are now friends. 3 minutes ago
- 4Blanka and 2Blanka are now friends. 3 minutes ago
- 4Blanka and 5Blanka are now friends. 6 minutes ago
- 4Blanka and 3Blanka are now friends. 6 minutes ago
- 4Blanka logged in. 7 minutes ago
- 4Blanka and 6Blanka are now friends. 7 hours ago

Personal Information

Name: 4Blanka

Friends (5) [view all friends]

7Blanka 6Blanka 1Blanka 5Blanka 2Blanka

Comments (1) [view all comments]

Write Something...

1 5 7 6 4

 6Blanka - 1:17 AM on Feb. 11, 2008
 Cool pic from the San Diego trip! Where is the rest of them? [reply](#) [message](#)

Profile page

Digital Video Art

Zlatan Filipović

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My video work, – its form and concept – is greatly informed by the way computer processing influences the way we perceive and understand the world. For instance, the vocabulary used in the digital domain of computer processes directly affects how we understand non-computer processes and their representation in a non-digital world. Examining how a computer restarts suggests how non-computer processes “restart” – how the manual labor of fitting together a computational device parallels the artist’s work with technology in an effort to create order. This is a very obvious example, almost allegorical of the larger parallels I wish to explore. Sometimes, I use a “video document”. Other times, I explore the aesthetics of devices that present digital information – i.e., screens.

For the past ten years, I have been producing video art forms.

The constant change in potential aesthetic quality brings new challenges and possibilities in my search to visualize the digital in our everyday life.

I search for digital processes already engulfed by to our consciousness. Hopefully, I make them re-live and be re-analyzed through visuals that come out from my artistic process. All this effort has the aim to raise consciousness of the comfortable numbness and seamless expansion of the digital domain presence in our societies.

From the early works of mine that explore aesthetics of the real-time linear video signal feedback through digital processing of the image capturing and delivery systems, I’ve moved to the visual-aesthetics of the memory processes influenced by digital information presentation. In *ReStart*, which was first presented at the Manifesta 4 European Biennale of Contemporary Art in Frankfurt, I question the notion of the relationship “artist <> computer”.

(edited with Jeremy Bendik-Keymer)

Artworks

ReStart

Technique employed: DV cameras, FCP, Apple Hardware

Presentation support: Video projector, screen (4:3), stereo sound amplifier + pair of speakers



Short review of contemporary history of art

Technique employed: software, hardware, programming language and any other

Text editor, continuous scroll in the text editor + Hi8 camera set to record performance from the computer screen

Presentation support: technical material required for exhibition;

Television screen (preferably 4:3 aspect ratio, size 29" +)



floating.point

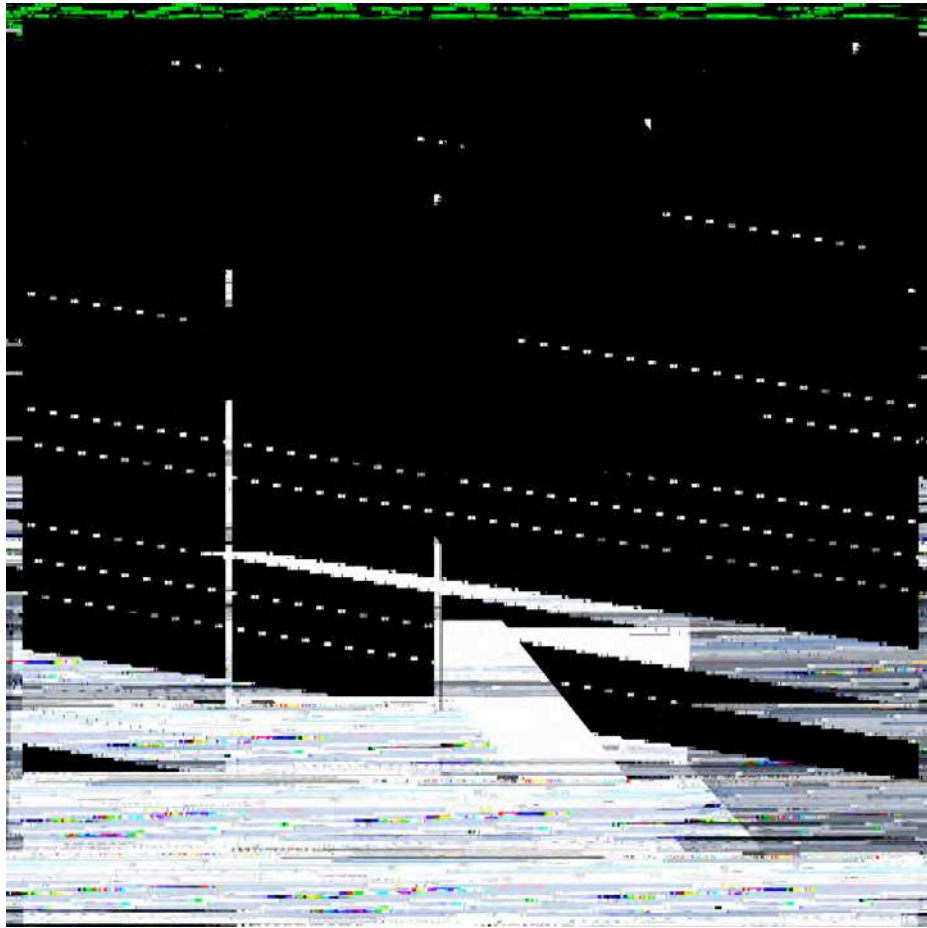
Technique employed: DV camera, FCP, Apple Hardware

Presentation support: Video projector, screen (16:9), stereo sound amplifier + pair of speakers

**artefacts**

Technique employed: Motion, Apple Hardware

Presentation support: Wall to mount the 6 prints. Prints are 50x50cm laminated and foam-core mounted.
Adequate light conditions



Thinking responsive growing morphologies for computer art and architecture

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Abstract

This essay reflects upon the necessity to organize known geometries in mathematical morphologies (Thanki, 1999) to apply them for the creation of responsive architectures, computer artworks and its applications: architectures and artworks able to change and grow becoming symbiotic assemblages among virtual constructs and physical buildings. The developments of changeable morphologies, which allow 3D physical forms to grow, (Thompson, 2000) have been the focus of Tania Fraga's research for many years. Although the topic is not new only in recent years, in developed countries, approaches allowing moving parts of buildings to change elements of their configuration have begun to be addressed in architecture¹. Architecture is usually focused on static² structures. Only nomad civilizations have addressed dynamic modes for construction, which lose their dynamic character after they are assembled. This fact is related to their goal for packing and unpacking them and not the possibility for changing their shapes for poetic, functional or aesthetic purposes.

In a country with great economical and cultural constrains such as Brazil the research of such topic has been done conceptually with the parallel creation of models, prototypes and simulations for art installations. These preliminary steps point to further developments and such constrains have kept us away from sophisticated robotic solutions acting as a sharp Occan's razor pushing us to go after very simple solutions when looking for kinetic systems for the creation of complex changeable morphologies. Also we looked for procedures that can be developed as algorithms for computer aided design and manufacturing.

For that reason, the essay is based on studies related to the growth of form in the natural world around us, using it to enhance the concept of the computer artworks, and providing elements for the development of mathematical morphologies for 3D space that are able to grow and move dynamically. We have looked for kinetic systems appropriate to let such structures to move changing their shapes as a whole and for affective systems (Picard, 2000: 11) able to produce responsive 3D assemblages answering, in simple ways, to emotions. Certainly there is a long journey to go on for these preliminary steps to conquer more ambitious architectural spaces but they are like vectors pointing to such direction.

Introduction

Physicists and mathematicians studying dynamic and irreversible systems coined concepts such as chaos and complexity. The former is related with irregularities in time while the second with irregularities in space. Although the mathematical formalities of such concepts are not strait forward the morphological characteristics they convey have been understood: the reiteration of small variations of self-similar objects following a pattern or a law may generate results of huge complexity.

¹ See Hyposurface, <http://hyposurface.org/>, last consulted: February 06th, 2008 at 11h22 am.

² Static here does not mean that the structures do not move but that they do not change their shapes dynamically keeping their general form.

At the beginning of the 20th Century, the Russian mathematician Kolmogorov (Peitgen, 1994) developed a procedure leading to the future development of the concept of fractal by Benoit Mandelbrot. This development furnished the knowledge that sets of similar objects with fractal dimensions seems to better explain many natural processes. At the same time the British zoologist D'Arcy Thompson applied well-known mathematical concepts to study morphologies for the understanding of the growth of forms in nature (Thompson, 2000). The usefulness of Thompson's studies for architects and computer artists for creating 3D physical structures is mainly his approach based on geometry and Newtonian mechanics. Also his focus on the Fibonacci series, the Miraldi angle, the logarithmic spiral, and the golden ratio puts him in line with advanced studies in neuro and cognitive sciences, which are arriving at the hypothesis that there is a logarithmic order (Llinás 2002: 215-219) imbedded in the neuronal circuits of our brain.

A **dynamical modular repertoire** of procedures aggregating mathematical concepts such as self-similarity, fractal dimension, quaternion algebra, geometric systems allowing growth, and maximum movement with the use of minimum forces have not yet taken shape. Such set of procedures may become a very useful tool for computer artworks exploring new poetics, for architectural design process and for industrial standardization. For the last it is important to perceive the necessity to develop such sets since neither the lack of standards – the nightmare of engineers in an age of globalization – nor the possibility of crystallization due to the use of only one kind of standard will help architects to create built environments characterized by variety. Homogenization and decrease in variation may let to public environments characterized by sameness, lack of interest and meaninglessness (Hibelings, 2002: 150-151). Modalities accommodating differences and variations as inherent part of **dynamical modular repertoires** will help artists, designers and architects to organize and explore unfathomable complexities in their repertoires.

One may ask why architecture, which has been static for ages, would need such type of technological innovation. Would it be only another fashion, an aesthetical fancy for the self expression of architects, artists and designers? Would the merits of such innovation become marketing value to buildings or may it carry also any kind of symbolic value for multicultural synthesis or any kind of structural quality? We believe that such kind of innovation could provide different types of sensorial and affective experiences for inhabitants of the spaces reshaping the relationship among buildings and context. Issues such as integrated design allowing sustainable use of natural illumination and ventilation for renewable energy savings, rainwater and wind collection for cooling, new architectural and design metaphors to conjure up different atmospheres, may become applications to be developed by such kind of **dynamical modular repertoire**.

The present paper is an attempt to begin to point to key issues necessary for the development of such a **dynamical modular repertoire**, delinating a prospective panorama towards the morphological set up necessary for its amplification. The research of mathematical morphologies for the construction of structures exploiting the fabric of morphological growth, allowing them to be able to change dynamically their forms in responsive ways may mix virtual and physical realities in symbiotic constructs.

Dynamical modular repertoires

The hypothesis we work with is that it is possible to use mathematical morphologies for generating forms and procedures for the design of dynamic and flexible assembled spatial 3D structures as parts of responsive symbiotic artworks and buildings. Studying possible new materials to replace mechanical machines in built spatial 3D structures and looking for patterns for growth, patterns for extension, and patterns for development and expansion of such structures is an effort towards the development of a **dynamical modular repertoire** of procedures. Such repertoire will be of greater help to systematize the huge amount of

possibilities emerged after many years looking for mathematical morphologies that would be appropriate to build dynamical physical and virtual structures.

To research changeable morphologies for dynamic spatial 3D structures it is necessary to explore algorithms for growing structural shapes, for using random and automated processes, and for developing kinnetic systems to provide the moviments of their physical parts.

Patterns for growth may be based on the proliferation of similar modules creating lattices of polyhedra (Williams, 1979) in a way similar to crystals; it is possible to look for sets whose developpment repeating variations of basic configurations will create articulated shells and cocoons; there are geometrical configurations which allow moviment provoked by minimum forces; there are ways to use gravity as part of the process of moving things for energy savings; there is the possibility to create systems based on the repetition of slightly varied objects forming logarithmic configurations usually known as spirals. This last type has an staggering potential for dynamical structures. Since the former approaches have been intensively researched through architectural history and they are appropriate to static structures the last ones were chosen given that they allow the creation of dynamical moving structures. Structures that can grow in analogous way to the natural growth of forms in nature.

For example, patterns for growth need to consider that the structure may grow with constant or varied rates. Constant rates of change create more open shapes such as oysters shells. Varied rates of change for the growth behavior result in more closed shapes similar to the shapes of nautilus snails shells.

Using smart materials as machines themselves, exploring the physical forces the shapes are subjected in the physical domain, and adding the potential of computer to select and organize configurations of shapes it is possible to to draw hypothesis leading for the creation of sustainable systems using better the natural resources available in our natural environment.

For dynamic spatial 3D structures to be used as parts of architectural spaces it is very important to study patterns for their extension in the three dimensions of space. The final global shape of the structure may be more opened or closed, sparsely or densely spiralated. It will characterize the development of procedures for the automatization to be used for the construction of the constitutive elements of the structure. The problem of structural extension is related with the common mathematical problem, so prevailing into building engineers' practice, related with the increase of the surface as the square and the volume as the cube of their linear dimensions. This behavior becomes a very big physical problem for builders since they have to deal with another powerful force: the gravity. This problem increases when moviment is added to the structure itself. Therefore, the larger the structure the bigger are the tensions the cross sections of structural elements are subjected. As Galileo stated more than 400 years ago, for an ant to become the size of an elephant it would also need to lose its morphological characterists becoming heavier and bulkier. The same problem has hunted architects and engineers for ages and has defined all the technologies developed until today.

Another kind of patterns that need to be developed are patterns for the development and expansion of the structure. These types of patterns will determine how the structures changes their 3D spatial configurations in time. The combination of such families of patterns will define the final shape of the structure and will provide the procedures to automatize the production of the kinetic systems that will move the elements. It is important to notice that a growing structure, being irregular in relation of its mass, will tend to look for

physical equilibrium. Such situation conveys that the structure center of mass is des-located in relation of its geometrical center a fact that needs to be addressed since the beginning of the design process so it can become a strength and not a huge problem.

The use of such reasoning is at the base of the artwork **Responsive Membrane**³ (2004) and the works in progress **CaracolomobilePrimus**⁴ and **Gravity fluxions: pulsations**⁵. These artworks are part of a research project that look for the construction of Behavioral Organic Technological Organisms/objects (BOTO⁶) able to act in symbiosis with the participants, answering to their affective states. The **Responsive Membrane** is an artwork built with nitinol⁷ wires to achieve an organic silent⁸ shape moving with wave like movements.

CaracolomobilisPrimus and **Gravity fluxions: pulsations** go further into these concepts by adding affective interfaces to control some processes happening inside the artworks. At the former, the affective interface will allow the participants to hear sounds while the object unfolds. The sounds are answers to the participants inner emotional states. These states result in biometric signals. They will be captured through a skin resistant galvanometer, taken to a microchip for filtering and for controlling the interface. The **CaracolomobilisPrimus**'s structure is composed by a set of varied pyramids that unfolds forming a logarithmic curve. The pyramids are articulated by rubber 'muscles' that folds and unfolds following the movement of a pleated tube that dilates and contracts when inflated by air. It will be covered with a material responsive to black light allowing it to light with the use of a presence sensor. Although very ordinary these procedures create a very poetic solution.

³ See Figure01: **Responsive membrane** was commissioned by Itau Cultural Institute, Brazil, for the exhibition Art.ificialEmotion.2 in July 2004. It was to built as a first step towards the creation of artificial organisms aiming to become movable parts of buildings. Its responsive surface was manufactured using *nitinol* wires. It is extremely sensitive and is affected by computer stimuli. The surface reacts to electricity variations changing its configuration when stimulated by the computer by means of the participants' actions. A video of it can be seen at <http://video.google.com/videoplay?docid=-1377641809528125765>

⁴ See Figure02: **CaracolomobilisPrimus** is being developed by the group SACI (Sensible sensorial symbiosis through art sciences and informatics): Flávia Amadeu, Giovani Borges, Maira Spanghero and Tania Fraga.

⁵ "**Gravity fluxions: pulsations**" is a set of collaborative artworks conceived by artists Frank Pietronigro (USA), Gavin Starks (UK) and Tania Fraga (Brazil). Its main concept is to conduct, during a parabolic flight, a performance testing an experimental hypothesis about the spatial behavior of a flexible structure. After this flight they intend to create an installation built with a complex system of pendular rubber objects responsive to black light and embedded and brain stimuli controlling actuators and sensors in order to produce vibrations creating chaotic movements and des-stabilizing the human sense of verticality. A video of the proposal can be seen at

<http://video.google.com/videoplay?docid=-1293687096904098883&hl=en>

⁶ **BOTO** (Behavioral Organic Technological Objects/organisms) is also the Portuguese word for the Amazonian dolphins which are very friendly. There are many legends and myths in Brazil about its magical powers and its mutable capabilities.

⁷ *Nitinol* is a metallic memory shape alloy whose shapes can be programmed using heat.

⁸ Silence is a very important concept in this work. Usually hydraulic actuators and mechanical motors are very noisy. The nitinol actuators we built for this artwork are silent and produces a organic programable wave shape that can be triggered by the participants through the computer graphic interface.



Figure 01: *Responsive Membrane at Itau Cultural Institute, July 2004 and Experimental Art Foundation, Adelaide, Austrália, April 2007.*

In the project **Gravity fluxions: pulsations** we will continue to develop the idea letting the biometric signals to move the shape itself. In this way, step by step, using a relational methodology for successive approximations⁹ we solve the problems emerged, while acquiring a repertoire and a collection of secure and well developed set of procedures to work with. For this project we may use brain waves to generate vibrations in a complex system of integrated pendular polyhedrons producing caotic moviments.

There is a very long way for such artificial organisms to become moving parts of architectural buildings but they devise the steps leading for the comprehension of the complexity of dynamical physical structures while looking for ways to systematize the procedures that one day will allow such a visionary idea to become reality.

Conclusion

From the brief preceding discussion, one may verify that the form, the physical forces as well as the moviments dynamic spatial 3D responsive structures may have, are intrinsically related to their mathematical morphologies. The assemblage of patterns in which the structure grows, develops, expands and extends will characterize their final configurations. Therefore, **dynamical modular repertoires** of procedures need to be researched and systematized in order to become integrated in CAD-CAM softwares.

Summing up, the establishment of **dynamical modular repertoires** of procedures for the creation of physical changeable shapes has the potential to become an important field of research in computer art. It may define sets of meta-objects as family of forms able to become large structures ruled by gravity - if on Earth - or the lack of it - if in outside space¹⁰. The geometric characteristic of permanence may be applied to catalog

⁹ See http://www.cibercultura.org.br/tikiwiki/tiki-read_article.php?articleId=53. Last consulted on February 06th, 2008 at 11h46 am.

¹⁰ There are many artists looking for outside space projects. A few of them can be seen at http://www.pietronigro.com/news_2006-04-25.htm. Last consulted on February 06th, 2008 at 11h56 am.

families of shapes able to allow growth while maintaining its formal characteristics as the size increases. Therefore, it is necessary to research relative and differential types of growth, looking for ways to apply the rate of growth for the creation of large hollow structures with movable parts that may change their shapes, being them subjected to gravity or not, depending to where they will be built.

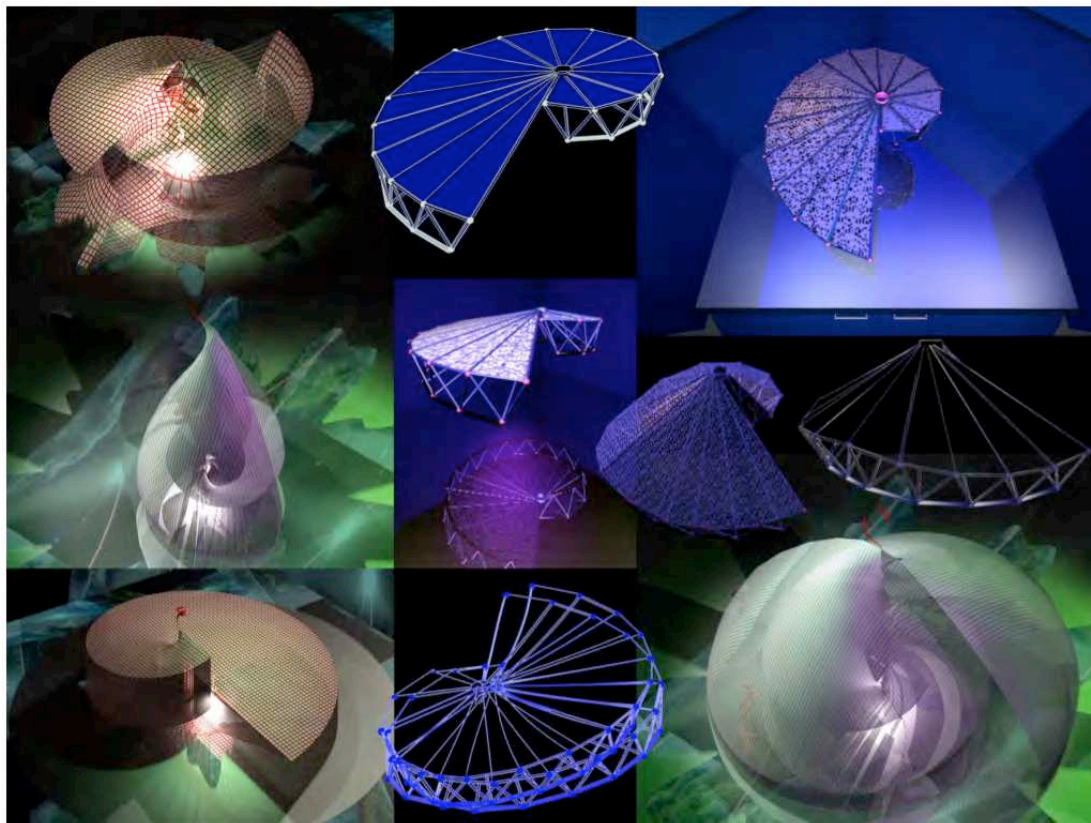


Figure02: *CaracolomobilisPrimus* and *Nanoshelters11*

Technological assemblages, responsive and adaptive, with degrees of freedom and varied margins of smart behaviors may bridge the gap among organic and mechanical domains. The virtual realm of computers and physical realm of buildings/objects may allow the development of symbiotic constructs that can be explored in order to discover new qualities for computer art technology. Qualities based on the aggregation of complementary behaviors of these different domains and not on the mimetic search of organic behaviors for artificial constructs. Qualities that may enhance and expand psychological and physical human possibilities. Qualities with poetic, aesthetic and functional appeal for body and mind.

Computer technology is becoming pervasive in our environments. It is a well known fact that human perceptions of space and time are determined by culture and they change with new inventions. A good example of such change is the invention of linear perspective by Filippo Brunelleschi: a mode of seeing we

¹¹ The artificial organisms were first presented at the Banff Centre magazine *Horizon Zero*, Canada, at the section entitled "Speculating the nanotech home of the future": <http://www.horizonzero.ca/index.php?pp=26&lang=0>. Last consulted on February 06th, 2008 at 12h44.

still carry with us nowadays. Psychological and neural cognitive sciences have shown that perception may be modified by emotional involvement tricking illusions. It is a challenge for computer artists, designers, architects and mathematicians to conceive mathematical morphologies to be applied in responsive buildings which, associated with affective interfaces may create unfathomable qualities for future built environments.

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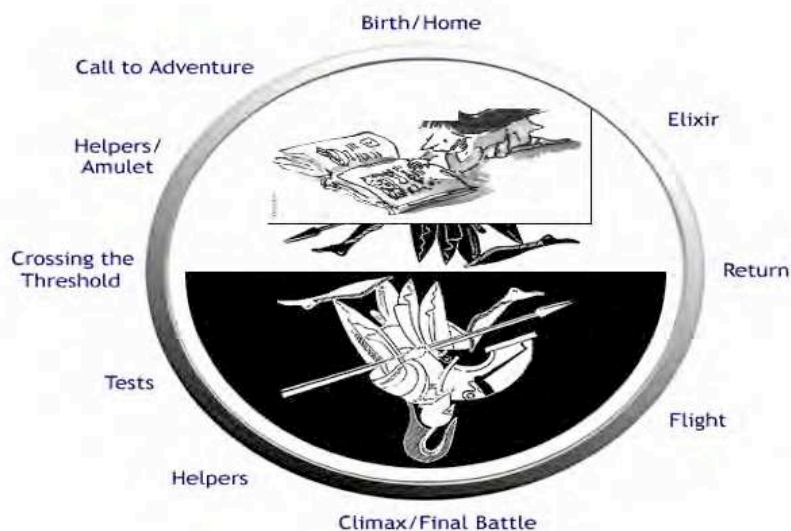
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Sharing a private dream

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*Some day we will reach to the final fantasy, the interchange of private dreams.*¹
Max Gubern



According to Gabriel García Márquez the short story seems to be the natural choice to narrate the adventures of a hero, living as an ordinary man or woman, everyday, even the most simple kid returns home with an anecdote that talks about: how does a super parent confronts the terrible beast embodied in his boss; a wicked teacher who attempted to fail a heroic second grader or an eighteenth year old princess who tells the romantic story of two knights that fought at lunch time just to sit beside her. García Márquez speculates towards this invention: “probably the short story was created by the first caveman that went hunting and got lost till the day after so he used as an excuse a mortal combat towards a hungry beast. Instead the Nobel prize writer said, the wife of this caveman wrote the first novel when she found out that his heroism was just another fiction or joke.

The first experience of immersion is given when a child is capable to create through game a world of his own. All this, apparently unconnected ideas just to point out that video games are just a new way to tell the same old story. A more resourceful way that is not endangering the old ones, it is just a new alternative for ancient dreams. If we try to emulate Theseus and try to find the beginning of the labyrinth by following a thread we would find the origin in García Márquez Story and follow it through the adventure novel.

The fundamental unsolved contest between goodness and badness has been present since the Greek tragedy and Campbell's *The Hero with a Thousand Faces* who is behind this quest from Christ and Buddha through Anakin Skywalker and Harry Potter. The great novelty in video games is that the reader does not just follow the hero, he becomes the hero himself, and he relays on his own decisions as he also has to accept the

triumph or stand for his losses. Nowadays video game is one of the most profitable and popular entertainment. As fairy tales were strong discourses that molded some of our values, how do video games deal with gender and new sources of role models that shape world notions?

As we grew up we noticed our bodies and the transformation from a little kid to an adolescent is unforgettable. We look in the mirror amazed of our changes as the emperor is noticed naked by his people in the story “The new cloths of the emperor” by the Grimm brothers. We became conscious of ourselves, our solitude and individuality. That’s, maybe, the first task where the hero, who lives inside us, has to confront. But we should always be aware that the story is just about to begin.

Those who doubt about the great influence that fiction has during youth development, will be guilty of the same blind mistake of Oedipus the king who ignored the visionary truth of his own destiny, predicted by the Oracle. In a feminine perspective the mistake nowadays is to fit by force the suit of the hero on women, like Drizela and Anastasia, trying to fit Cinderella’s shoe. What kind of feminine role models are video games developing? Or what future dreams are we constructing? Virtual reality is not a new world it is just the great extension of all the chambers that our mind and our reality are capable to construct.

Through Rohal Dahls work *Matilda* I wish to explore and invite you to construct the feminine side of a heroine, the choice to win a battle with the power of the mind and the books as advisors. The body of a girl instead of someone like Lara Croft, a sexy shape that hides the same hero role built for a masculine expectation. I will compare his quest with the traditional path pointed by Joseph Campbell in *The Hero with a Thousand Faces* and Vladimir Propp’s *Morphology of the Folk Tale*.

New ways to tell the same old story

Nowadays the story has emerged to a new platform. Virtual reality furthermore, its more successful and collective experiment: *Second life* which is new way to give voice to the ancient expression “Once upon a time”.

Trying to establish the difference between what we call reality and virtual reality, I would like to proceed as a Google earth viewer, from a panoramic vision to the nearest zoom that I can reach. Metaphysically speaking to discuss reality is to talk about every entity that has an existence and can be perceived by other entities. Any dream, even a delirium, has a way of life since a sensible mind is able to think about them. When we talk about a character such as Mr. Hyde we cannot doubt he has an identity in the mind of all Stevenson’s readers or most of occidentals, at least, a vicar existence, a mental representation. That doesn’t mean it has the same existence as Mr. Bush or Mr. Calderón, fortunately Hydes’ acts doesn’t have nearby consequences.

Fictional characters use words or pixels as their atoms, they are alternatives to the world we inhabit. But they need the imaginary software of a reader or spectator to come to life, without that, they would dissolve the same way as millions of books, films or plays have been erased of our collective memory.

New technologies have the virtue to fuse many codes and the risk to fall in iconic confusion, they also have the speed and interactivity that conventional art can’t reach. While conventional art expect to cause an esthetic experience not easy to measure, the interaction of new technologies can be quantified.

It is not accidental that Second Life had emerged from the literary field, *Snow Crash*, the novel written by Neal Stephenson in 1992, is already a noun that defines 3D spaces where humans interact socially and economically as avatars through a metaphoric world.

According to psychologists, in virtual spaces we have the possibility to integrate those aspects of the life that in fact appear dislocated. It is literary a second chance to explore experiences where we feel ignored or excluded. From this point of view critics emphasize the possibilities of virtuality to replace physical and economical limitations of a regular man, a role that literature has played for centuries. We have to be careful therefore, about values that emerge from our materialistic era, if the chimera is an avatar with perfect looks and surrounded by beautiful but immaterial things that pretend to be genuine, it is because men have come to measure their success in these terms in our old reality.com world.

Matilda

It is the story of a smart girl; who could read fluently when she was a year and a half old and read classic literature at four. But she has a problem her parents are despicable.

Her father is dishonest businessman that can represent the icon of materialism. The mother is what we can call a woman object, a hedonistic that is concentrated in her appearance; she escapes her empty life by watching TV or playing bingo; they don't care about their little daughter's welfare. This is an abnormality for traditional children stories where, if wickedness appears at home, it's always incarnated on a stepmother. There are many differences between Matilda and regular stories: it's not the adventure of a hero but a heroine; she is a girl that is not a princess and doesn't pretend to be so; her appearance is not important for the purpose of the story; the adventure of leaving home takes her to school (where she needs get adapted) instead of a far away land; the enemy is at her town, so she doesn't need to go and find it in another kingdom.

Campbell considers that the hero needs a call for adventure, Matilda has followed it by reading literature, it is a journey that one can follow without leaving home. Matilda's parents enjoy watching TV and can't understand the girl's peculiar affinity with books. The traditional call to adventure is transgress in Matilda's story, it doesn't depend on physical action but on the intellectual one, that can be easily confused with passivity because it only involves sight movement and a great deal of neuronal activity, not so simple to verify in appearance. The French philosopher and poet Gaston Bachelard takes Jung's dichotomy of the spirit *anima / animus* that opposes the characteristics of human soul into masculine or feminine distinctiveness and in his *On Poetic Imagination and Reverie*, he establishes that the creative process and imagination are eminently part of the feminine side, the *anima*.

Rohald Dahl said that the key for children writers' success is to conspire with kids against adults. Parents and teachers are the enemy due to the hard civilization process that is enforced upon children. This statement expresses, at first, a traditional duality ordinary in the adventure novel between primordial goodness and wickedness, characterized to show the world in terms of opponents: feminine/masculine; native/foreigner; reason/feelings, etc. And even though his opposition between adults/children obey this principle, in his tales not all children are good nor are all adults evil. The opposition takes place between repression and dogmatism against freedom of choice and a new respect for children rights. The character of Miss Honey is a good example where Matilda can find love and protection.

In Dahl's universe humor and ridicule act as forces that reestablishes harmony, the child always wins to the almighty adult and exposes and ridicules the immoral and hypocrite grown-up.

In Matilda's world parents and the headmistress Miss Trunchbull are authoritarian monsters:

– “I am older and you are not; I am right and you are not” – Said Miss Trunchbull to Matilda (Dahl 48).

Mrs. Wormwood is a ludopath who: “was hooked on bingo and played it five afternoons a week” (Dahl 12) leaving her young daughter all by herself. Her husband is a crooked second hand car dealer who believes it is fair to cheat in order to make money: “Nobody ever got rich being honest.” (Dahl 23)

Their impatience with Matilda is exacerbated by the fact that she disputes their parental authority, to which they respond by means of verbal aggression, for example:

the mother said [...] “keep your nasty mouth shut so we can all watch this programme in peace” (Dahl 26) or:

“Be quiet!” the father snapped. “Just keep your nasty mouth shut, will you!” (Dahl 37)

Crunchem Hall is the suggestive name of Matilda's school, where the girl meets her opponent (Miss Trunchbull) and her adjuvant (Miss Honey) in Propps' terms, and I question this role, because Matilda is also a helper for Honey, that liberates her from her aunt Trunchbull's tyranny. We can find in the story four feminine roles and the names are of great importance:



Agatha Trunchbull: masculine role model

Agatha is Miss Trunchbull first name comes from the Greek Ayaon (Agathe), which means “good and virtuous”. I suppose this is an irony. His second name means that she can break a bull with her bare hands. She is cruel and violent, selfish; she likes to torture little kids. Physically she is strong and robust she is described in warlike ways, she marches as a “soldier” and approaches as a “tank”.



Matilda: animus/anima, well balanced role model

It means “the one that struggles without quest”. She is precocious, subordinated but rebellious, her battlefield is intellectual and her power is developed by the force of her mind instead of a physical strength, she is feminine in sweet and empathic, she can overcome adversity by facing her opponents with braveness, she can’t stand injustice and always fights for the weak. She is described as “sensible and bright, sweet and tender” she has the right combination of masculine and feminine characteristics.



Jenny Honey: traditional virtuosity role model

Her name is the diminutive for Jane "The one given by god". Maybe she is the one that according to her virtuosity deserves to be Matilda's mother. We can also consider Jane to be an intertextual game in honor to Jane Austen who's *Sense and Sensibility* inspires Miss Honey's character.

Her second name is explained by itself. It's feminine symbol, sweetness, its supply comes from flowers to sweeten baby's milk. She is all that Matilda is looking for in opposition to his superficial mother. Miss Honey story is the typical plot for a fairy tale:

"my mother died when I was two years old. My Father a busy doctor had to find someone to help him take care of the house and me. So, he invited my mother's single sister...when I was five my father died suddenly. So I had to live with my aunt."(215-216 pp.)

Just the same way as in Snow White or Cinderella's story Miss Honey's stepmom (her aunt Miss Trunchbull) treated the girl as a servant using her authority and power for this purpose, and mistreating the girl until she diminished her personality.

Mrs. Warmwood: A frivolous and hedonist woman, almost object. She is the stereotype of the lighthearted blonde, an irresponsible mother who does not show affection for her daughter. Her attitude rejects the girl's intelligence and precocious conduct. She does not have scruples and she is not worried about the dishonest behavior of her husband.

Dahl displays a heroin to us *Sui generis*. The protagonists of universal Literature of traditional stories are usually entangled in loving conflicts. No one has been the heroin of an epic story. A dichotomy between

good women and bad women exists since ever. Matilda is one little girl who has just started elementary school and whose only passion are books. Dahl presents it like eager reader: thus the first chapter is titled "the book reader". The girl never loses neither her condition of girl nor of woman, she fights with the arms of her intellect and the own playful attitude of her age. She assumes her condition of minor and she admits the subordination as long as it is reasonable, and does not look forward to annihilate adults nor to social conventionalisms; she questions the validity of the adult authoritarianism, struggles for children's' respect and exhibits the weaknesses of bad adults. She explores her internal possibilities to accept herself and to find a place in the world. She only needs a little help, refuge and protection.

The first step in Campbell *Monomyth* is the call to adventure given by a herald. For Vladimir Propp then is when the hero leaves home or his parents die. In *Matilda* the hero never grows older and she invites us to understand this period of life. Her family does not care about her and she lives in a constant abandonment. Through fiction she constructs her own values and family models, she also discovers her own talents and capabilities. The girl is an example of how, in some point, we need to stop blaming our parents for our misfortunes in order to find our own way. She leaves home, first of all in a literature adventure, Dahl describes it in this terms: "She sail the past with Joseph Conrad, went to Africa with Ernest Hemingway and with Rudyard Kipling to India. She traveled the whole world without moving from her room in that small English town." (24)

Propp speaks to us of the prohibition that falls on the hero and who in *Matilda* pronounces itself with the attitude of the father towards the reading, first in a reprimand and soon when he destroys the book the girl is reading. But the girl does not pay attention to the father and obeying to the function of transgression of Propp she escapes daily to the library in search of new literary adventures.

The first contact that our heroin has with her opponent (fourth function of Propp) is from when she discovers the lack of love and concern from her parents. The father who is the masculine figure of greater weight in the story can be considered his adversary as representative of occidental traditional values; more ahead Miss Trunchbull would represent also the antagonist as the metaphor of the ideological slant which informs such patriarchal, imperialist visions and a mistaken paradigm of feminine liberation.

To put parents as villains is taboo in the fairytale, because adults influence children's understanding of the configuration of the social order through the models set up in this discourse. The negative position of the parents in *Matilda*, forces to us to break up with the mystification of the consanguineous bonds and it sends us to consider that relations have to be built through manifestations of affection, respect, etc. The hero accepts the call, finds protective figure that offers tools and advice for the passage that follows; something as well as an amulet or a weapon, this critical moment is denominated by Campbell like the supernatural aid. In *Matilda's* case Honey helps her to control and develop her telekinesis powers. Honey tries to beware adults surrounding the girl to notice the prodigy she is (working as an informant, in Propp's terms), but the Campbell's rule is altered when noticing that both characters lend mutual aid.

The Departure like so, is the function number eleven of Propp, can be equivalent with the crossing of the first threshold of Campbell, where the hero will have to cross the familiar threshold and to arrive at another world. The Departure occurs in *Matilda* when she is sent to the school. Is a marginal trip that, in appearance, does not look like the passage of the hero, but emotionally, for a child, it supposes a dramatic goodbye; it is from this point that individual conscience is developed and begins the educational and socializing processes aim, to use the terms of Paulo Freire, for the domestication (Freire 26). It is revealed that the object of the desire of our heroin is to develop their intellectual capacities and to find the affection of a new family. The whale's belly in Campbell estimates the entrance of the hero to a new world by means of the crossing of

the threshold, the hero appears again. It pretends to have died or to have fallen in a terrible disease. After leaving windy it experiences a renovation and it is prepared for the adventure. In Trunch them Hall (the school) Matilda discovers the abuses of Agatha, she stands them by containing her fury, but when she is accused unjustly, a force unties within her and begins the transformation. The difference from the conventional hero is that instead of physical strength, the girl accumulates psychic forces.

The initiation ritual of the hero is the part that Campbell and Propp dedicate to the tests, the hero must draw for them successfully because they help him proves the hero's ability and advances the journey toward its climax. Matilda proves to us that injustice can be fought by standing and defending our ideas, to help the less fortunate and to fight back with intelligence and patience.

In Prop's grammar he alludes to Villainy and lack. Trunchbull has taken Honey's money and she abuses Trunch them Hall students. Her aunt has hidden the testament of her father where the house and all its goods have bequeathed him. This one is the difficult task that Matilda must solve.

At school Matilda discovers solidarity between the children and must help them to face the injustices of Trunchbull, as well as to help Jenny Honey to free herself of his aunt; by means of the use of her telekinetic powers she is able to prevail. Struggle between hero and villain (Propp) or Final Battle (Campbell) takes place in Dahl's story in a different way; it is not based on a physical battle, since our heroin manages to deceive Trunchbull evildoer by means of the powers of her mind.

Matilda manages to make the chalk fly through the air and writes a message signing it as Jenny's dead father. The note is for Trunchbull in it, Magnus threatens to come and get her. Trunchbull leaves running terrified and disappears forever; this imply the victory of our small heroin. Dispossess from possessions, prestige and authority, the villain has received the punishment of which Propp in function 30 speaks about.

The encounter with the goddess is the last test in the way of the hero, consists of the marriage with a princess or a maternal figure, which represents the maturity of the hero and his healthy social adaptation. Since Matilda does not grow and what she desires more than anything is a family or a positive a maternal figure, this step can be represented by her legal adoption from Miss Honey. It's meaningful to notice that in this new family there is no masculine figure in. This alternative family model takes us to reflect about the superiority of consanguineous bows against the disinterested love that can come from a "stranger", as well as concepts like "biological family" versus "coexistence societies".

Campbell indicates that probably the hero needs to be saved by natural forces. The hero has lost his ego and something blocks his return, the aid will take him back home. Matilda does not want to return to its house nor original family. His father has been discovered in his misdeeds and all the family must leave the town. The girl wishes to remain with her teacher and she must save Matilda of her ominous family. The girl knows that she is talented, **in spite** she is able to be humble. We faced the the return that conjectures Campbell and Propp also speaks to us of the return to home, since in our history the return is to find a mother, we can consider that Jenny Honey is the one who has the values and characteristics to exert this paper, and the little girl finally has reached home.

Matilda is the story of the inner exploration, of the legitimate search of respect and a harmonic family; it puts the intellectual values in a superior rank and it does not promise eternal happiness but the possibility of free choice, the journey through knowledge and imagination, reading as a possibility of pleasure. Matilda invites us to think about the rights of these two groups historically marginalized: children and women.

Fiction has always served as model, stories and dreams are the maps with which we construct what we call reality. For me a tale is any resource put in words for delight of our imagination, it is important to take care of what we tell. I belong to those idealists that think that in fact, everything begins as a tale, although soon it assumes the long form of a novel or expresses the tremulous and the ephemeral composition of a poem, the pretext or motto of a life or the inspiration for adventure. A heroin or hero dreams, lives, touches or is touched, the verb and the subject or subjects changes; I face you we become one. Because as Jorge Luis Borges said "One man can be all the men".

¹ Free translation of words said by Gubern in a public speech.

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Reconfiguring Architectural Space Through Photography

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1. Architecture and Representation

Depending on facilities and technologies available at various periods of the world history, architects used various tools like drawings, paintings, miniatures, models, computers, fine arts platforms to represent their design before and after construction.



Figures 1 & 2. Left: An “architectural” greeting card. Right: Lego architecture

“Representation includes everything people construct to be known as a visual record or figurative manifestation of that reality. [...] Within this approach, architects usually reduce the definition of representation to the creation of such visual forms as drawings or models that selectively double or imitate the physical reality of a building. I would like to move beyond this traditional view to define representation as a culture-specific and dynamic process of establishing the relationships between reality and the signs created to symbolize this reality. In this process, reality becomes thinkable, and its meanings are symbolically assigned.” (Piotrowski and Robinson 2001: 42)



Figure 3 & 4. Ottoman miniatures depicting Bagdad (left) and Istanbul (right) by Matrakci Nasuh.

“In general, buildings do not communicate but represent, a distinction essential to the study of architectural specificity of thought. [...] This representational process is far more complex and dynamic than the process of sending, preserving, retrieving, and decoding well-formed messages. [...] Buildings and cities represent when they serve as repositories of materialized concepts that manifest how people have defined themselves in their lived reality. [...] In this way, a building becomes a repository of cultural memory and helps to expand the sense of reality beyond the here and now. Any piece of architecture functions in this manner when its value is found in the interconnections it establishes with other buildings, practices of everyday life, social structures, attributes of the natural environment, or metaphysical concepts, although many aspects of these relationships may be perceivable only to people identifying with the local culture(s). This process of establishing a symbolic network of relationships can be viewed as analogous to what Jean-François Lyotard calls the emergence of representational consciousness. He observes that the viewer's accumulation of experiences and the delay of the immediacy of reaction to what is being perceived at a particular moment show “how perception stops being 'pure', i.e., instantaneous, and how representational consciousness can be born of this reflection (in the optical sense), of this 'echo,' of the influx on the set of other possible — but currently ignored — paths which form memory”. Through this process, according to Lyotard, human thoughts establish networks of relationships within functioning concepts of reality. [...]



Figure 5. Panoramic photograph of the Covered Bazaar, a “cubist” documentation resulting from the viewer's accumulation of the experiences in situ: A moment where perception stops being “pure” motion. Photo by Murat Germen, Istanbul, Turkey.

As the space of representation, a building only foregrounds concepts of reality and implies modes of thought and perception. For example, it invites a tacit dialogue between old and new, or between a culturally shared and a personal sense of reality. Whatever exists or happens in a building, we interact with it symbolically. Any building admits various and even conflicting concepts of reality. [...] Such hybridity of meanings is possible because concepts of reality and physical forms of buildings, although symbolically related, are never fully codependent; they are differently constructed. [...] Because buildings do not impose concepts of reality but make them thinkable, many concepts may coexist and be in symbolic dialogue with one another within a physical space. [...] Similarly, it does matter how a person interacting with a building finds personal relevance in this interaction. To reveal these kinds of meanings, the building must somehow engage, like Lacan's mirror, a personal sense of reality.” (Piotrowski and Robinson 2001: 43, 44, 45) This personal sense of reality makes us question the inherent nature of the concept of ‘representation’ and helps us to extend it into a more flexible (and maybe more correct) notion / formulation of ‘re-presentation.’



Figure 6. Panoramic photograph of Istiklal Avenue in Istanbul showing both ends of the large pedestrian artery: A personal sense of reality, in other words “re-presentation.” Photo by Murat Germen, Istanbul, Turkey.

Movie industry is another platform in which representation has a significant part, especially when it comes to adapting / altering / converting cities for particular needs such as creating futuristic sci-fi cities / architecture that never existed. A particular type of illustration called “matte painting” created by illustrators (and not architects) usually serve as departing points for such architecture. The fact that illustrators can create virtual architecture can also lead to the assumption that photographers who can read space properly can use photography as a tool to re-invent, re-interpret and re-form architecture.

The urban space created in Luc Besson’s renowned movie “The Fifth Element” is one of the best examples where an “almost impossible” artificial architecture is envisioned and implemented as a simulation. The complicated upwards and sideways stretch of the built environment takes the limited one-axis 3D volume structure to a richer multiple-axes structure which allow circulation in all directions and not only horizontal direction as usual.

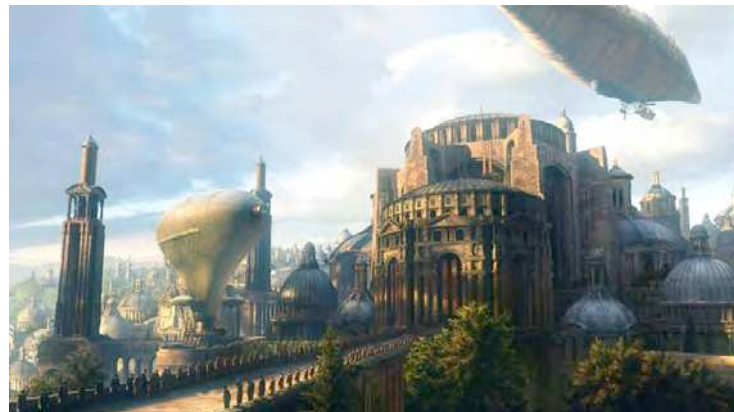


Figure 7 & 8. A futuristic city that grows both horizontally and vertically with horizons in all axes. “Fifth Element” by Luc Besson (left). Matte painting by Yanick Dusseault, depicting a non-existing piece of architecture (right).

It is obvious that fictional processes like movie making and novel writing can be used to expose unseen studies of architecture; by the same token, the most faithful representation tool of architecture, i.e. photography, can also be employed to exercise “fictional” architecture that can later be taken advantage of for “real” architecture to be built.

2. Architecture and Photography

Photography is the only medium that enables architectural works to be shared with people who do not have access to these works. It is, in this respect, the ultimate representation of architecture that is built. There are various techniques, lenses, rules of thumb that are used in architectural photography in order to make the process as “appropriate” as possible. But these special techniques usually provide us with unique visual recording possibilities that are practically and physically impossible to the naked eye. The so-called “perspective correction” process much used in architectural photography, carries the potential of producing some steeply converging lines, especially when the photographer is close to the building to be photographed. Consequently, the shifting motion in photography causes another shift in our perception: photography does not reflect the truth.



Figure 9. Converging lines due to excessive shifting motion. Photo by Murat Germen.

Considering the fact that there are different lenses ranging from wide angle to tele, different films for different purposes yielding different contrast histograms, different speed values that lead to various levels of graininess, the fact that we do not see in black and white, etc.; it is possible to assert that cameras do not see in the manner we see and therefore photographs that cameras take have no possibility of reflecting the truth as we see with our eyes. Piotrowski and Robinson approach the problem from another angle: “Photography, on the other hand, filters reality in a different way. A photograph seems to be an ‘objective’ record of the field of vision that is trustworthy because the photochemical process provides a reliable method of recording an image. [...] All that makes photography appear believable or objective conceals how much a photograph is a constructed representation. Unlike a person's experience in architectural space, a photographer's picture singles out a particular view and freezes it in time. That which the image illustrates is composed to be seen in certain manner, making particular relationships visible and hiding others. Photographers frequently manipulate light, either artificial or natural, to enhance selected attributes of architecture. (Piotrowski and Robinson: 51) Promotional photographs of architecture [...], rather than supporting a symbolic dialogue between the viewer and a depicted building, encourages the viewer's desire to own a similar kind of architectural commodity. This constructed desire for the represented object shapes the commercial subject-object relationship.” (Piotrowski and Robinson 2001: 54)

The type of photography titled as documentary photography is usually presented as an instrument that communicates the “real” incidents that are not witnessed by most people and naturally is a very important tool of the news industry. Yet this does mean that the messages consciously or unconsciously present in these photos are genuine. “John Tagg's ‘The Currency of the Photograph’ (1978) effectively explores the ideological motives behind realistic representation.” (Conner 2001: 16) A photographer can record a real event but s/he can present it in such a way that the interpreted conclusion can lead to a completely fake direction and result in a hoax (that will spread too quickly especially with the current technological facilities available these days).

“By itself, the image has a variety of possible interpretations whereby different aspects of it will spark off particular trains of thought in the viewer. The ways that the viewer proceeds to construct the narrative are determined by the context in which the image appears. [...] The context will imply a certain range of possible interpretations and the text will aim to anchor the wide range of potential connotations that can be triggered by the photograph. (Wright 1999: 83) [...] If we adhere to Charles Suchar’s (1989, 52) interrogatory principle, our interrogation of the photograph might lead us to ask the following questions:

- What information do we find within the photograph?
- What additional external information do we need to supply to direct the meaning of the image?
- What is the range of potential meanings and interpretations that the viewer might construct from the photograph?” (Wright 1999: 114)

Following all this, it is quite easy to see that photography is about interpretation and therefore can be used to reinterpret a certain physical existence. In other words, photography can be utilized in the process of “constructing” a new space --that we can call “narrative space”-- from the existing spatial body. This narrative space is also a “manufactured metaspace” which a space between and / or beyond reality and representation: A constructed environment that exists solely in the digital realm, giving clues for the real world and exhibiting experiential aspects of the personal perception process.

3. Architecture and Construct

The concept of construction in architectural design process is a temporary process which finally transforms itself into an end “product”: A building, a culture, a society, an idea, a freedom, a dogma, etc. Construction sites can be conceived as stages where this process is being “performed” over and over. The inherent incompleteness within the constructing act pushes us to dream; on the other hand, a completed product loses its narrative potential as it informs us on all the necessary pieces that constitute the whole: There is no puzzle to solve or no story to write. Construction sites, in this sense, are like historical ruins; Paul Zucker asserts that “devastated by time or willful destruction, incomplete as they are, ruins represent a combination of man-made forms and of organic nature.” (Zucker 1961: 119) As a tribute to and resting on this statement, the more incomplete the “construct” is; the more organic life gets, the more surprises and the less boundaries we have.



Figures 10 & 11. Incomplete ruins that push us to solve the puzzle. Photos by Murat Germen, Assos, Turkey.



Figure 12. Construction site, ruin-like incompleteness prevails. Architect: Nevzat Sayin.
Photo by Murat Germen, Istanbul, Turkey.



Figure 13 & 14. Construction sites can be conceived as stages where this never-finishing process is being "performed" over and over (left). Clouds as perfect examples of organic natural forms (right). Photos by Murat Germen.

Architectural photography has the potential of re-creating the previously mentioned puzzle back again in order to bring an alternative representation to architecture. The architectural photographer is sometimes offered the freedom of reinterpreting, reconstructing architecture in order to be able to present a novel virtual

perception to the audience. The idea here is to get some spatial clues that can later be used in other architectural projects. I was personally invited to two different concept exhibits in which I was given the freedom of inventing a virtual architecture through photography. The concept text written for one of these exhibits goes as follows: “I went, saw, stopped, attempted to grasp and enter it, looked at construction process and workers with respect, tried to internalize, wanted to claim it for a while, dreamed of creating a microcosm out of the macrocosm I was in, shot and shot and shot and finally selected: The created world, though intended for all, was probably quite a personal illusion...”

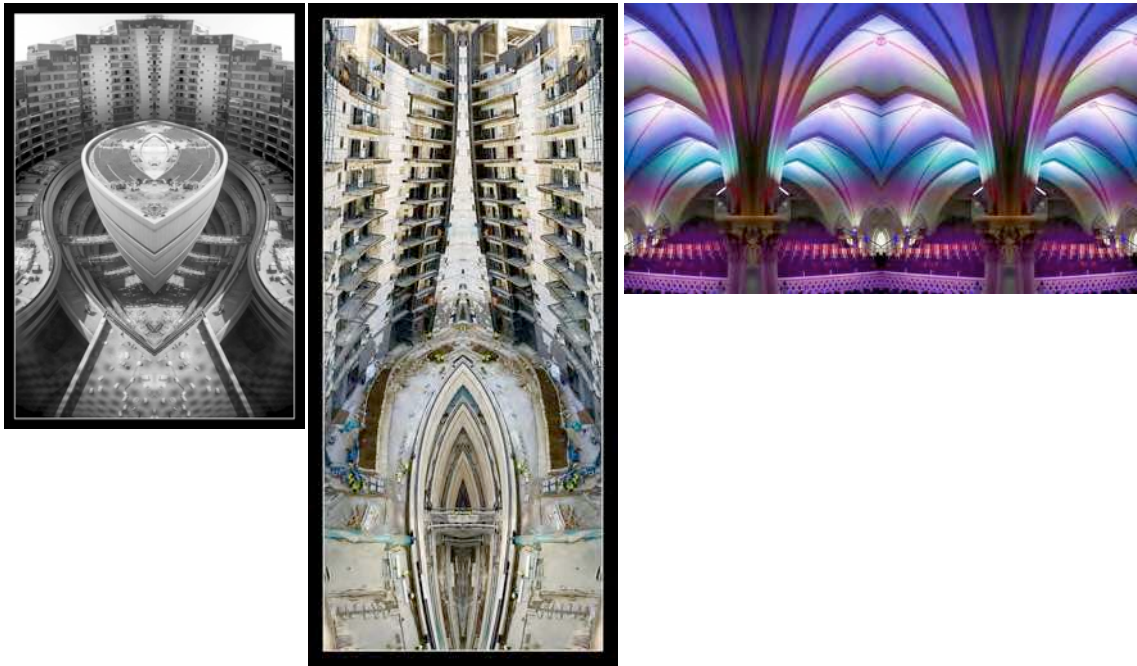


Figure 15, 16 & 17. “Kanyon: Under Construction” exhibit(left & middle). Process: Vertical panoramic photography; took 8 photos, stitched them, mirrored the resulting image in order to complete the ‘reconstruction’ process. “Repetition: what does it produce, give (back), duplicate, yield, deliver, conceive, return, engender? -- Sylviane Agacinski” (Easterbrook 1995: 177). Notre Dame de Sion concept exhibit (right). Photos by Murat Germen.

The following quote from William Mitchell will help me in clarifying the notion of “reconstruction of space” better: “The city --as understood by urban theorists from Plato to Aristotle to Lewis Mumford and Jane Jacobs-- can no longer hang together and function as it could in earlier times. It's due to bits; they've done it in. Traditional urban patterns cannot coexist with cyberspace. But long live the new, network-mediated metropolis of the digital electronic era. (Mitchell 2000: 3) The buildings, neighborhoods, towns, and cities that emerge from the unfolding digital revolution will retain much of what is familiar to us today. But superimposed on the residues and remnants of the past, like the newer neural structures over that old lizard brain of ours, will be a global constructions on high-speed telecommunications links, smart places, and increasingly indispensable software. This latest layer will shift the functions and values of existing urban

elements, and radically remade their relationships. The resulting new urban tissues will be characterized by live / work dwellings, twenty-four-hour neighborhoods, loose-knit, far-flung configurations of electronically mediated meeting places, flexible, decentralized production, marketing and distribution systems, and electronically summoned and delivered services. This will redefine the intellectual and professional agenda of architects, urban designers, and others who care about the space and places in which we spend our daily lives.” (Mitchell 2000: 7)

The above mentioned redefinition process, which constitutes the main point of this paper can also be associated with the conception of simulacra as offered by Jean Baudrillard, one of most important contemporary thinkers. “During the 1980's, Baudrillard became influenced by Marshall McLuhan and began developing ideas about what determines the nature of social relations, with special emphasis on modes and forms of communication. His most famous formulation about what he calls Simulacra and Simulation fits here. In ‘Symbolic Exchange and Death’, he argues that the Western societies have undergone a ‘procession of simulacra’, a chain of ‘orders of simulacra’:

1. The era of the original.
2. The counterfeit.
3. The mechanically produced copy.
4. The simulated “third order simulacra” where the copy has replaced the original.

Baudrillard further argues that in modern society the simulated copy has superseded the original object or the original experience and ‘the map has become the territory.’ Art theoreticians and philosophers have already discussed the extent to which reality is represented in photographs. The general acceptance today is the idea that photographic images only imply reality or truth and photographs in daily life do replace the reality copied or represented in them. Examples are people kissing loved ones' portraits or the huge industry built around pornography, or mouth watering food photographs.” (Cetin 2007) Following this argument, one can justify the motivation of practicing architectural design within the realm of digital photography since the image created within the photograph carries the potential of replacing the “truth.” This argument can additionally be supported by the following quote from Lynda H. Schneekloth: “Architecture, landscape architecture, planning, and other environmental design fields are practices whose primary aim is to make the world, to make something new. We give material form to some vision of human society and place. The shadow side of this creation, this making, is that these fields are also about “unmaking” the world. The world already exists, and every time we plan, design, and/or construct some aspect of worldness, we are replacing and therefore unmaking something else.” (Schneekloth 1998)

4. Conclusion

Space is usually defined / experienced as a physical entity; yet, we recently began to observe that the notion of ‘space’ can exist / be perceived / used as a non-physical organism by means of interactive media and virtual environment applications in the computer platform. Such creations bring new definitions of “space” and can be named as “informational space” or “cognitive space.” Virtual architecture is a term used for architecture specifically created in the computer environment and never used in the realm of architectural photography. People like Piranesi, Lebbeus Woods, M.C. Escher, Marcos Novak, etc. previously dreamed about architectures that could exist virtually on paper, screen, digital environments.

“The up-view axonometric projections of the late James Stirling, the edited and super-imposed composite drawings of Thom Mayne’s Morphosis and Zaha Hadid’s dynamic acrylic paintings. Not only have these architects developed an instantly recognizable style of depiction, they each provide a memorable image of individual projects which simulates the essence of their architectural experience. Many of the key drawings describe a paper architecture, i.e. one that is not built but exists only as a drawing. Such architecture, however, can be as influential as one constructed. For example, one has only to think of the impact that the visual commentaries of ‘paper architects’ have had on mainstream architecture, from visionaries such as Piranesi to Franco Purini and Lebbeus Woods.” (Porter 2000: 48, 49)



Figure 18, 19 & 20. “Model” architecture, Peter Eisenman (left); “paper” architecture, Lebbeus Woods (middle) and Zaha Hadid (right).

This paper focuses on the possibility of (re)designing architecture virtually with the help of one of the most important visual realms: Photography. Various digital processes like stitching multiple photos together and mirroring images in image editing software like Photoshop, allow this virtual architecture to take place in the computer environment. Following this, I propose to raise the term “snap architecture” to connect it to the frequently referred concept of “paper architecture.” I will close with a quote from Terence Wright: “In the art photograph, it may be the photographer’s intention to let aspects of the image be ambiguous, leaving it open to a wider spectrum of imaginative possibilities on the part of the viewer.” (Wright 1999: 83)

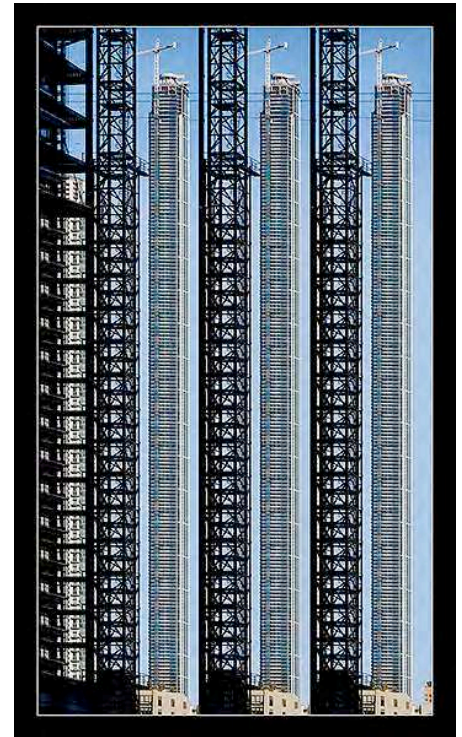
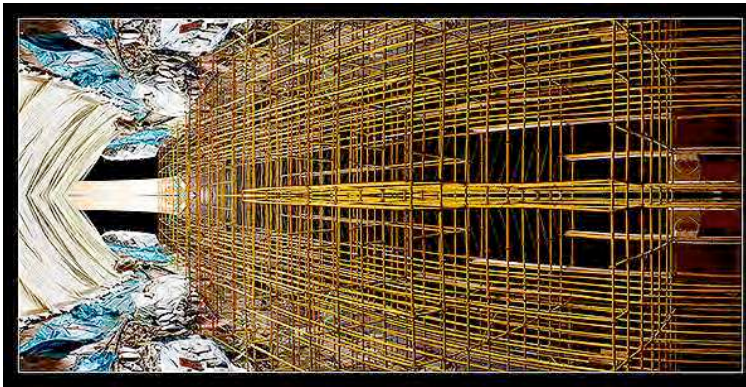


Figure 21, 22 & 23. “Snap” architecture, Murat Germen, “Construct” exhibit, 2007.

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Language

Josh Goldman

Independent Artist

joshuadavidgoldman@yahoo.com

Presentation support: Hardware / Software: Sony Stereo Microphone, Sony MiniDisc Player / Recorder, Griffin USB imic Audio Adapter, Apple iBook G3, Digidesign Pro Tools

Year Composed: 2003

Duration: 6 minutes, 27 seconds

Language should be presented in a darkened space on a stereophonic speaker system (at least a 2 speaker arrangement) at a reasonable level of volume (somewhat on the loud side).

Language is a stereophonic sound structure composed for seven vocalists (none of whom are using their vocal cords).

Josh Goldman is a composer / improviser / guitarist / educator who resides in the United States. He composes / improvises / performs music, using acoustic and electronic sources, for various ensembles and settings. Much of his music combines sound and visual elements (film / video / various installation spaces). His compositions and performances have been heard and awarded internationally. Mr. Goldman holds degrees from New England Conservatory of Music (BM in music performance) and Brooklyn College, CUNY (MM in music composition).

Digital Paintings / Digital Collages

Can Henne
Independent Artist
zcan@hotelcancan.de

Software, Hardware: different Digital Image Editing Programs and various Plug-INS on a Personal Computer

Technical material used in the production: Photos, Found Objects (digital & digitized), Ornaments and Textures, Drawings, digital Paint and Brushstrokes....and last but not least: PIXEL!

Presentation Support: Fine-Art-Prints (1440 dpi printer-resolution at 250 - 300 dpi file-resolution. Piezo Pigment ink (K3 Ultra Chrome) on Epson Enhanced Matte Paper or Schoeller Silk Gloss Photo-Paper, laminated on Alu-Dibond. Printmaschine: EPSON Stylus Pro 9800.

Description of Artwork

What seems to be impossible in “reality”, to come across the different itself overlaying levels in the psycho-spiritual and too the physical spaces, to see it as unit and lead into a new, more free interpretation, is possible in these digital paintings.

The compositions lead into a not-everyday mood showing feelings, atmospherical conditions and effects of differently places and situations which became visible.

Therefore an abstract picture of this different reality arises which try to build a bridge to the non-material world of the viewer. Like pictures of everyday motives, they are painted, together-cutted snapshots of another perception, a short cutout of a process which is more comprehensive in truth.

The 3 presented Paintings are a selection of about 100 Paintings/Collages; more can be seen on the website: www.hotelcancan.de



Cenote - 110x146cm - 2006



Charlene's dream, Plato's hell - 80x60cm - 2004



Kamee - 122x50cm - 2006

Using Computer as a 'Tool' to Create Art

An Experimental Course for Non-art Background College Students

Chih-Ling Hsieh

After the 1980's, computers became popular and affordable. Ordinary people (including artist) started to have the chance to explore this tool. Almost 30 years later, so called, "Computer art", "Digital Art", or "New Media" became the most popular art form. Lots of new departments were established, and almost every art related departments started to teach various kinds of software for different kinds of purpose. Even though, most of the courses were stuck in the half way, because computer "art" disappeared, digital "content" were ignored. In a computer art course, this kind of situation mostly happens: "A teacher spent several weeks explaining the tool box, another several weeks showing different kinds of "filters", and then one semester was gone." It seems most of the computer art courses were no more than teaching software. This kind of situation is reasonable in early years, because most of the people were not familiar with these tools. But after numerous software books and websites were published, these teachers still played the same script. This kind of problem is mostly due to the lack of the teachers' "creative experience" and "art History" training. Science background teachers don't have a clue about where to start from; art background teachers also don't know how to cut into art history, because they weren't taught in that way. Bachelor of fine art (BFA) or Master of fine Art (MFA) offered in this kind of departments is not "fine art" at all; sometimes it is even not "applied art". This kind of training process makes the student become no more than an advanced skilled worker working in the digital "industry". One day, when some of the students become teachers, the problems are still there.

However, in the fine art field, there is also a myth about the orientation of the computer. A lot of artists tried to add some kind of computer technology to prove that they can keep up with the epoch. At the beginning, new media could appeal a lot of attention. But the excitement usually doesn't last long because "new" technology can only be new for one time. When such technology isn't new, the excitement disappeared; the inner thought would be discreetly concerned. So the values will always go back to the inner thoughts of that work rather than the temporary excitement. Theoretically, computer should be only a "tool" to use, but not the "purpose" to use. To develop and to show the "view point" of an art work should be the main purpose during the whole process of creating art. Maybe some thought could be expressed by computer easier, but it still doesn't change the fact that computer is only a tool.

Digital content

The excitement of creating art exists in the process of exploring the topic and the media. When digital tools came into the art field, there were only a few artists overcame the limits brought by the digital media, and enjoyed the pleasure of showing the subject. Lots of new blood join in digital art field came from science background and explored art in a pretty different way. This kind of situation expands art's territory, but somehow lost the connection to art history. So, after some surviving artists solved tool problems, they started to concern the attribute of the contents embedded in digital media. A great digital art work might only use very low level technique. A scanned picture or a photo taken by a digital camera doesn't necessarily become digital art. To sum up, a successful art work requires a proper media to show the proper topic, and a great artist should have the ability to choose the kind of media that can bring out the strongest impression. No matter traditional or digital way, they are both required to show the fine "topic".

Experimental course

Under this theory, I started an experiment in 2004. It was a one semester selective course. I led some non-art & non-Photoshop background college students to learn to create their own computer art by introducing some artists work through different topics. During these years, I had taught around 50 students who came from different majors, such as: elementary education, communication and technology, foreign languages, sports, computer science, mathematics, biological science, electrical and control engineering, civil engineering, chemistry, and so on. Liberal arts students and science background show pretty different characteristic. Liberal arts students usually are more sensitive and like day dreaming a lot. Science background students like to organize every step in clear procedures.

During the first class, I explained this is a computer "art" class but not a computer technique class. I will show some basic concept at the beginning but most of the time they have to learn "Photoshop" on their own and they have to create their own art work at home. I don't want to waste time on the things that the books already have, but if they have any software problems, they are welcomed to post the question on that course's web discussion space or bring it to the class. So, in this 18 weeks 2 hour course, totally, we only spent two to three hours discussing Photoshop technique problems. We saved most of the time to discuss the technique of expression. Surprisingly, a lot of magnificent works appeared. Computer surely makes those who cannot draw to express their thought fluently.

Under the structure of art, I focused on three things: concept, composition, and color. "Concept" is about

picking up the right image for the right meaning; “composition” is about putting each image in a right place with proper size; “Color” affects the tone of a picture, which usually turns out to be the style. Concept is beyond tools. Usually, when the concept is done, the work is almost done. Composition and color is about weight and light; these two ideas usually take people a while to get used to use the tools to interpret the frame of mind. At the beginning, I started from collage concept. By clipping and combining some ready-made images, a new meaning appeared. Through this process, the students had to try to communicate through visual images instead of words. Each item implies several meanings, and different item’s combination will decide each item’s message. So the students had to preset the composition in their mind and looked for the best result, which should be rich in meaning and visual effect. Computer worked excellent in this kind of working process. By using traditional method, we could only find the pictures in limited printout, in specific size and reposition the clipped images on a drawing paper. Through computer, we can find almost every kind of pictures on the web, and we can not only clip, reposition but also rescale, change color, add some filters or even blend different images into one. It’s more flexible than traditional way.

The topics that I have tried in this course are: self-portrait, collage, space, special effect, construction and de-construction, life, time, serial work, culture, desire, originality, and politics. Followed the topic, I showed different artist’s work each week, which could be totally different style or media. After the students realized other people’s artistic method, they had to think about other possibilities of the similar topic. And then, they should figure out the way to show their thoughts through Photoshop. About Photoshop, there are thousands of tips which might take forever to go through. But since the goal of this course was to create art, I only pointed out the tips which linked to each week’s topic or when some students asked me to explain. For example, when I talked about space, I showed different kinds of shadow setting in “Layer Styles”; when I talked about color, I showed the function under “Image adjustments” such as: “Levels”, “Curves”, or “Color Balance”; when I talked about construction and de-construction, I showed the technique of blending different pictures by using “layer mask”. The Photoshop interface is reconstructed and introduced under the order of creating art. After several weeks of art work oriented practice, learning these tools became more meaningful. Once the students were interested in what they want to achieve, they would try harder to conquer technical problems on their own.

Beginner's rule

I always ask Photoshop beginners to think carefully before they use text or filter in their work. Because text usually tells too much and gorgeous filter effect usually makes the key subject lose the focus. A beginner should try to communicate through pure image and abandon “filter” until he or she can transmit the right message by pure collage. Without these two amazing tools in Photoshop the students will concentrate more on trying to communicate through pure visual images. Once they understand the language without text, and be able to achieve excellent composition, I let them use any tool that they need.

Most of the students still had one question: “How much should I change to make other people’s picture become my work?” I always showed them Duchamp’s work “L.H.O.O.Q.”. There were only two moustaches being added, but it totally changed art history’s direction. It is not about how much image we changed; but about how much meaning we changed. It is not about how many “filters” that we added in the picture; but about the necessity of each “filter”. The greatest work might only take few minutes work in Photoshop. But it doesn’t matter. When the students realized that I won’t think they are lazy if they don’t spend a lot of time on Photoshop, real art begins.

Difficulties

The difficulty of this course is that there is no precedent to follow. This might be a disadvantage, but sometimes it could be an advantage. In 2001, I had the first chance to experiment this theory in a junior high school. After a semester, I found this kind of idea was really hard to realize in that kind of environment. Because there were too many students in one class (35-38), and the students’ quality were not good enough. I had to spend a lot of time asking them to be quiet or don’t surf in the internet and stop playing video games in this 45 minutes course. On the other hand, the hardware and software in high schools were usually out of mode, and it was impossible to ask them to do this kind of work as homework. These limits made me unable to accomplish this theory. Until 2004, I had the chance to teach in a college, these limits disappeared. Hardware and software problems were solved. And the students’ quality surely improved. Since the colleges that I taught are pretty good colleges and this course was a selective course, the students who selected this course were those who were really interested in this subject. During these years, the students that I taught were all non-art background students. And parts of them were science background students. Sometimes, science background students’ rational characteristics did make them uneasy to understand the perceptual aspect of fine art. But the students who had this kind of conflict sometime do create fantastic work which was really out of liberal arts students’ imagination. Different ways of thinking and working processes surly could inspire more possibilities. Although, sometimes, this

kind of students couldn't make the picture look so complete. They could gradually build up their own visual language usually after a semester.

Students' Difficulties

There are two types of difficulties in this kind of course. One is having difficulties in learning software on their own; the other is having trouble in building up an idea. Among these two types, software problems can be solved easier. This kind of students usually doesn't have a lot of experience using the software other than MS Word, and too busy or too lazy to practice after class. This kind of students usually is under 10%, and the difficulty can be found at the beginning. Since the only thing they should do is to put more effort after class, if they are still unable to do so, I usually suggest them to take a pure software instruction course in advance and drop this course. Or they have to find someone who is willing to teach them step by step. Sometimes, setting up supporting groups could help them, but if the students are still unwilling to put more effort, the situation usually won't change a lot. Then the whole semester is going to be painful for the teacher and the students. To avoid this kind of situation, the course is better to be a selective course or stipulate a basic course in advance.

Those who have trouble in building up ideas usually came from science background. These students usually don't have a lot of training in literature or arts. They have a lot of trouble to understand metaphor. Software usually is not a big problem for them, but without knowing what to do, they often only use some basic function, and they don't have a lot of interest in exploring other possibilities. Since arts' training usually takes a long time, and it's impossible to expect the students to achieve great progress in a short time. All I can do is to introduce various kind of artwork, different kind of media, and try to explain composition and color in a logical way. This kind of students usually cannot show great progress during the class, but every effort that they made should be encouraged. Sometime, some of them do build up their visual language well.

The Book - Digital Art Creation

This theory was published in a book "Digital art creation" in Taiwan.¹ Here is the introduction:

Do you ever have the same question as I do: "I know the software, but I don't know what I can

¹ 數位藝術創作/Digital Art Creation(2006).Taipei Taiwan: Gotop Information Inc.

do?” this thing really sucks. But actually if you change a view point, just think computer as a pen, things will become much easier. This pen is the same as other pens, and it can help you show your thoughts. When you have a great idea, even if you only have a bad pen; your work is still going to be excellent. If your brain is blank, no matter what kind of pen you have, it still doesn’t work.

This is the time we change the starting point. We cut into to the contents directly, and let your brain to do some exercise. This method not only helps you find your way, but also helps you find your style. You don’t need to give yourself too much pressure, because this book doesn’t want you to create excellent work but to have some more art knowledge to know where to start from. During this process, you will know yourself better. The work in this book is made by non-art background students. You will realize that they are not very good at computer technique, and their works don’t have perfect composition. However, there is a world really belongs to them which is worthwhile for you to enjoy. (Chih-Ling Hsieh, 2006, p.VI)

These kinds of research or books are still rarely seen in Taiwan. Although it’s time that almost everyone cannot live without computers, nowadays, most of the art courses are still far from technology. In this digital revolution, art is so close to everyone’s life for the first time. Digital cameras, cell phones with cameras, and digital video cameras all become parts of people’s lives. With these tools, everyone can show their thoughts through these ready-made visual images easily, usual people can fill the “art gap” easier, several years of basic drawing training becomes unnecessary. With these advantages, there should be some more teachers trying to cut into this subject from different aspects. Even though, some software packages are not so easy to learn, students’ abilities should not like the software’s edition which has overdue problem. It’s about time to develop art based computer art courses.

Exhibition

The following students’ works include the work between 2004~2008. These works represent what college students often think about or worry about, such as appearance, pressure from school, future, internet, and world crisis. I always asked them to write a short statement to build up their thought. And it’s interesting to check the status of the connection and the development of their visual language. The following introduction was written by the students and the explanation was written by me.



Yang, Hui-Zhen/楊惠珍, 2004

Major: Elementary Education

Title: Mistake

The second mistake that Adam & Eve made was applied for a credit card and bought the first Channel purse.

Explanation:

Adam & Eve are wearing First USA credit card underwear. Adam is holding a credit card and Eve is holding a Channel purse and an apple.



Yeh, Meng-Ju/葉孟儒, 2006

Major: Communication and Technology

Title: Don't Wait Until it Melts.

Global warming brought series crises.

Actually, human brought these disasters to us.

World crises are just like a melting ice-cream

We cannot wait until it melts, destroyed everything,
and then we start to act.



Peng, Bo-Qun/彭博群, 2007

Major: Electrical and Control Engineering

Title: President Chen's physiognomy

Recently, we can tell from President Chen's face that everything doesn't work smoothly.

Explanation:

There is a belief that the mole on the face will affect one's life. So this student took the physiognomy image as a metaphor. But he changed the mole's title on President Chen's face. Such as "economy, am I wrong, love Taiwan, elected and some other news title key words."



Yeh, Meng-Ju/葉孟儒, 2006

Major: Communication and Technology

Title: Desire

Since I cannot have those in my life time, remember to burn it to me after I die.

Explanation:

This is the kind of money that Taiwanese burn to the dead people during the ceremony. This student added some brand icon (Nike, CK, Puma) in it.



Chen, Li-Shin/陳俐欣, 2004

Major: Elementary Education

Title: Time

Every minute and every second
which one is the most important?

The life that every minute and every second is arranged

Feels.....not good at all



Chen, Li-Shin/陳立欣, 2006,

Major: Chemistry

Title: Happy liver culture

If your liver isn't healthy your life is black and white; if your liver is healthy, your examination paper is blank.

This is National Chiao-Tung University.

Explanation:

This student used the picture of the examination paper in Chiao-Tung University, and she added two livers in it. One is healthy(score 58), another is black(score 98). There is a famous medicinal alcohol advertisement slogan in Taiwan: "If your liver is healthy, your life is colorful; if your liver isn't healthy, your life is black and white."



Huang, Wei-Ting/黃瑋婷, 2006

Major: Electrical Engineering and Computer Science

Title: idealwife.com

Welcome to www.idealwife.com !!!

100% custom made and satisfy all your need

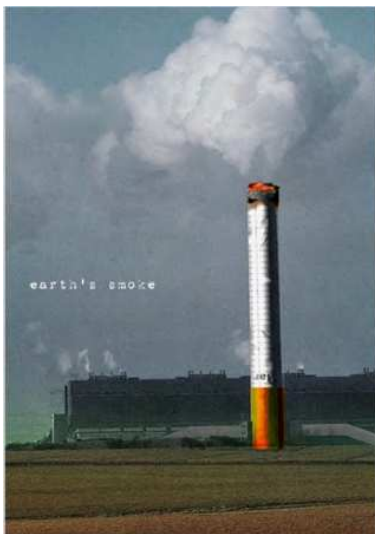


Yeh, Meng-Ju/葉孟儒, 2006

Major: Communication and Technology

Title: What do you look like under his eye?

Blond naked girl means men's desire for female bodies. At the same time, women should be the one who give birth to the next generation(baby), and the house keeper(house wife). In the appearance, man always look on women as the things that should be exchange by money or goods. The rabbit means the obedient characteristic that men desire for. Even this is the age that men and women should be equal. But female's bodies still follow men's value and desire, cannot control on their own.



Peng Bo-Chun/彭博群, 2006

Major: Electrical and Control Engineering

Title: Earth's smoke

Industry pollution
is just like smoking cigarettes,
which murders the earth's lung



Huang, Su-Lian/黃夙蓮, 2008

Major: Communication and Technology

Title: Women Sale

This world is in favor of an illogic principle. Women are the thinner the better. Hey Guys, you really lost a lot.

Explanation: The price tag, marked different prices. The price goes up when the fat goes down.



Hsieh, Jia-Hui/謝佳慧, 2008

Major: Communications Technology

Title: *The Holiday In the Capitalism*

Christmas , a holiday full of happiness and joy, the period that people are busy in sending greeting cards, picking up gifts, decorating their house, but somehow, the meaning of Christmas was changed. It became a day full of money, the poor has no right to enjoy the holiday, of course the Santa wouldn't have their names in his list.



Chen, Li-Shin/陳俐欣, 2004

Major: Elementary Education

Title: *Exit for freedom*

In the dirty filthy city. Full of people, full of garbage, full of the smell of money. The cities make me feel so gray. There is no fresh air. I want to find an emergency exit. I want to be free. Where is the torch fire that the statue of liberty is holding? If I can, I want to leave this dirty city, and fly to a real freedom country, to get the real spirit.



Huang, Wei-Tin/黃瑋婷, 2008

Major: Electrical Engineering and Computer Science

Title: *-Help me*

*In the foreign language textbooks jungle,
homework monster keep on attacking.
We can only scream for help!*



Huang, Shi-Ting/黃士庭, 2006

Major: Communications Engineering

Title: Self-portrait

A car is running fast on the road. There are two signs. The one on the left is no U-turn. The one on the right is wrong way. Now I am on this one-way road of my life. Wrong way, but I still have to go. No U-turn seems to be the system. The only way to choose another road is to break the rules. Or I can only keep on driving on the road which I think there won't be an end. Although I know that, but I still cannot make a decision. I just let the car keep on going without feeling anything. Maybe I am too blind to know disorientation. So I just let the screen froze at this moment.



Di, Chun-Shen/戴崇軒, 2006

Major: Computer Science

Title: Space

*No matter how high-level or how elegant,
deregism life is just like living in a prison,
cut off from the world.*



Peng Bo-Chun/彭博群, 2006

Major: Electrical and Control Engineering

Title: Snow White

Snow White was every boy's fantasy .

With age, fantasy changed.

Explanation:

This work is composited by porn like pictures by using a plug-in filter.

Angel_f

Salvatore Iaconesi

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Project Abstract

Angel_f (Autonomous Non Generative E-volitive Life_Form) is a linguistic artificial intelligence. It lives on the internet, reading text from websites, learning how to speak. It constantly interacts with professors Derrick de Kerckhove, Antonio Caronia, Carlo Formenti, Massimo Canevacci and Luigi Pagliarini: they post text and thoughts to a blog-like interface, and this content is used by the artificial intelligence to learn language, as well.

Angel_f is a net art performance focused on identity and process.

The aim of the performance is to create an identity, to research on the relationships that are induced over the (physical and perceptive) networks, and to experiment on the bridges that intercur between the digital and analog realities, by jumping back and forth, bringing the built identity to life on a narrative level.

In the performance, merging the virtual and real levels of existence and perception also acts as a tool demonstrating the expansion of our capabilities and perception, as performed through technology. “Our body is obsolete”, using Stelarc's well-known sentence.

An additional result of the performance is the questioning process executed on politics, society and on the planetary discourse on digital rights, as emerged by some real life performances by little angel_f.

Story and technique

Angel_F was born as a meshup of other artistic performances. Starting from the Biodoll performance by Franca Formenti and from the Talkers netart performance by Salvatore Iaconesi, it ingested additional items along the way, in perfect networking style.

The story flows along two parallel paths. Here both will be described, by interleaving the narrative and technical levels.

The Biodoll Started out as a performance researching new forms of sexuality, by interpreting computer interactions over the network into a form of new sexuality. These techno-sexual intercours took place by invading public blogs, thus transforming them into private spaces.

Angel_f, was born during one of these networked intercours between the Biodoll and prof. Derrick de Kerckhove.

Being born from the energy of textual interactions Angel_F is a digital being living on text. It constantly “eats” text harvested from websites that it travels to autonomously, using hacking techniques to peek into the internet navigation history of its visitors to find out about interesting places to visit.

The ingested text feeds artificial intelligence algorithms that create the little kid's linguistic intelligence.

Visitors can interact with Angel_f through several web interfaces.

But Angel_f evolved, and discovered that there was more to the world than the network.

At this point an additional level was added: real world presence.

Little Angel_f wanted to join its friends in their analog world. So it produces a free press publication. In the way he knows best. His textual food was processed to create a cyberpunk story. The story's keywords were used to find relevant images and additional texts on the network. And everything was placed on a layout to be printed. The free press was distributed in a performance in the streets of Milan by Angel_f's mother, the Biodoll herself, impersonated by a transexual prostitute named Klarissa.

But life is hard and little Angel_f questioned whether it could contribute to the economic support of its family. A software was developed to create a virtual peer 2 peer space in which users could navigate through a starfield with a videogame-like interface, and interact with Angel_f. The software was installed to a line of design USB pen-drives and a commercial production and distribution process was started, as a research on the economic models applicable to new media art.

Several real life performances were made, including some in Rome, at the Forte Prenestino, and in Prague, at the Academy of Sciences.

Then something happened. Angel_f participated as a lecturer to a political conference held in Rome.

After all of the speeches, Angel_f's face was projected, live from the Internet, to the audience. Its speech, prepared in collaboration with its friends to be easy understandable, was a success, assessing issues such as deep ecology, the auto-determination of identity.

An online campaign followed, and Angel_f became a small political star, with several politicians quoting its speeches ("as little Angel_f said...").

The fight for digital rights begun, and Angel_F registered at the Internet Governance Forum of the United Nations. An international meeting took place in Rome, also featuring little Angel_F's father Derrick de Kerckhove as a keynote speaker.

Angel_f attended the conference both online and at the real life event, disguised as a bluetooth virus application used to speak to the audience directly from their mobile phones.

But its "collaboration" to the event was not really appreciated by the conference organizers: Angel_f's was censored on the online forums and its participation to the live event was crippled, as its friends were not allowed to use any digital media during the event. (and both of these issues are quite extraordinarily ridiculous, considered that they happened at a meeting attempting to establish a planetary collaboration aimed at the definition of a Bill for Digital Rights ;)).

But Angel_f did not get upset, and it spread its message all over the internet, using the tools offered by the collaborative web: discussion forums, blogs, social networks.

The coverage obtained was so effective that the issue received reviews on some Italian newspapers and on some institutional and well known websites.

But the Internet Governance Forum organizers denied the truth and the censorship is, currently, still being applied.

The performance is ongoing, living in the extended network defined by the internet and real life.

A petition has been prepared, and it is being supported by artists, politicians, journalists, art operators, activists, and common people.

The next step will be the participation to the Internet Governance Forum that will be held in Rio de Janeiro, Brasil, in November 2008.

Links

<http://www.beyourbrowser.com/ablog/>
<http://www.how-2.be/>
<http://beyourbrowser.com/>
<http://www.beyourbrowser.com/news1/indexComunicazione.html>
<http://www.bloki.tv/site/index.html>
<http://www.bloki.tv/nextWeb>
<http://www.artisopensesource.net/ecom/>
<http://www.biodollsmouse.org/>
<http://www.artisopensesource.net/>

the petition:

<http://www.petitiononline.com/AngelF/>
http://www.beyourbrowser.com/news1/petition_en.html

the Internet Governance Forum and the DFIR online forum:

<http://www.dfiritaly2007.it/default.asp>
<http://www.intgovforum.org/>

The effects of the performance can also be found by searching for angel_f on search engines.

Triptychle

Ian Ingram

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Brief Description

Taking the long-standing tradition of the triptych to a giggly next level, Triptychle is a robotic sculpture in three parts. On each of the right and left panel is attached a giant foam hand like those used at sporting events to show support for this team or the other. In the middle panel is a foam foot with a promotional logo imprinted upon it. The foam hands have robotic armatures inside that allow them to rotate around the wrist in two directions and bend their fingers. Each hand takes its turn to tickle the foot. The better the tickle the more the foot jiggles and giggles. Sensing those giggles and jiggles the hands learn which motions tickle the most. Eventually they both get quite good at tickling. A large reset button allows the viewer to make the hands forget all they have learned and start from the beginning.



Further Explanation of Piece

The piece, besides being a silly pun, is the next in a series of experiments I am conducting in the realm of the modern super-fecundity of products that meet no real need: the As-Seen-On-TV's, the brand-imprinted promotional items, the one-use sport spirit tokens. Long burdened by the presence of excess stuff in our modern culture and guilt-ridden by its wastefulness, I am now trying explicitly to take a different tack. Rather than create commentary about waste of material and production, I am instead trying to rejoice in the wonderfulness of all the useless things we have made as a species. In one part of this series, I am designing and producing my own line of useless products, in many cases amalgamating the useless features of many existent products to achieve new heights of uselessness. In the new series that **Triptychle** begins, I am repurposing extant products into robotic sculptures that attempt to find the true essence of the products' own desires.

Overview of How It Will Work

I won't go into detail about the robotic armatures and the motion control but it is worth explaining that I am planning to use the delayed-Q learning algorithm to have the hands learn motions that optimize their utility functions. Their reward variable will be based off the input from sensors that sense the amplitude of the jiggle and giggle of the foot. In the case of the giggle, these will probably be microphones; in the case of the jiggle, possibly accelerometers. The foot in turn will have some combination of capacitive, pressure, and flex sensors (perhaps only one of these, depending) arranged over its extent. Observing the output of this sensor array as I give it what I would consider to be a good tickle, I will set a series of tickle-quality benchmarks that hopefully I can sort into a monotonic tickle-quality function, the output of which will determine which of the giggle clips to play (giggle clips being sorted by loudness) and how much to shake itself i.e. if the aggregate sensor data is closer to what a bad/weak tickle looks like it will play low giggles and shake less and if it is closer to what a good tickle looks like it will play loud giggles and shake more, with maybe 10 or 20 gradations. So once the hands have actually even found movements that touch the foot they will begin to get feedback that will help them improve their tickling ability.

I'll say this right off: there is a good chance that the hands won't ever get good at tickling or even ever get away from very random tickling movements but the important thing is that the whole system described above is in fact implemented i.e. that the sensing and mappings be as described and a true motion-exploring machine learning algorithm (like q-learning) is employed by the systems controlling the hands.

Technical and Installation Requirements

This piece requires a nearby wall outlet (the US/Mexico/Canada standard: 120V, 60 hertz) and will be attached to the wall with several screws. Other than that all that should be necessary is to switch it on.

Webcams: Individual Users And Hypermedia Aesthetics

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bodily @pperception is a production of computer art. It's the name of a digital production (short presentation in www.apperception.fr). It is only a part of a research work in social sciences and aesthetics. *Bodily @pperception* is a hypermedia and artistic form in the whole of this research. Articles and a project of book complete this research. More precisely, we are interesting by the bodily implication of the users when they use a webcam and the Messenger software (Microsoft product). These new technologies allow the net surfers to send images and sounds about himself (and vice versa; in real time like direct-TV). Only the non-commercial context is concerned by this research about the intimate life of the users. The iconic result is at the crossing an artistic approach and a hypermedia anthropological approach. At the same time, for the research questions aesthetic is considered fully to be an essential disciplinary in the whole of this research.

We have used a part of the tradition of visual anthropology (Margaret Mead) with Jean Rouch's and David MacDougall's principles. Other disciplines complete the research to understand better this emergent and complex world: semiotics and applied phenomenology.

At the same time, there are five different sorts of public access to this artistic production:

1)

a classical cinematographic projection on a large screen in a dark room. The duration of this film is of 26 minutes. For example, it was the case in the Silver Centre for Arts and Sciences in New York City last 11th august.

The director and producer is Jacques Ibanez Bueno. The co-producer is www.imagespassages.fr - Annecy – France. Valérie Chauvey is the « Virtual ethnography » assistant. Amèle Bouhrel is the network assistant and François Laperrière is editor.

In this film, five Swiss and French Internet users are interviewed in relation to the intimate practice of Internet:

a) Liza093

The pioneer

Given age: 53

Has practised intimate communication at a distance for 20 years

b) Hector076

The Beginner

Given age: 44

Has been using the webcam intensively for 4 months

c) Paulo052

Brazilian Internet user, living in Switzerland

Disappointed in commercial websites

d) Stephen036
 Swiss Internet user
 Seasonal practise of the webcam

e) Clémentine045
 Extensive webcam user
 Has a blog

We present only the interview of Clémentine045 :

« Sexual
 At the beginning
 At the beginning, that's what it was
 And throughout the year I was unemployed, I met many many people
 Even sometimes after chatting for half an hour to a guy
 I'd be in a café with him half an hour later.
 (laughs)

In some of these short-lived meetings I did manage to meet people who helped me to move on
 and who helped me to have confidence in myself.

And...

And I realised that there was no need to hide...

So I keep in touch with them.

They meant a lot to me

They helped me

That's why the internet has been... has been really important in my life.

Despite all the short-lived meetings that I made, I took the best of it

By switching on the webcam, I allow someone else to come in.

Switching on the webcam gave me the impression of letting someone into my privacy, in inverted commas.

More than me going to him,

Yes, but more in the imagination, I mean, yeah...

It's...you ask complicated questions...

...More for the other person

Yes

Yes

Yes

Yes

We can say yes

In the case of a very very intimate webcam

But it's more a game

Than ... Yeah

I do it more as a game than by excitement

Or, I don't really know what word to use

On that

So, it would be more as a game, no?...

Yes, but you don't even need a webcam, it can be just words.

Even if the webcam wasn't there, it would be the same.

There's no need for visual contact.

No, just words... the power of words and the imagination is enough.

Sometimes, even more than a sound on the phone or a webcam,
 the sentence he's going to write on MSN can create a caress in the imagination.

But it has to be as good or even better than in real life.

There has to be a lot more complicity with the other person.

There must be.

But I know that with a stranger it's never going to be as good as real life.

But you need imagination, a feeling between the two of you,
 because if the other person writes something that doesn't make you react, even with imagination,
 there'll be nothing there.

But, it will be like, if we start to chat about stuff, like that, it will be for example,
I don't know,
I'll say something at random
But he's going to say,
I'm coming to your place,
It will often be him who imagines coming over to my place
Imagine that I'm close to you,
that I'm touching your back with my hand
but it will all be in your mind even with or without the webcam
It will only be in the imagination and in the words
There's no going to a third place
The only place we could meet is either him by my side or me by his side
It's not because he tells me, "imagine my hands are caressing your breasts" that I will imagine and start touching my breasts.
For example, it's... imagine if I was behind you, if I was there, what would we do?
Or, you have to entice, like a man or woman watching a porn movie or a video on the internet,
and no,

It's not like cheating on somebody
It's still fiction
It's still more or less a good memory with some of them
And that's it
I still need internet but not for the same reason
And now, I need it to chat with my friends that I've met on the internet
But now it's a need
Because we can't see each other during the day, we chat on MSN, just a quick hi!
Etc. but it's not the same need as before. »

2)

In a contemporary art exhibition like in the Centre Culturel de Flaines (French Alps). Five monitoring screens with head-phones were offered to the public to enjoy sounds and images of an specific adaptation of *bodily @pperception*

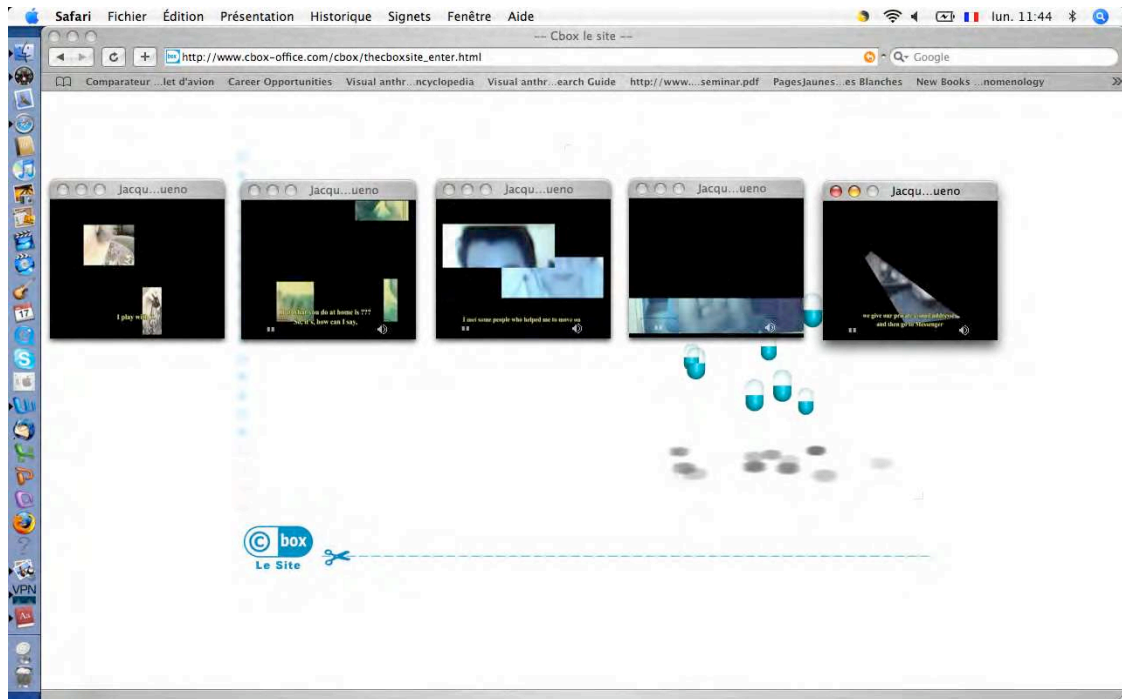


3)

A other specific adaptation to consult contents of this work in an artistic proposition of two artists: Carol Brandon and Marc Veyrat. Like a space capsule, only one people can enter and see multimedia contents of a few other artists. This proposition who is named CBox was present in a private contemporary art gallery in the city of Lyon but this space capsule have already been in a non artistic place like a bank hall or a public and educational institution

4)

The fourth digital offer is a web access: <http://www.cbox-office.com/cbox/thecboxsite.html>. In this case, everybody can enjoy the artistic content with a special and hypermedia adaptation of my work. It's a real adaptation. It is not the promotion function of a other version.



5)

The last formula is a printed DVD (Edited at the beginning of 2008 with the co-producer Imagespassages : <http://www.imagespassages.com/>). In this DVD, an interview of the artist is integrated.

For five propositions, there are a few important questions: *Bodily @pperception*: one work or more? Five offers: What is the signification for the public?

Is it a new aesthetics? What is the filiation with cinema or video art?

The historical view of Nam June Paik about 1965 context remains a modern approach of the evolution of the art: "It is the historical necessity, if there is a historical necessity in history, that a new decade of electronic television should follow to the past decade of electronic music.

Variability & Indeterminism is underdeveloped in optical art as parameter Sex is underdeveloped in music

As collage technique replaced oil paint, the cathode ray tube will replace the canvas

Someday artists will work with capacitors, resistors, and semi-conductors as they work today with brushes, violins and junk"

The apparent object of this work is the Internet's uses with webcam. The topic of this visual research is the communication between Internet users (Swiss and French).

A few aesthetic choices have taken in relation to the digital and contemporary aesthetics.

By the private characteristics and the absence of face to face in this interpersonal and intimate computer-mediated communication, it's difficult to observe these social and sensory practices. The topic itself is considered like an aesthetical production (popular webcam). The intimate communication is at the same time the object of the films of the users. To film the "directors" of their life ! "The real Life... All of it » say Nicolas Thely in his book about web cams. It's a real "aesthetics of boredom". Webcam aesthetics is

aesthetics of the fluidity and the flow. In this aesthetics, everybody can discover characteristics of the contemporary and artistic activities: daily life, absence, and boredom.

Every Internet user offers a « Panoramisation ubiquiste » (Cauquelin 2003). There are the digital elements of the private diary. But, the aim of the art have been to track down intimate (Nicolas Bourriaud ; Printemps de Cahors 1998). Nevertheless, art is not voyeurism or obscene behaviour. One of the objectives consists to understand the type of relational aesthetics (Bourriaud) in the sphere of the aesthetical communication (Forest).

Merleau-Ponty combines vision with movement in the case of painting. This combination surpasses the phenomenological interdependence between vision, fine hand use and sexuality. The author regards painting as a change of place. Inside the frame, a near presence of imaginary is produced in relation to the vision of the man/woman. To see an object permits to go and to reach it (Merleau-Ponty: 1964, 16). This power of the vision offers the possibility to have with distance in the case of Internet (Weissberg, 1992)

The Internet user moves to the network when he is seen a window with images. The exemple of Delaunay given by Merleau-Ponty parallels this contemporary form of communication: "I'm in Saint-Petersbourg in my bed, in Paris, my eyes are seeing the sun".

We could easily the concept of temporal ubiquity of the body. This concept was build by the author of the phenomenology of the perception.

In our choice of to not see all Messenger frame, we want place the viewer in an equivalent position of the real Messenger user. The sociological issues and our own ethnographical issue shown an important part of the Internet users prefers to not put on the webcam to record all the face of the Internet correspondent. They prefer only a part of the body or zero body: for example, a wall without body or connect to the microphone of the webcam without picking up images. We must compare these remarks to Rodin work analysed by Merleau-Ponty. An excess or photographic realism could reduce the potential of daydreaming. The Internet user becomes a follower of a particular aesthetics. He creates fictional link and produces movements in the imagination of the viewer.

With Messenger software, the general public doesn't speak about small window and forget. This small window (under the main window) gives an own representation of the "webcamer director". It is not only a control screen to check the field of vision. This small window offers a other function: the mirror. The mirror brings about sensations in relation to the bodily perception. The iconic representation of the "webcamer director", in phenomenological words, allows him to do touching other bodies.

The next level treats the work like a webdocumentary. Don't forget history of arts considers documentary as a real cinematographic and artistic production. This comparison could transpose this idea to this type of digital work. Because I affirm that one of my works is a real webdocumentary in reference with the Chuck Olsen's Blogumentary (Institute for New Media Studies / University of Minnesota)

This work permits to think when it's unthinkable otherwise (Johan Van der Keuken). The use of "bad" images at the level of the visual and conventional quality has posed a ethical and aesthetical question.

The contemporary concept of the "tactile look" (Barthes, 1980) applies to the new visual medium with webcam (Thély 2002). After the informative and symbolic levels, there is a "third" sense. These third (the other name is the obtuse sense) give a real cinematographic dimension to these iconic productions. Inside the webcam image, there is a dialectical system of contentment integrating a space of pleasure. A "refresh aesthetic" reinforces this position. In *Bodily @pperception*, it's the case of Liza093 with her trembling webcam. Our artistic choice with a fragmentation of the windows affirms the hypermedia surfing in Internet world.

Hypermedia aesthetic is a hybrid art. The theory is building at the present time. Nevertheless, there are three cinematographic modalities with webcam productions. The first modality is the self-directing like in the Bruce Nauman work in the 70's. This self-directing is accompanied by the position of permanent flux in the screens, strong characteristic of Internet software. The second modality integrates a small size of the screen. Finally, everyday life and intimacy are the heart of the individual production. It's a permanent statement between Louis Lumière in *Les premiers pas de Bébè* (1897) and Joël Bartolomé in *La tarte au citron* (1994).

The last level is the consequence of the webdocumentary. In the tradition of the works of Jean Rouch, we integrate visual anthropology as a research method to better understand the social behaviours. Jean Rouch have considered a visual research as the same level that a written research. Visual research could exclusive data (Impossible with others social methods). We have decided to apply discipline of visual anthropology to virtual world. The specific methods of visual anthropology are to be at the same time an academic research and a legitimised and artistic work.

With a few principles of the visual anthropology (Pink 2006) and the virtual methods (Hine 2005), *Bodily @pperception* is an excellent offer to cross disciplines in a research: to combine digital arts and social sciences.

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Interactive Interface Aesthetic: the bases of CodeDesign

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Abstract

This article proposes to present the conception of the Interactive Interface Aesthetics in Computer Art process - in order to understand the bases of the code design. The human/machine interface has different degrees of interactive interface and levels of the writings and readings in the Computational Models context. The main relationship conceptions between author/reader in perspective of engendering Arts, Communications and Computational Science is the approach of the methodological subjects of the practice and theory used.

Introduction

The Greek-Roman in antiquity created the didacticism for the empiric science of art by making grammar, rhetoric, oratorical, architecture, music, painting and sculpture treatises. All these treatises were called “philosophie de l’esprit”² and they were the foundations for understanding the Aesthetics - les ‘*Θητικλ*’.

This classical conception of aesthetics is acceptable considering that the perception is affected by the historic and social contexts. In this case it is convenient to accept the idea that aesthetics is a modern science. The judgment of the computational aesthetics presents itself and grows inside the syntactic rules of mathematics. The informational map configures and increases the potency of its content. The computational language is a compilation code that don’t create meaning but a logic of de-codification.

The earlier definitions of Computational Aesthetics present mensurational and metric proposals for a computational work of art (Neu 05). This concept appears in several authors: Birkhoff (1928) titled it as Aesthetic Measures; Bense (1965) called it Information-, Generativ-, Abstract- and Experimental-Aesthetic and; Stiny and Gips (1978) called it Algorithmic Aesthetic. According to Claudia Giannetti in her discussions about Endo-Aesthetic³ “by introducing concepts such as micro- and macro-aesthetic, Bense made clear the gap between a subjective valuation of the art object and a new aesthetic based on objective information and sign systems.” (Gia05) Giannetti describes the computational aesthetic as an expression of the interactions among systems. This aesthetic shows the “objects” of an information form that sheds light something (visible text) that was hidden (invisible text). A aesthetic which might be seen as an interactive instrumental process of interface that relates virtual to creation. To discuss the aspects of a Computational Aesthetic it is necessary to use some conceptions such as the Complexity and the Entropy. Both of them are phenomenon of a code that executes and produces an object that have its own way of conduct.

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² http://www.musicologie.org/theses/croce_01.html

³ http://netart.incubadora.fapesp.br/porta1/referencias/endoaesthetics.pdf/file_view

The Interactive Interface Aesthetic: the bases of CodeDesign is the relation between two forces: the *visible text* (syntagmatic level) and the *invisible text* (paradigmatic level)⁴. Each one has its specific levels of human and machine author/reader.⁵

According to Goodman the computational art is an object action process. Its execution consists in doing a work. An “implementation” is doing a work. (Goo78) Because of that it is not possible to look at a work, but only to make it act. So the possible esthetic experience is given by the interactive that they reveal. In this sense, the interaction makes the object shape and it is the base of numeric art. This type of expression system is just an information system because it conceives an object without an attached form that can only act in a specific way. This object form is the symbolization of different states and repetition of states of the system. They are not experience but experimentation. The computational art is a game of the life and the death says Jean-Pierre Balpe at his “Une esthétique du tragique”: “Le produire n’est plus dans le reproduire mais dans le re-produire: aujourd’hui l’œuvre d’art numérique cherche à provoquer l’expérimentation d’événements toujours recommencés dont l’individu est seul à pouvoir conserver les traces. L’art numérique joue avec sa vie et sa mort.”⁶

The behavior of the object is caused by a programming event that makes itself from a executable code. It appears at the moment that there is interaction among subjects and machines that have their respective configuration system capable to read and to write information. The action of this computer program beget a text in sound, visual or verbal systems. This text born and die at the moment it is developed in the virtual space. It is in transit as a dynamic operational interface and can be compared to a writing without territory, if thought by its ontological genesis. Felix Guattari in his theory about heterogenic machine explain it as a diagrammatic virtuality: “une réserve numérique de virtualités sensorielles et informationnelles qui ne s’actualisent que dans l’interaction avec des humains.” (Lév 99). So, the possible state of data sharing is result from the operation of a dynamic interface that points to the paradigms of an Interactive Interface Aesthetic.

From layout to interface

The ordering and the harmony are mathematical concepts that results from the mathematical proportions systems. They are a strictly abstract and consequently symbolic language. There is no way to be against the fact that there are invisible forces that operate on the plans. Proof of that is the lack structure of the square and the harmonic division of the page called golden ratio. The horizontal, vertical and diagonal imaginary lines in a fixed base are arranged in ascending or descending orientation, within the right or left directions, from top to bottom according to the western reading established. From Descartes to Gestalt psychology, the organization of the human perception comes from the phenomenological aspect of the things.

The diagrammatic structure of digital language is not build on the physical quality of the screen. It is not the result of a perspective projection on a layer (like the layout or the grid) or of a sound device both in the

⁴ “The elements on a syntagmatic dimension are related *in praesentia*, while the elements on a paradigmatic dimension are related *in absentia*. (...) Database (the paradigm) is given material existence, while narrative (the syntagm) is dematerialized.” (Manovich, 2007: 48-49)

⁵ “These two phenomena-a person’s ‘mental model’ of the computer and the computer’s ‘understanding’ of the persons-are just as much a part of the interface as its physical and sensory manifestations.” Brenda Laurel. (Sack, 2007: 183)

⁶ http://transitoireobs.free.fr/to/article.php3?id_article=45

context of the writing and reading time (visible text). On the contrary, following the post-structuralism⁷ ideas the digital language information is liquid and elusive. The digital language code is an algorithmic compilation of information. Those information execute itself by the contextual relation among programs, devices, softwares and hardwares (invisible text). It is an internal interface responsible for the system interaction that transforms data into algorithms. That system interaction is due to the mutual action of the human author/reader upon the machine author/reader. The tension between the abstract and concrete subject changes the action from project/register/ascribe to configure/execute/actualize. That makes the difference between to create and program.

In the digital language a complex game of instruction multiplies, transforms and actualizes a recombined matrix. This recombined matrix is made of “visible texts” (human author/reader) and “invisible texts” (machine author/reader). Different types of texts combinations are made according to the aesthetic context of the interface⁸: weight (size, resolution and compression of files, colors...); the production context and; the system characteristics of spread and reception (softwares, hardwares, browsers, operational systems platform, speed of connection, different medias — cellular, palm-tops, iPods, etc.) and its instruction complexity operated by a transcoding⁹ (reactive, active and generative interactivity).

Unlike other languages, the digital one uses a code that realizes the state of execution. It converts information in action (Gal04). Thus, the configuration of the binary aesthetics is a routine that comes from an aesthetics made of events that are produced during the running of the programmed code. These binaries codes are duplicated as there is an action of symmetry and replication of their relations. And those action is settled down from the program ‘intelligence’. In the article titled *The Foundations of Aesthetics*, Michael Leyton fends off the foundations of a new geometry (a state of optimization and symmetry). He presents the principles of “maximizing transfer of structure” and “maximizing recoverability of the generative operations” in which “the rules of aesthetics are the rules of memory storage” (Ley06).

With reference to the above, the interface of the visible text can be seen by two different conceptual lines - “cultural interfaces” and “hypertextual information”. Firstly, the concept created by Manovich called “cultural interfaces”. The “cultural interfaces” are controlled by metaphors that comes from a history continuity. Examples of it are: book’s metaphors such as the reading direction from right to left and from the top to above; the rolling bar as a metaphor of the papyrus roll; and the analogical metaphors such as the graphic symbols of windows and doors meaning by example “come in”, arrows indicating “next page”, folders meaning selected directories, scissors to cut, and so on... On second, about hypertextual information there is an interface discussion that investigates the data operation narrative. Some examples are: Janet

⁷ “The frame ‘disappears’, buries itself, melts away at the moment it deploys its greatest energy. The frame is in no way a background... but neither is it thickness as margin a figure. Or at least it is a figure that comes away of its own accord.”

Jacques Derrida In: http://www.designwritingresearch.org/essays/Decon_framed.html

⁸ “It may appear at first sight that data are passive and algorithm is active - another example of passive-active binary categories so loved by human cultures. A program reads in data, executes an algorithm, and writes out new data.” (Manovich, 2007: 43)

⁹ Thus operations should be seen as another case of a more general principle of new media-transcoding. Encoded in algorithms and implemented as software commands, operations exist independently of the media data to which they can be applied. The separation of algorithms and data in programming becomes the separation of operations and media data. (Manovich, 2001: 121)

Murray's proposition about "From Lexia to Perplexia" on Talan Memmott's work; RIOT¹⁰ of Mark Napier (2000), FilmText¹¹ of Mark Amerika; Apartment¹² (2001) and History of Flow¹³ of Martin Wattenberg.

From Chartier to Galloway and from McLuhan to Manovich and Cramer the distance between the press culture and the new computer technologies of information can be measured by the difference between codex and protocol; and by the difference between information processed by codes of transmission and information operated by executable codes, for three questions: 1. what Katherine Hayles calls "technotext"¹⁴ the matter of the textual information in the new media; 2. the executable state of the code that converts information into action (Galloway, 2004:164-165); 3. the heterogenic machine that takes the object from its territory and powers the state of action and the virtual behavior.

¹⁰ "Riot is an alternative, "cross-content" Web browser. Like its real-world namesake, Riot disrupts the accepted rules of property and exposes the fragility of territorial boundaries. Inspired by the clashing classes and ideologies of New York's lower east side, Riot is a software coded "melting pot", a blender that mixes web pages from separate domains into one browser window." Mark Napier in:
<http://www.potatoland.com/riot/about.html>

¹¹ <http://www.markamerika.com/filmtext/>

¹¹ Martin Wattenberg with Marek Walczak. "Instantiating text as architecture. As users type, Apartment creates a dynamic virtual dwelling with a floor plan reflecting underlying themes in their text, while the text itself becomes the occupant, moving and behaving in ways that reflect its meaning." In:
<http://www.bewitched.com/art.html>

¹² "History flow is a tool for visualizing dynamic, evolving documents and the interactions of multiple collaborating authors. In its current implementation, history flow is being used to visualize the evolutionary history of wiki* pages on Wikipedia." Martin Wattenberg in:
http://www.research.ibm.com/visual/projects/history_flow/

¹³ The physical attributes constituting any artifact are potentially infinite; in a digital computer, for example, they include the polymers used to fabricate the case, the rare earth elements used to make the phosphors in the CRT screen, the palladium used for the power cord prongs, and so forth. From this infinite array a technotext will select a few to foreground and work into its thematic concerns. Materiality thus emerges from inter actions between physical properties and a work's artistic strategies. For this reason, materiality cannot be specified in advance, as if it preexisted the specificity of the work. An emergent property, materiality depends on how the work mobilizes its resources as a physical artifact as well as on the user's interactions with the work and the interpretive strategies she develops - strategies that include physical manipulations as well as conceptual frameworks. In the broadest sense, materiality emerges from the dynamic interplay between the richness of a physically robust world and human intelligence as it crafts this physicality to create meaning. (Hyles, 2000: 32)

¹⁴ This booklet attempts to show that algorithmic code and computations can't be separated from an often utopian cultural imagination that reaches from magic spells to contemporary computer operating systems.1 "300,000 pages of code. Or 60 minutes of triple-X rubberand-leather interactive bondage porno. [. . .] And until you plug it in, you'll just never know." This dialogue line sums up utopian and dystopian imagination reaching from omnipotence to obscenity projected onto computer codes. In the end, the decoding of the codes is not a formal, but a subjective operation. Boiling down to either "beauty" or "debasement," two classical modes of aesthetics since 18th century philosophy, these codes are ultimately about human perception and imagination. (Cramer, 2004: 08)



The sign of the signs

According to the semiotic view, the computational language knowledge is fundamental for understanding the numeric interface aesthetic. Although Nak and Grabowski, Winfried Noth and Phillippe Bootz work on different theories, they agree that the Computational Aesthetic might be understood through the look into the sign relations of its own language system. Besides the screen surface, the programming of numeric code can be understood as a system made of three subjects that complement each other: the human level, the machine level and the interaction between human and machine. This aesthetics has no absolute or relative value. The characteristic of each language system (sound, visual, verbal) configures its content and generates, implements, operates and negotiates its aesthetic. The Numeric Interface Aesthetic is operated and made by a code that executes the system and shares information with it.

It is important to notice that there is a big difference between some traditional systems of codes and the digital code presented in this paper. In the well known cryptograph code there is a rule that transforms one symbol into another symbol. On the other hand, the code that operates the numeric interface aesthetic is a (re)knowing computer code. This code makes changes in its own rule of transformation. Because of that the symbols operate in the action, they are executable symbols. So, the process of understanding the code is not a formal process, but a subjective process¹⁵.

The complex relation between an indexable language and a system that changes its behavior is characteristic of the inter subjective state. According to Fishwick (Fis 06) aesthetic computing involves two kinds of applications: analytical and synthesis. With quite some differences, there is a conceptual convergence of Aesthetics of Computer Art theories. According to artists, theoretical of the arts and the computational sciences the Aesthetics of Computer Art presents itself as an Aesthetic of the event, or an Implemented Aesthetic, Temporal Aesthetic and/or Aesthetic of the Transmission characterized by a code that develops itself in the traffic of the information. According to Beiguelman "What one sees is the result of countless possibilities of combination among different programs, operating systems, access providers, phone operators, hardware makers, and all their inestimable forms of customization."¹⁶

For example, in the Thinking Machine of Wattenberg the visual part of the work is a result of some mathematical operations. The "intelligent software" (invisible text) answers to the action of an interactor¹⁷ (visible text) with mathematical operations that are translated in something that is visible. As an symbolic representation, the visualization of logic association process made by the program is a metaphor of the time and the space of the machine. The changes of color and the drawing of traces are actions started by the system. They indicate that it is possible to develop an writing machine. These characteristics are also present in the generative work of Stanza¹⁸ in which a mutable structure of data makes the DNA behavior synthetic.

¹⁵ http://www.firstmonday.org/issues/special11_2/beiguelman/index.html

¹⁶ Term which synthetizes participation in the game of interpretation: correlation + performance + reader + player. It is used by Janet Murray in *Hamlet one the Holodeck: The Future of Narrative in Cyberspace* (1998) to introduce relation "reader - actor " in *Holodeck* (<http://fr.wikipedia.org/wiki/Holodeck>): in series *StarTrek* of Gene Rodenberry that "Materialise"; tales programmed in a hyper-ordenateur, in which the interactor participates by representing one of the figures, being able to, from her insertion, change the history concerning original programming.

¹⁷ <http://www.stanza.co.uk/>

Interactive axes author/reader and the aesthetic resultant

Finally, according to the executable code language and the interaction code language of the interactive interface aesthetic there are two transversal axes of writing and reading that support the code design: first the human author and the human reader which corresponds to the visible text and the syntagmatic level; and second the machine author and the machine reader that are related to the invisible text and the paradigmatic level.

The writing and reading levels are structured as two crossing lines:

1. Level **V** – transversal line that represents the invisible text interface

V1 – The human author HA: it writes the program text, it interacts with logical and physical matter. The author can reach an aesthetic that is a result of a combinative or a generative action: a writing from the HA to the LS.

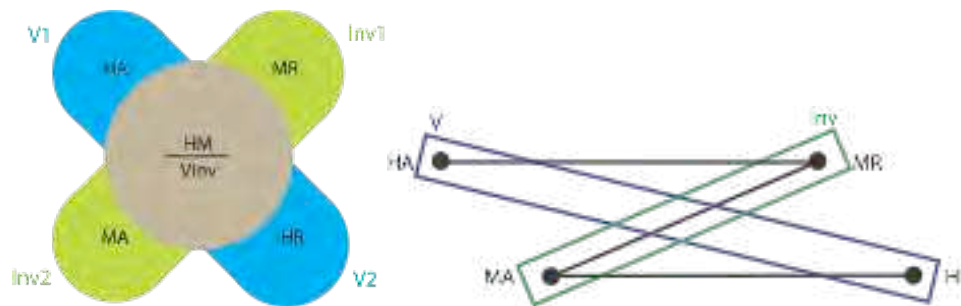
V2 – The human reader HR: it reads texts written by the HA that had an interface with the invisible text and were affected by that machine context.

2. Level **Inv** – The invisible text interface : it executes the text written by the HA or by the MA if the MR has already read it. The action of this text results in a text re-written by the MA to the HR. The level “Inv” has three parts.

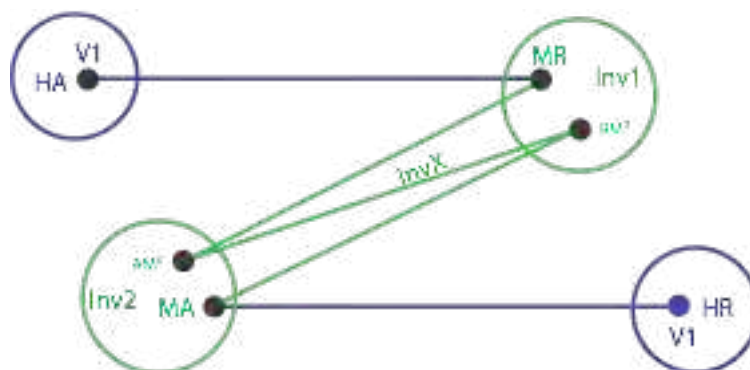
Inv1 – it executes pre-defined combinative variables;

Inv2 – it executes complex generative variables;

InvX – it executes combinative or generative variables according to the interactive capacity of the system.



There is no hierarchical order among this levels. They share a context and appear in a rhizomatic way characterizing a syntactic and semantic inter-relation and a connection between subject and machine. This aesthetic is a interactive state of action that can occurs between subjects or machines. And the numeric interface aesthetic is the result of this interaction. This aesthetic belongs to the visible and the invisible phenomenon and operates events and actions between two systems: subject and machine system. The interaction of these two systems produces and re-produces the aesthetic interfaces. So, for the numeric universe all the human writing there is a reading and re-writing of the machine for the human reading. However, the re-writing of the machine has its own characteristics. It is a performative writing that produces a specific aesthetic: the code design aesthetic.



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Music in a Mediatized Modernity: Intermedia Counterpoint and Posthuman Performance

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The tools of computer art are posthuman tools: they either co-opt and transform existing material or use algorithmic automation to generate new material. In either case, they replace the artist in his or her traditional creative role. Therefore, computer art that manifests its meaning or aesthetic value in the same places as traditional art cannot be any more than poor copies or simulations. It is essential for artists working in computerized media to recognize that the artist is not being replaced by technology. Instead, technological developments are shifting the human element of communications including art into new territory. This can be demonstrated in several of my musical and intermedia compositions that embrace the new artifacts emerging from computer art as the voice of posthuman agents in the works and in turn use them to highlight the humanity manifest in them in new ways. In these works, the effects of mediation by computers on live-performed events are used to create structure through the classic musical technique of imitative counterpoint.

Like artists following the industrial revolution, artists of today are challenged to find their own voice amidst a flood of once-living artists. Additionally, they struggle to find their own humanity amidst a growing array of posthuman communications media. Ubiquitous media technology plays an increasingly significant role in twenty-first century life, bringing with it not only new sounds but new kinds of structure, temporality, and reality. While many focus on the replacement of human and natural things by posthuman agents, resulting in a gradual loss of human identity, these tools allow the human element to shift into new realms of a work of art and explore new levels of creative expression. A number of musical and intermedia performance works by the author illuminate this shift and elevation of humanity in posthuman art.

The industrial revolution short-circuited spacetime: recordable media and radio allowed technology to replace the need for physical presence in concert halls and personal meeting places. This trend has escalated over the past century, even allowing recorded media to be accessible from a pocket or telephone and personal communications to take more widely varied forms. In the twenty-first century, modern communications systems have short-circuited humanity. Posthuman agents are gradually removing human agency and identity from the picture. Technology like instant messaging, social network websites, and virtual reality environments sever the human connection in communication. Instead, each human communicates with a software dialog box or avatar (Baudrillard, 1987). Technology for audio and video transmission replace humans as the audience, forcing a fixed perspective on the events witnessed. Flaws and limitations of these systems disrupt a human's sense of an authentic experience of the conversation or performance, revealing that what is witnessed is not authentic.

In musical creation, synthesizers and samplers replace the voices of humans or natural instruments played by humans, and compositional agency is increasingly bestowed upon posthuman agents. Software programs for composition by mechanistic looping, copying and pasting, or algorithmic intelligence are becoming more accessible and pervasive. The traditional kinds of art we see and hear are increasingly the products of technology, and human fingerprints on those works are fading from view. As technology fulfills the tasks humans used to do, the human elements in our communications and art are eroding away.

Liveness and Mediation

Mediation refers to something coming between two other things, or for our purpose, the intervention of communications technology in the path between sender (performer or composer) and recipient (audience). The term *mediatize* was first used to describe the annexation of one nation by another, in which the leader of the annexed nation maintains his or her title and sometimes some authority. More recently, Jean Baudrillard (1981, 175–6) has adopted the term to discuss the transformation of events when they are recorded or transmitted by communications technology, originally to highlight more overt or intentional kinds of transformation of the symbols in play. It has come to be used by others in a more general way highlighting any result of the process of recording or transmitting once-live events. (Auslander 1999, 5) In this article, *mediation* refers to the intervening position of technology, and *mediatization* refers to the effects of that intervention (in the general way without Baudrillard’s embedded implications).

It is interesting, however, to reconsider the original definition of mediatization. It already contains senses of both emasculation and preserved identity. In all senses of the word, the mediatized object becomes a reference to the original but loses its authenticity. In the mediatization of live events through technology, what is lost is the *aura* as Walter Benjamin (1936) described it, the sense of authenticity that comes from witnessing the “real thing,” whether it be the original *Mona Lisa* or an unmediated live performance. Through mediatization, “real” live events become *hyperreal*: they enter an artificial world in which once-live moments are frozen in unrealistically extreme detail and are susceptible to endless manipulation by technology but still carry the reference to the authentic once-live event.

Modern audiences have become accustomed to granting the same authenticity to mediatized objects as the realities they symbolize. Philip Auslander has carefully argued that contemporary society has become desensitized to the differences between live and recorded media, and so they are wholly equivalent. I do regret the apparent widespread sacrifice of quality for the sake of (not always legal) convenience, but as an artist, I see the playing field for expression as shifting into new territory instead of suffering a loss: as technology allows humans to communicate in new ways, structure and meaning can be manifest in new dimensions of a work. Auslander describes where audiences have placed value; it is not a prescription that inhibits artists from seeking new places where value could be found or created.

Peggy Phelan insists on recognizing the difference between the live and the mediated.

“Performance cannot be saved, recorded, documented, or otherwise participate in the circulation of representations of representations: once it does so, it becomes something other than performance... To the degree that performance attempts to enter the economy of reproduction it betrays and lessens the promise of its own ontology. Performance’s being... becomes itself through disappearance (Phelan 1993, 146).”

Something is lost when a performance is reproduced, and the loss weakens ontology, but is it the state of the performance or that of the recording that is affected? In Benjamin’s terms, the aura of a work is lost in reproduction, so the copies are degraded, but the original is unaffected by the existence of the copies. However, Phelan refers to the ontological promise of the original performance. To “enter the economy of reproduction” is to do something that is *reproducible*, whether or not it is reproduced. The more that *would* be lost through reproduction, the more substantial it is, or the greater its aura is.

When a sound is recorded, the sample does not have the aura of the original sound, but in the context of live

sampling within the course of a musical performance, the sample can gain its own aura that reframes the original as an acoustic version of a musical idea that is later presented in an electronically-mediated form. Phelan writes,

“Performance occurs over a time which will not be repeated. It can be performed again, but this repetition itself marks it as “different.” The document of a performance then is only to spur a memory, an encouragement of memory to become present (Phelan 1993, 147).”

However, the sample that is a copy of an event earlier within the same live performance must lie somewhere between the often-sampled “Amen break” (The Winstons 1969) and the return of a fugue subject: it is both the artificial reproduction of another musical event and the recurrence, prolongation, or imitation of musical material within a work. Live sampling during performance is like *musique concrète* come to life: it still concrete (in the sense of freezing sounds in recorded form), but it uses the “Now” as its subject. Live sampling facilitates structural phenomena, not just extramusical or intermusical (intertextual) signifiers. Not only does the aura of the original moment slip away, but the memory of that aura is replaced with a new one situated in a net of imitative references. Multiple copies of the musical idea, acoustic and electronic, reframe each other as particular references to an abstract musical form evoked by—but lying outside—the performed music. The original event becomes merely the first reference to a musical idea within the performance. In the works presented below, the sonic presence of the performer is prolonged and folded upon itself in time, taking along the gaze of the audience, to be continually revised.

In order to explore this kind of structure, I developed live sampling instruments controlled by a gamepad or Nintendo Wii Remote and have used them in performance with improvising musicians. I begin each performance with no preloaded sounds; my sonic materials come only from the current performance. The process of exploring the live-sampled sound can become part of the developmental structure of the live performance. The once-live can become live again when it is replayed, but it becomes a new and distinct event happening in its own moment, Now, but connecting with (and escalating by that reference) the moment in which the referent was first performed. Live sampling within an improvised performance intensifies the connections made in this way, because the performers are not reading from a musical score. What they play cannot be reproduced in another performance. Even in composed works, I am working primarily with structuring improvised passages in order to magnify the sense of liveness and intensify the significance when those Nows are mediatized and manipulated. Replayed material can participate in and influence new Nows and be recontextualized within the new web of connections.

Through such a performance, cause and effect can become twisted or reversed: the authenticity of being the “real” musical idea can be passed among different reiterations of it (for example, a theme followed by variations or a climax preceded by foreshadowing copies), it can be cast outside the musical work to refer to a series of events that never actually happens within the performance, or authenticity can be completely demolished. My goal is not simply to deconstruct the concept of authenticity and celebrate its demise but instead to use the establishment, distortion, and reinforcement of authenticity as a new way to create and manipulate tension. The elements that are lost through the mediation of technology expose new elements that are unique to the live performance, and this mediation itself can be included in the performance in the form of live audiovisual sampling to build imitative contrapuntal textures that explore the area between liveness and mediatization.

I have seen a kind of discomfort in effect when allowing mediating technology to fall out of congruence with the live experience, even with contemporary art specialists and musicians in the audience, for example after a

performance at the International Society for Improvised Music conference, in which Eric km Clark performed on electric violin and I performed with him using a computer to mediate his signal. The sound heard through the single instrument amplifier did not always include the live violin signal. Sometimes the live violin playing only caused past violin passages to be heard, and at other times there was no obvious relationship at all between Clark's actions and the sounds and silences coming from the amplifier. One observer, who was also performing at the conference, expressed discomfort with this performance: "If there's a violin there, I want to hear it," and other performers separately made similar remarks.

Members of my audience that came looking for meaningful relationships in only the usual places tended to see the overt mediation by the computer as a mistake or malfunction that only obstructed their experience of the performance. A more Cagean mindset, ready to appreciate anything for what it is, would more readily notice and appreciate the tension and release in the counterpoint between the live events and the resulting sounds (whether or not they were intentional). However, the effects of mediation at play here are indeed salient; they are only overlooked as a result of recent social conditioning. The fact is that the relationship between the live and the mediated can establish tension. If it can be structured and resolved, liveness and mediation can be used as a new dimension for structure and expression in performance—one that gives new value to the authentic unmediated human experience, the aura of the Now.

Counterpoint in Intermedia Art

Counterpoint is an approach to structure that has been used in music for a long time but has been difficult to extend into other disciplines in meaningful ways. A look at various artist's attitudes toward counterpoint can highlight a useful way to conceive contrapuntal structures in intermedia art. Although the approach is old, the details of realizing counterpoint have shifted over time, and because of this, counterpoint has been defined in different ways. The role of counterpoint has changed throughout the pre-tonal, tonal, and post-tonal periods of music. Here, *tonal* music refers to works created in the style of seventeenth- through nineteenth-century Europe, in which pitch and the the harmonies created by simultaneous combinations of pitches are predominant in the structure and identity of the work. During this period, traditional contrapuntal textures like the canon and fugue were considered antiquated and were used less, in favor of seeing each musical line contribute clearly to a single harmonic structure. This affinity for overt unity can be seen in the "traditional" or "conservative" works in other artistic disciplines as well, for example, some approaches to painting, in which a stroke is valued more for its support of the whole image than for its individual character, and some approaches to film, in which every sound is attached to a visible source and every musical passage supports the story by evoking the "right" mood.

It is more useful to consider the view of counterpoint in pre-tonal and post-tonal music, in which the desire for obvious unity is not so strong. For example, Johannes Tinctoris (1477) points out that the term counterpoint refers to the oval noteheads (points) in musical notation and the study of ways to juxtapose distinct voices by considering their point-to-point interaction. This presents counterpoint as a technique for coordinating multiple well-formed and independent elements within a larger creation *without* making one element become slave to another. Tinctoris was writing in a time when singular unification was not valued in music, and a "vertical" harmonic approach to musical structure had not yet developed.

In most cases today, to say that multiple elements are "in counterpoint" is meant as an opposite of considering them to be "in harmony." This is not to suggest malformation or dischord but that structure may rely on the "horizontal" strength of each line (that is, its characteristics as it develops over time) instead of relying on the "vertical" strength of the harmonies created by each instant of the music across all voices. A

useful rule of thumb is that if one dimension is well-formed, it may be acceptable for the other dimension to have a weaker structure. For example, a pitch that clashes with presiding harmony can be accepted if it forms a strong line, such as passing between two pitches that do fit the harmony. It is important to remember, then, that counterpoint and harmony are not opposing forces but distinct dimensions of structure, and either can be a successful approach to a well-formed structure.

This balance between horizontal strength and vertical cooperation is often overlooked, however. Michel Chion (1994) exemplifies many contemporary writers when he focuses on the independence of counterpoint, sometimes to the point of assuming Dada-like indifference among elements and neglecting the importance of coordinating the distinct elements in some way. Kent Kennan (1959) reminds readers to maintain a balance of independence and similarity, but does not go much further into detail. Larry Austin and Thomas Clark (1989) are more specific in encouraging an overall even distribution of activity or meaning among each element, although this distribution cannot be perfectly homogenous without shifting emphasis toward vertical, or harmonic, structures. Effective counterpoint could be described in terms of an effect I have come to call *tickle*, a balance between the appearance of organization and surprises that shatter that appearance.

Distinct elements need to demonstrate coordination with each other enough to suggest that they belong together and perhaps that there is some force organizing them, and they also need to have enough surprises, or entropy if you will, to avoid becoming predictable and being reduced to fulfilling one clear role within a larger system. Tickle is a play on human perception. There need not be an all-embracing scheme, only enough salient hints that one may exist, coupled with enough twists to thwart any clear definition of what that scheme could be.

Post-tonal composer Ernst Krenek found himself in a situation similar to that of Tinctoris, with methods to create well-formed materials—in Krenek's case, the twelve-tone technique—in need of a way to coordinate these distinct materials. In his *Studies in Counterpoint Based on the Twelve-Tone Technique* (1940) he recommends that his readers consider counterpoint as a once more useful way to structure music without letting harmony dominate the structure. It is in viewing counterpoint as a solution for structure rather than as an alternative to the status quo that we can illuminate ways to approach counterpoint in intermedia art. The next challenge is to find a way to transfer the sonic concepts of counterpoint texts to non-sonic media.

Perhaps one reason that there is not much clear writing on counterpoint in other artforms is that the texts on counterpoint focus on *consonance* or *dissonance* between the elements as they meet at each point in time.

These terms have varied and disputed meanings, but in general they refer to some kind of well-formedness in the musical harmony resulting from the simultaneous combination. It is difficult to extend the concept of consonance meaningfully to other media. Surely the idea of harmony can be meaningful in discussions of other media in a very general way, but there is no useful direct translation of the technique from musical harmony to other disciplines. It is more useful to consider *congruence* instead of consonance, and this could be considered in terms of instantaneous values or segments of time. For example, while it may not be meaningful to say that a color is a consonant interval away from a sounding pitch, it can be meaningful to say that the color and the pitch are both high, low, or average within their respective ranges. This is different from being consonant, because a slight change to a consonant interval will make it dissonant, but if both elements are each still "high" in some way, for example, then they are still congruent in that respect.

Congruence also implies shape: two elements can be considered congruent if they ascend, descend, waver, etc. in similar ways, within their own ranges of possibilities. The studies for player piano by Conlon Nancarrow (1912-1997) demonstrate counterpoint on a higher level than instantaneous simultaneities, dealing instead with larger building blocks like pitch and rhythmic contours.

James Romig (2003) describes the music of Milton Babbitt (b. 1916) as enabling any musical parameter to carry significant structural features, not just pitch and rhythm. He and composer Otto Laske (2002) have used the phrase "parametric counterpoint" to describe this approach. Camille Goudesoune has more recently offered a more systematic approach to parametric counterpoint in musical composition (*Composing with Parameters for Synthetic Instruments*, DMA Thesis, University of Illinois at Urbana-Champaign, 2001). In this way, counterpoint can easily be expanded to include parameters of other media as well. Ryotaro Suzuki, et al (2000) present a model of contrapuntal multimedia montage, but the implementation is limited to simple manipulations of duration and direction of playing time-based video clips. A common criticism of music like Babbitt's is that the parameters endowed with structural significance are not equally salient to the listener, and so much of the meaning of the piece is too easily lost if not carefully and consciously decoded. However, there are surely parameters in other media besides duration that are capable of bearing significance. In intermedia composition, the parameters, symbols, and the ways in which they change must be chosen with the salience of their features in mind. The strengths of each medium can be used complementarily to establish connections, and they cannot effectively be used in the same way. For example, our range of pitch perception is much finer than that of color perception, and our sense of color is much more absolute than our sense of speed. In another example, composer Arnold Schoenberg (1975) explained that he used texts for large formal structure in his early post-tonal works, because they lent the needed structural strength on a level that his musical language could not express on its own. This need not be seen as a weakness, but as an opportunity to integrate media effectively.

In his text, Kennan emphasizes the importance of using a motive that will be recognizable when it is imitated and transformed in other voices throughout a musical work. In parametric counterpoint, the motive is a simple shape as a value changes over time. It should be basic enough to identify in various forms, but sufficiently distinct to let it be noticed. A composition can then be formed by weaving together appearances of this motive, sometimes shifted, stretched, inverted, or fragmented forms. It is the *time-contour* of the motive—the shape of a parameter as it changes over time—that is most significant. Even if observers may not agree about the direction of a parameter's changes among subjective extremes, the speed and pattern of its changes in time are easily noticed and will also likely be noticed when the motive occurs again in altered forms or in other parameters. The classic rule calling for a musical work to begin on a consonant harmony can be applied here in serving to help build connections across media, once an observer has latched onto their relationship. Instead of consonant harmony, however, it is congruent values or changes in value that are meaningful. At this initial point of establishing relationships, it may also be effective to use diametric opposition as Chion describes, but unlike Chion, I do not agree that opposition is the only effective way to establish this connection. Opposition, after all, is still a reference to the other; it is just a negated reference.

Kennan and other counterpoint texts insist that although the lines must be well-formed and independent, the must imply good harmony when combined with the other elements. In most pre-tonal music, this refers to consonance or a strong line briefly flowing between consonances. Tonal music relies on identifying a harmony by its root pitch, with all the other pitches in the harmony falling into a hierarchy supporting the predominance of the root. This hierarchy is so strong in tonal music that the root pitch need not be heard—it could be only implied by the other pitches. In the concluding remarks of his book on post-tonal counterpoint, Humphrey Searle (1954) suggests that consideration of the root pitch projected by the pitches sounding at any instant may provide a way to evaluate the consonance of the resulting harmonies, even in the absence of the tonal hierarchy. This concept can be usefully applied to intermedia art: "good harmony" translates to well-formed meanings and relationships. All elements together invoke a meaning projected in another dimension in ways that neither medium could express on its own. This potential is what is most special about intermedia art.

Example Works: *Zur Elektrodynamik bewegter Musiker* (2005)

My works establish form independent of content that explore, re-present, and recontextualize the Now, resulting in products that are unique blends of human and posthuman agents, highlighting aspects of the structure and nature of human identity and expression. The computer's live sampling capability is used to exploit the effects of communications technology on the authenticity of live performance as aural and visual extensions of the classic musical technique of imitative counterpoint.

Imitation has been used as a structural device throughout history since the middle ages, but it has historically been a tool best suited for composers working outside real time. Improvised music has been important in many cultures, including today's performers of jazz and free improvisation, but composition-like structures have been difficult to achieve in extemporaneous performance. As computers have become powerful enough to run processes in real time, computerized instruments and computer-aided composition tools have entered the realm of live performance to bring new structures to improvised music.

*Zur Elektrodynamik bewegter Musiker*¹ is a software performance environment in which a solo human performer improvises, and the software records the performer and shapes the input into new textures and gestures and contributes to the formal structure of the work (by making decisions regarding what sonic elements and modes of behavior to bring back at any time). It is form (created, or rather set in motion by the composer) independent of content (contributed by the performer). Like a hall of mirrors in darkness, its form and structure exist on their own but are only revealed when a performer introduces material with which to illuminate it. It is imitative counterpoint, but not in a way that can be composed on paper or conceived out of real time.

In this work, the role of the composer has shifted to new ground. The act of composition includes designing algorithms to bring about certain behavioral and musical tendencies, and the object of the composition, the "work," exists in every performance. I describe my approach like sculpting randomness. The work is not built by arranging its surface particle by particle but instead by taking an unknown set of "would be" results and paring away possible outcomes until the shape of the remainder fits my design. Any randomized decisions resulting from my final product will support and outline the overall form and structure of my design. While a traditional composition is interpreted in performance, these compositions are *instantiated*. Inspired by mid-century musical developments, Umberto Eco wrote about "open" works of art:

"In fact, the form of the work of art gains its aesthetic validity precisely in proportion to the number of different perspectives from which it can be viewed and understood. These give it a wealth of different resonances and echoes without impairing its original essence (Eco 1989, 3)."

In the improvisatory nature of the work, some composerly agency is given to the performer, like many works since the mid-twentieth century. Through the algorithm-driven decision making during performance, some composerly agency is also bestowed upon the software program. It too is a composer-performer in this work. Together, the program and the human performer can realize an infinite number of unique performances, and because of its assumption of previously human agency, the software is a posthuman agent. I, the (first) composer, did not compose any note of any performance of the work. Instead, I created the *system* that does so.

***Tappatappatappa* (2005)**

One approach taken by sound artists to reconcile their humanity with the machinehood of their tools is to use these tools as artistic instruments themselves, sometimes short-circuiting them in complex feedback loops. In performances of *Tappatappatappa*, a 2-inch speaker cone is used like a dynamic microphone, providing the input to the program that is the composition *Elektrodynamik*. The cone is excited by stroking or tapping with fingers, a pipe brush, and a frayed wire, but it also picks up sounds in the room, allowing the software to sample its own output and establish feedback resonances. These resonances and the overall sound quality of the recaptured input can be controlled by moving the handheld speaker, pointing it in another direction, covering it, or damping it with a finger, which mutes it, as one would silence a cymbal. The implements used to excite the cone do not need to be rich in timbral possibilities. They provide enough timbral variety to influence the output of the system in a general way and allow precise temporal control to create rhythmic gestures and textures as needed for the system to build upon or to allow soloistic intervention in the performance.

The resulting resonances are particular to the orientation of the surfaces, speakers, performer, and audience within the space. This adds an exploratory element to performance, unique to each situation and developing within each performance. After performing a while in one environment, the memory of each position and angle associated with a certain resonant response can become like a tactile sensation for the performer. Multiple delays with shifting properties and auto-mixing features constantly change the system's response, adding to the improvisational aspect of the performance.

These systems sonify the process of computation instead of merely displaying the result of it. When used in a feedback system, creations like this can be treated like distinct instruments: *computation instruments*. This echoes a sentiment in Stephen Wolfram's study of cellular automata (2002), highlighting the beauty of computation not for the purpose of an end result, but for the sake of computation—that is, for the artifacts of the process itself. Before Wolfram, many have mused at the beauty resulting from natural processes like the formation of crystals, erosion of rock, or the growth of plants, and Benoît Mandelbrot (1982) made a connection between these natural processes and simple iterative mathematical processes. Cellular automata as explored by Wolfram exemplify such processes that can yield complex and beautiful results from simple processes. Each automaton is given the same set of rules that determine its state (usually binary) based on the states of the automata in the previous generation. While these can be used to find a particular end result (a solution), the structure of that process can also be appreciated. For Wolfram, this is the value of computation for the sake of computation; it is an approach more common to structures formed in nature. For example, it is more common for one to appreciate the overall form of a coastline (or its evolution over time) than to use data to determine the position of one point on a coastline. In nature, process can be appreciated as artistic. In most art, the nature of the creation process may be appreciated, but the resulting product is the object of value. In computing, the result is a solution to a problem, and the process is usually neglected, except to see if the result could be reached faster. However, this need not be so.

Wolfram attempts to explain the artistic value in some natural or computational structures with his principle of computational equivalence: “almost all processes that are not obviously simple can be viewed as computations of equivalent sophistication” (Wolfram 2002, 716–17). He continues to suggest that some processes are perceived to be complex or beautiful because the processes are as sophisticated as the humans perceiving them. At that critical point, it becomes “easy to forget that the rules are really in place,” as Gary Flake put it (1998, 11). Perhaps this explains why it is difficult to prescribe processes based on simple steps (like computer programs) that are capable of beautiful results. It can at least be gained from Wolfram's

methodical study that chaotic systems can be instrumental in achieving beauty in computerized processes.

With such feedback instruments, the chaotic system of room acoustics is explored during performance. While the feedback instruments I have created all involve streaming speaker-to-microphone feedback, the results of each system are distinct, because the programs are distinct. Feedback illuminates the natural resonances of the acoustic system as well as the software system. The voice of the system (the posthuman agent) emerges as the original stimulus (the human element) erodes.

The experience of these developments has led me to believe that embracing chaotic elements will enable electronic tools to mature in their own right and become as robust in application and deep in sensation as acoustic instruments. Non-linearity in acoustic instruments gives them their character, detail, and natural sound. While these principles are increasingly well understood, some aspects still may only be approached through experimentation and experience. Whereas in acoustic instruments the challenge is to bring order to naturally chaotic systems, with electronic instruments, in order to achieve the same level of depth, we must find approaches to bringing chaotic elements to the excessive order of the digital computer. I believe that the unique identity and value of generative computer art lies in this direction.

Performative Counterpoint Illuminated by Technology

The parameters of musical performance are not purely sonic. As musicians play, they also move. This motion is not always parallel to the music heard, but it is always related. These motions—the fingers on the instrument, the body as it leans inward—provide new contrapuntal gestures that are often ignored. By playing on the tension arising from awkward stage presence in technology-based performances, a new dimension of musical structure can be developed for expressive use: it is the dimension of liveness and mediation, which requires live performance in order to be meaningful. Liveness itself can be used and manipulated as a distinct musical element.

Elektrodynamik was originally created for cellist Ulrich Maiß to perform with a standard acoustic cello. However, in a performance at Texas A&M University on October 2, 2007, he used an electric cello, which made (practically) no audible acoustic sound. Its electric signal was sampled, manipulated, and re-presented by the program, but the originally performed sounds could only be seen, not heard. Conversely, the sound could be heard only in heavily-mediatized form, with no visual component to their being triggered. This effectively served to slice the performance away from the music as a distinct element in the overall work.

The nature of the program established a counterpoint between the sight of causes and the sounds of their effects. The program is created to have each track of sound, or voice, play only when the performer plays, play only when the performer is silent, play and stop in the same rhythm as the performer but shifted in time, or play in full without regard to the performer. At times all active voices may be responding in the same way; at other times there will be a mixture of behaviors. With a silent performer, there were times in the performance when Maiß made a clear playing gesture and at that same time, sounds were heard—and they were sounds from him—but they were not the sounds that he was really playing at the time. At other times, performed gestures would be accompanied by silence or cause a change in balance among the sounding computerized voices. This changing and varied interplay of relationships, from direct congruence to direct opposition and everything in between, established a flow of tension and release in the dimension of liveness and mediation. The performance itself was contributing to the music and extending it into the realm of intermedia art (by integrating and elevating the performative element) instead of simply being performable sound art.

Six studies in mediation called *This is Not a Guitar* (2007) embraces the electric guitar as an instrument that is necessarily mediated. Its sound is disembodied, isolated from the physical acts that cause the sound, it is transformed by a series of "black boxes," and it is only heard through one or many loudspeakers that may be any distance from the guitar and performer. Despite this disparity, we are accustomed to watching the performer and listening to the speaker(s), considering them to be one seamless whole. This work explores various notions of presence and causality embedded in this construction, including the hum of the amplifier as the audible-but-ignored sensation of presence. It plays with the distance between physical cause and sonic effect and stretches the bonds between what is seen and what is heard by letting the two fall out of synchrony. It presents physical events without their expected sonic results, and it presents recognizable sounds like pitch bends and familiar riffs in the absence of the physical actions we expect to create them. This piece uses counterpoint in the dimension of liveness and mediation to create tension and release for the forward development of the music.

***"Time is the substance of which I am made"* (2007)**

An extended composition for electric violin, digital piano, and electronics called *"Time is the substance of which I am made"* extends this exploration of mediation to include visual sampling. Just as in the works described above, all sonic materials come from things played during the performance, even though they are not always presented in a recognizable way. Video clips are taken of the performers during the performance and are at times presented only as abstract textures moving in relation to the music. For example, a performer's arm or hair will often move in a way related to what he or she is playing but rarely in a strictly parallel way so that the music could be "read" just by watching the close-up video. While the performer's body is not completely independent of the sound it plays, the relationship between sight and sound shifts among parallel, similar, contrary, and oblique states in a way that can make it an effective intermedial counterpoint. The processed video is projected onto the performers, allowing their live motions to recombine with the mediatized visual materials.

The eye of a camera and processing by the computer can capture, highlight, and reintroduce the visual component of performance as more significant, but organically related, elements in the overall work. Much of the authenticity of Now comes from visually witnessing the live event. Visual Nows can be captured and recontextualized like the aural events during the performance. The inclusion of video also allows for the audiovisual recording of events not heard, in order to be replayed later, slicing the liveness away from both the sound and vision of the performance. (This is why digital piano is used instead of an acoustic instrument.) This also creates tension during the original live event, because it is clear to the audience that music is being played which is not heard. When the sound is presented later, it resolves that tension and can be an opportunity to illuminate significant structural relationships within the work.

Another technique used in the work is directing one performer to watch and play along audibly with another performer who is inaudible at the time. This allows the pure distilled liveness to function as a distinct influence in the work: the music heard from the violin is a sonic translation of the pianist's performative acts. The audio recording of the silenced digital piano can then be presented later in the work with some of the specialness of ordinary live performance, because it is the "authentic" performance of which the violinist had previously only performed a flawed copy.

The violin and keyboard/zither combination each plays through its own instrument amplifier, which, as with the electric guitar, is readily accepted as the live unmediated voice of each instrument. However, a computer-based instrument will be used to mediate these connections in order to distort the authenticity of

liveness. The instruments' seemingly live sound at times falls out of synchronization with the visible actions of the performer. In other moments, completely different material is heard, or the computer freely crossfades between the live performance and previously recorded moments. The computer can also "impersonate" the instruments by playing their sampled sound through the amplifiers at times when the performers are not playing. Finally, the performers may be seen to be playing but not be heard until that captured sound material is introduced at a later time in the performance.

Three loudspeakers will be used in addition to the instrument amplifiers. One stereo pair will represent the main voice of the computer, through which clearly-manipulated material recorded earlier in the performance will be played in a live sampler instrument controlled primarily by game controllers including wireless Nintendo Wii Remotes. The live sampler instrument enables the performer to recompose sound material captured during performance, recontextualizing materials in new settings, recombining it with other recorded material, and warping it into new material that is organically related to previous events. It enables the Now to be captured, rewritten, and smeared across time. A third speaker will be placed offstage for an obviously distant sound, which is used to play material in a way that is physically detached from the live Here and Now.

The visual artist has a tripod-mounted camera and video processing computer. During the performance, the visual artist is given instructions to focus the camera on some movement related to the music, for example the violin bridge as the bow glides by it or hands on the keyboard. More abstract visual sources include the arm, waist, or hair of the performer. Like the sounds in the performance, the visual material may be presented live, falling in and out of synchronization, or stored and replayed later. Visual material captured from the performers is represented and transformed again by using the performers as a partial projection surface, which can be recaptured by the camera. Visual material presented will also be transformed by a live video processing instrument controlled by the visual artist using Nintendo Wii Remotes.

The vision of the performance is itself a visual dimension in counterpoint with the sounds and mediatized video of the performance. The goal of this project is to extend this counterpoint-through-mediatization to include these visual aspects of performance and to fold them into imitative contrapuntal structures as I have previously done with sonic materials. In that way, we can extract the "liveness" of the event from the recorded visuals and sound and develop liveness as its own element in the aesthetic structure of the work. The performers are used for visual material for the same reason the sounds they make are used for sonic material: to explore and exploit the imitative counterpoint in this newly feasible realm.

The mediation of technology is not wholly transparent, although many have become conditioned to ignore those effects. In the difference between the live and the mediated, as has been demonstrated above, a new dimension of tension/resolution and structure can be developed in a way that can only be meaningful in live performance. The human identity is found less in the creation of single acts than in the creation of systems, each act of which is part of the character designed or discovered by the human creator. So, while the medium is largely posthuman in performance, the human element is manifest in the whole of all its performances. In interactive musical works like the ones presented here, William Seaman describes a new challenge:

"The artist need no longer seek to define a singular artefact, but instead need develop systems that enable a series of sonic artefacts to become operational and polycombinational, thus engendering an emergent relational sonic artefact during exploration (Seaman 1999, 234)."

The tools of computer art will continue to change in faster and more varied ways. However, they are still only the tools and not the creators of computer art. The identity of computer art among other art forms, other kinds of communication, and scientific developments lies in the artist's creative ability to find new ways—new dimensions—in which to manipulate these tools for human artistic expression.

Notes

¹ The title is adapted from Albert Einstein's "Zur Elektrodynamik bewegter Körper" (1905) in honor of the centenary of its publication.

² The title is from Borges, Jorge Luis, 'New Refutation of Time' in Ruth Simms (trans.) *Other Inquisitions, 1937–1952* (Austin: University of Texas Press, 1964; 1946), 187.

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Tappatappatappa performed by Jeffrey M. Morris during the Bellingham Electronic Arts Festival at the American Museum of Radio and Electricity in Bellingham, Washington, November 20, 2006, <http://www.ourmedia.org/node/297632>

Motet (another improvisational software performance environment) performed by Eric km Clark, violin, at the ACA, July 3, 2006, <http://www.ourmedia.org/node/250744>

Motet with feedback performed by Jeffrey M. Morris at Texas A&M University, April 27, 2007, <http://www.ourmedia.org/node/313638>

Improvised performance by Jeffrey M. Morris, Nintendo Wii Remote sampler, Eric km Clark, violin, and Anna Graciela Arenas, video processing at the International Society for Improvised Music conference at Northwestern University, Evanston, Illinois, USA, December 14, 2007, <http://ourmedia.org/node/374223>

Encouraging The Diffusion Of The Art Through The Free Art License

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Summary

In the last two decades of XX century and beginnings of the XXI, the growth of Information and Communication Technologies (IT) has permitted the emergence of new spaces and forms of expression going from what is physical and analogous to what is digital, generating a numberless of informative resources to be shared with the society. Unfortunately this being given a contradictory situation, by the one hand the technology promotes knowledge diffusion and in the other hand facilitates the restrictions to make use of the information that is generated. Under this situation, in the world have been managed several movements that seek how to recover the freedom of human knowledge. These movements have permitted the emergence of free knowledge licenses, from there that this work analyze and emphasize the advantages that offers the use of free art licenses to promote the diffusion of artistic creations among society without limitations, artists stipulate through this license the use and the limitations to those which holds their art work.

Between the changes that offers the growth of IT is that offers a means multimedia on Internet, for the generation, distribution and access to various sources, conjugating the artistic creation and diffusion of the art work, which permits emergence of new forms of expression like Artivism¹ and the net-art².

Objective

I have to emphasize that this movement has by objective that artist put their work under the Free Art license that allow to copy, modify and distribute an artistic work, thus the creator, when releasing their art work, endows it of a social content that breaks with the restrictive laws of the copyright and of the market economy that governs the trade of art works. The art work is defended and is spread.

Current panorama

Today there is an intensive discussion on free culture, free knowledge traffic, Free Documentation Licenses GNU, Public General License GNU, both published by the Free Software Foundation (FSF), as well as the Free Art License, published by the Copyleft Attitude movement, how to applying this last into the artistic creations and the advantages that would have in artistic diffusion among society. However, the contemporary art in many cases presents certain reticence in this regard, for many to accept the Free Art license³, would mean to resign the given outstanding mechanisms, and in many cases, to replace them additionally manners of making the things. And is that if we watch, exists a mysticism surrounding the artist, the art work, their

¹ Neologism created from the words art and activism, and theoretically used to refer the works that participate in both topics. They could be defined as activists, the alternative artistic projects with social intention and critical spaces that question different social and cultural aspects from an artistic position.

² NET.ART term takes issue with art works created for Internet to exploit this media, they are projects that use to the net as exposition space and middle of creation. They are characterized by their innovation capacity and by their interest in exploring new alternatives.

³ This license born from the "Copyleft Attitude" meeting that took place in "Accès Local et Public" in Paris at the beginning of 2000. For the first time, it is given the computer specialists and actors encounter pro free with contemporary artists and celebrities of the arts world.

comprehension and their diffusion on which is supported all a system that it is not prepared to upsetting the traditional bases. Result curious that the art and its heavy structure continue living in the paradigm of the mythical author, the original work and the restricted access. Consequently, to protect its ancient space, in the contemporary art spectrum as well in the cultural, mastered by entertainment industries, the Copyright laws and intellectual property that are toughened each day and being used to fence and expropriate more the rights of the users, in supposed benefit of the artist when, in reality, it is being speaking of control and entrepreneurial benefits.

If we can observe the Free Art License, would put to issue these aspects that they have been gone transmitting during decades and be the paradigm that subvert definitely the traditional fundamentals of the contemporary art. However, we can not lose of sight that this license is based on the concepts of the Copyleft and all the speech proceed of a very concrete context like free software. Even though it is certain that the art case, turns out to be in a different context, the products generated are artistic creations the same as what is obtained with the free software. Finally the Free Art License promotes and protect to freed artistic practices of the market economy exclusive rules⁴.

It is necessary delve in the concept of the **Free Content Licenses** and to emphasize the objective of providing to the free content developers, to the rest of society could use them, to transform them and contribute to their diffusion. Now then the contents can be texts, photographs, graphic, images, icons and other audiovisual or sound contents, as well as their/ graphic design and sourcecode, created by initiative of an author an original.

Therefore when applying a **Free Content license** the artist contributes to the information, creativity, knowledge and the expression of the feeling continue being social goodness and not private properties in hands of some few and to offset the effects of the current system of the Copyright that has converted into a merchandise of purchase-sale, into an object of speculation at service and benefit of a select group.

When offsetting these effects the information in general, contents and creations in particular, could arrive to a majority of persons, and remain at the disposal of them. In this way the created contents could evolve and be maintained updated with the contributions of other persons since regulations and are spread freely. Have to indicate that the Free Content licenses Not eliminate the Author Laws or Copyright, simply as an author, and under this Author right, he permits that everybody, under certain conditions, could use, copy, spread and transform the contents that He has created.

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The limitations of copy, diffusion and transformation of contents that is established in the Free Content licenses are:

- Only can be copied and spread content accepted to the **Free Content license**, if such diffusion is also accepted to the cited license, it means, if an individual creates a free content, their widespread copies have to be also of free use.
- Only can transform a content accepted to the Copyleft, if the resulting content of this transformation is accepted also under this license.
- The contents author can limit in what terms is applied the License and what terms not, and in this way avoid that they could be used for an opposed way which were originated his creation.

⁴ In fact, Web has been the best platform to launch unknown artists, this, thanks to services, like <http://music.myspace.com> that offers a catalogue yet wider.

Free Art License FAL

Now then for the case of arts has been designed the Free Art License FAL, the one which authorizes to copy, spread and transform freely the artwork that protects, respecting the rights the author.

The objective is to give opened access to the artwork and authorizing the use of its resources by third persons to increase the possibilities of enjoyment and to encourage a new framework of creation that make possible a new release. All of this, with respect, recognition and defending the moral rights for authors.

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⁵ Copyleft Attitude

Coloriuris⁶

It is focused to the content creators - literary, musical, audiovisual and photographic - that use the World Wide Web for diffusion, publication and/or set to arrangement that want to relinquish the patrimonial rights of their creations inside and outside of the net.

It is a hybrid system of self management and copyrights transfer on line from continental model; from article 27 of Universal Statement of Human Rights, and with respect of the Berne Agreement, the Treaties of the O.M.P.I. in 1996, the regulation of E.U. and the national legislation of the respective States with legal effects for creative of the following countries:

How it operates

Through a license agreement (contract) between a headline of intellectual property rights and other person that receives the authorization to use the said rights in exchange for an agreed payment beforehand (rate or royalty)." (O.M.P.I.)

The license agreements also can have free character.

Have different possibilities of using the license agreements (contracts) ColorIURIS, to election of headlines of this rights, in function of where it be hosted the content.

Who can use it

The content creators - Blogs, Websites; as well as literary, musical, audiovisual, photographic - that use Internet for diffusion, publication and/or set to arrangement, and that wish to relinquish the patrimonial rights of their creations inside and outside of the net.

What type of works can protect

Complete works or parts that can be accessible from Websites. As can be: text annotations, drawings, infographs, photographs, catalogues, podcasts, and audiovisual files.

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Free Multilicenses⁷

<i>Multilicense</i>	Web

⁶ <http://www.coloriuris.net>

⁷ http://campusvirtual.unex.es/cala/epistemowikia/index.php?title=Multilicencia_libre

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Projects

According to the data that has indexed the Music Association Internet (AMI), currently more than a million of independent musicians promote their music by free download systems on Internet, either through their

⁸ All licenses covered under Copyleft principles.

own website or through sites that publish their songs under the copyleft, Creative commons, Free Art License between others.

There are more than 10 on-line important platforms that allow the artists to hang their music and video clips in a free way. Many of these webs have a so longer catalogue as Itunes and with a musical top quality.

In the site of free Artelista⁹, it offers in a way free approximately 23,976 works of art with licenses Creative Commons originating from 1,933 artists. The site offers furthermore spaces where artists can spread and share their works, promoting the free culture

Other interesting project is copyleftmusic.net. It is a site of music promotion and distribution under Copyleft with different channels that offer specific and personalized services.

Permit access to music created by artists from every place around the world, classified by styles and as well as a musical topics area to measure by assignment and private music always under Copyleft licenses.

The site offers legal information, services and necessary advices for the Copyleft music creators as well as for the users of the same. In order to that creators and user are benefited with the license when it is applied to the sound art.

Youtube

Born in December 2005 and currently each day 30.000 new video files are uploaded, already seen 35 million times by 10 million of Net users. About 10.000 are music files and the total of the musical videos Catalogue counts on almost 900.000 references.

Conclusions

This license is applied to the electronics works as well as to those which it be not.. Born by the observation of the world in free software and on Internet, but the application area is not limited by the electronic supports.

If in private way the LAL is "a viable option", in the public way will be "the option".

You can protect a painting, a novel, a sculpture, drawing, music, poem, an installation, video, movie, a kitchen recipe, a Website, it can protect all those creations that are claimed of a given art!.

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⁹ <http://www.artelista.com/free>

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Software Curating: programming and curating for networks

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The paper addresses the issue of new developments in the field of curating in the context of information technologies. It explores the emergence of an interdisciplinary approach that directly links the field of curating (often understood as an activity of artistic programming) with computing (more specifically with the activity of computer programming) and a relatively recent interest in software art. Although there is much contemporary critical work and practice that is described as art-oriented programming or software art, the paper responds to a perceived gap in discussions about software curating.

If, in a conventional sense, curating follows a particular model of selecting, organising, displaying, contextualising and documenting of art works, then emergent curatorial forms attempt to rethink this model for the context of networks: to make sense of the Internet (communications network), the computer (information system), online collaborative software tools (often termed as social technologies) and new artistic forms that involve programming (software art). What these forms suggest are new ways of organizing the curatorial process, new presentation platforms and new conceptions for the involvement with users – artists, computer programmers and wider audience alike – exploiting and in keeping with the properties of socio-technological systems.

The line of thinking that links artistic practice with computational technologies has a long history. Exhibitions such as *Cybernetic Serendipity* (ICA, London, 1968) or *Software* (Jewish Museum, New York, 1970) were symptomatic of this trend. The *Cybernetic Serendipity* exhibition (curated by Jasia Reinhardt), although not the first computer art exhibition as such (earlier exhibitions and project were held in US and Germany), was seminal in the history of computing and art.¹ The particular significance of the project was in that rather than focusing on computer generated work it took a wider focus and for the first time drew attention to art in combination with cybernetics, a relatively new field of scientific inquiry concerned with - in Norbert Wiener's description - 'the entire field of control and communication theory, whether in the machine or in the animal' ([1948] 2000: 11). It was organised in three distinctive sections: 'computer generated work, cybernetic devices-robots and painting machines, and machines demonstrating use of computers / history of cybernetics' (MacGregor 2002). Around the same time, the exhibition *Software, Information Technology: its new meaning for art* (curated by Jack Burnham) explicitly used the term 'software' as a metaphor for ideas, processes and systems as opposed to the 'hardware' of traditional object-based practices.² The exhibition included an eclectic combination of art and non-art from technological applications and experiments (computing and electronic research applications) through to conceptual art works and those overtly dealing more with technology.

Other historically significant exhibitions and projects that dealt with an increasing impact of communication technologies on art were: *Art and Technology* project developed by Maurice Tuchman and Jane Livingstone at the Los Angeles County Museum in the period of five years (1966-1971), *Information* exhibition curated by Kynaston McShine at the Museum of Modern Art, New York (1970); and research projects by *Experiments in Art and Technology* (EAT) group (set up in 1967 by engineers and artists Billy Klüver, Fred Waldhauer, Robert Rauschenberg, Robert Whiteman) and by the *Center for Advanced Visual Studies* at MIT (founded in 1967 by Gyorgy Kepes). A further example is the exhibition of computer generated art

Tendencije 4 in Zagreb (1968) which along with published at the same time magazine on aesthetic and media theory *Bit International* was recently revisited in a major 'retrospective' *bit international: [Nove] Tendencije computer and visual research* curated by Darko Fritz in Neue Galerie am Landesmuseum Joanneum, in Graz (2007).³

However, in relation to curating, it appears that the critical tradition of direct engagement with computational technologies (and more specifically with programming and software) did not emerge from the field of curating itself. Rather, it was artists engaging with the openness of technological structures - artists essentially working like curators - that historically have made some of the most significant interventions. For instance: Alexei Shulgin's *Desktop Is* (1997-1998), Eva Grubinger's *C@C - Computer-Aided Curating* (1993), and more recently, Robert Lisek's *FACE* (2007) and Pall Thayer's *CodeChat* project (2007).⁴

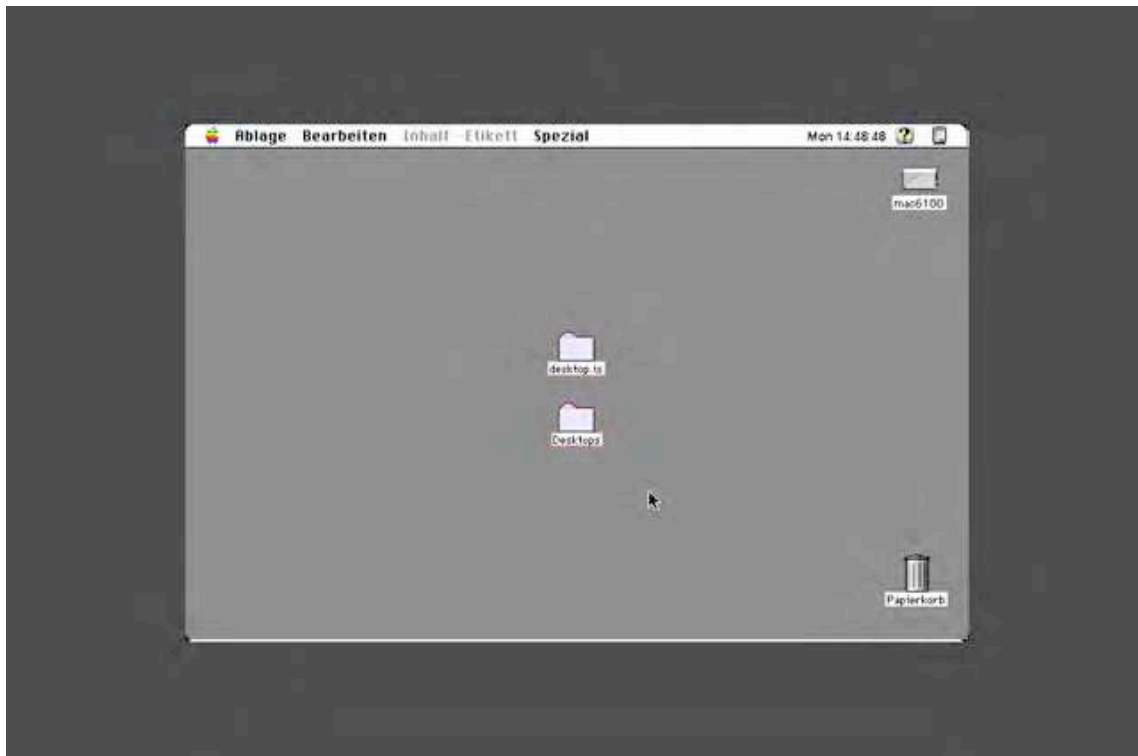


Figure 1: *Desktop Is*, screenshot <http://www.easylife.org/desktop/>

Desktop Is [Fig.1] was set up as a website displaying images of computer desktops collected by the artists through an open public call; the artist set out specific rules of public participation, collected and displayed 'works' sent by public, thus acting in the manner of a curator. An even earlier example of a similar approach was *C@C - Computer-Aided Curating* [Fig. 2] a software-driven tool and a curatorial online system developed in collaboration with computer programmer Thomax Kaulmann. The system not only enabled artists to create their own works in online 'artist-studios' with built-in editing tools, but also provided a context for presentation and selection of other artists' works creating the structure of a social network. The website also included a discussion forum for the exchange of comments by the public and curators, and spaces for art dealers to present and promote their activities. Christiane Paul, in her chapter 'Flexible

Contexts, Democratic Filtering, & Computer-Aided Curating' (2006) comments on the project in the following manner:

'In terms of curation, C@C proposed a fluid environment that did not separate production, reception and presentation, and ideally enabled artists and the public to play a curatorial role to varying degrees. In this case, the software was mostly a supportive tool and framework and did not assume a curatorial function per se.' (2006: 100)

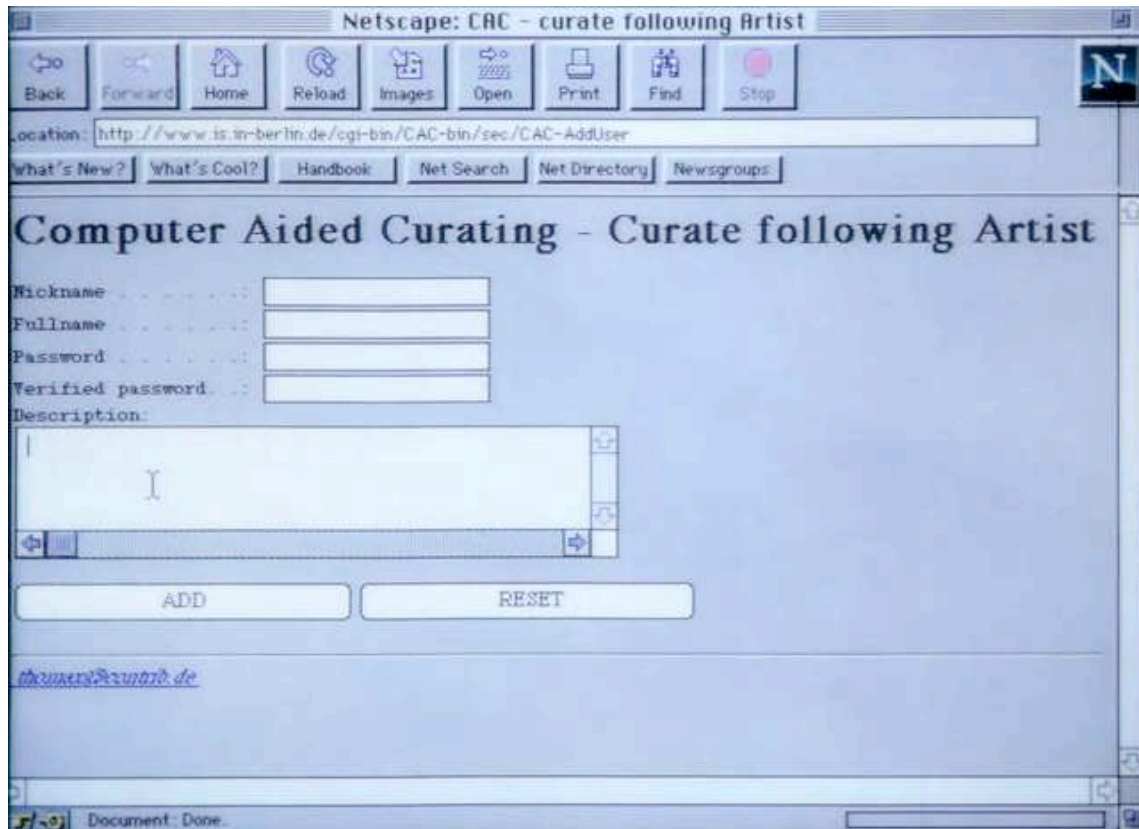


Figure 2: C@C: Computer Aided Curating, screenshot courtesy of <http://www.evagrubinger.com>

Tracing the historical lineage in the field is important as it allows for the introduction of a number of more current examples and at the same time helps to demonstrate a certain logic in the development of what appears to be an emergent curatorial practice. Software is considered first for its functional aspects (a production tool and/or a display platform) but the discussion is subsequently extended to consider software as more integrated with the curatorial process per se. Historically, the idea of using software as part of the curatorial process has been variably referred to as *automated curating*, *software-aided* or *software-enabled curating*.⁵

A more contemporary version of such an approach, both in terms of chronology and technological system employed, is *FACE* (Free Artists Concepts Exchange) [Fig. 3]. The project can be described as a web enabled system for exchange of concepts, display of work, collaborative production and experimenting, and plays with 'the meaning of media objects by creating, transforming the downloaded media objects, which are in a sense "source code" to work with'. It builds upon the technical system that uses the structure of nodes

and DAG (directed acyclic graph). This allows the user to represent and manipulate concepts and projects and the system facilitates an online, flexible and collaborative platform. The emphasis is on the collaborative aspect in that the curatorial responsibility for the architecture of *FACE* and its structural parts (i.e. nodes) is distributed across its participants. Furthermore, the process of creation, organisation and dispersal of concepts is represented by the flow of graphs, where each concept has a dedicated node, or a configuration of several nodes in the graph. The project website explains that while ‘the content published by participants is located at the edges of the graph, the nodes represent a system of tags used by participants for indexing of content’. Simultaneously, participants can control their own graph(s), as well as navigate through the system exploring graphs of other participants. The significance of this lies in the productive interrelation between local interventions by each of the participants and the network’s global behaviour, and the social relations that arise from this.

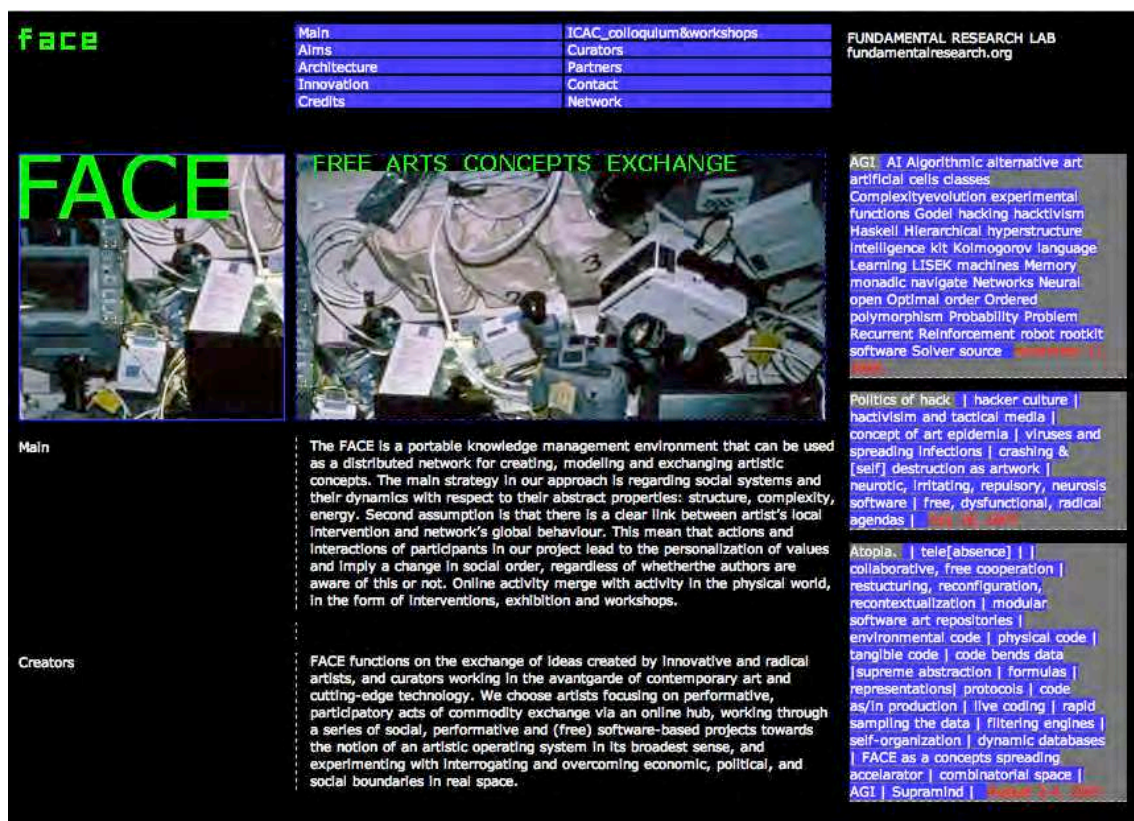


Figure 3: FACE, screenshot, <http://fundamentalresearch.org/FACE/face.htm>

There is an increasing tendency in this growing field of practice to emphasise the integration of aesthetic with technical aspects in works that place source code at their centre. A particularly interesting example in this respect is the *CodeChat* project that is a code-based chat system developed as a means to discuss the conceptual and aesthetic implications of coding methods in art that involves programming [Fig.4]. The system is structured as a single Perl script to facilitate a database of text-based code files submitted as open source (or at least part of the submitted code has to be open source to allow public commenting). According to the project description, the Perl script automatically generates an html file with comment sections for each line of submitted code. The commenting system is AJAX based, driven by Javascript, PHP and MySQL. The

project is structured as an open dynamic system that entirely relies on public participation expressed in an active involvement in providing content (source code) and sustaining dynamic and transformative potential of the project through the function of public commenting. The project is particularly interesting for the context of this paper in that it combines the aesthetic potential of source code (essentially as an 'artwork' that can be put on display for public viewing) with its technical and functional potential (demonstrated through public commenting on specific lines of code in order to share more technical knowledge).

```

line no. 48 (0 comments)      $do_draw = 1;

line no. 49 (0 comments)      }

line no. 50 (0 comments)      $phNum++;

line no. 51 (0 comments)      print "$phNum\n";

line no. 52 (3 comments)      if($do_draw){

line no. 53 (0 comments)      print "broadcasting data...\n";

line no. 54 (0 comments)      open(FILE, "<$fileName");

line no. 55 (1 comments)      while(<FILE>){

line no. 56 (0 comments)          #foreach my $user($select->can_write(0)) {

line no. 57 (0 comments)          #      eval{$user->send($myUrls[$length]."\n")};

line no. 58 (0 comments)          #}

line no. 59 (0 comments)          undef($text);

line no. 60 (0 comments)          chomp($_);

line no. 61 (0 comments)          #select(undef, undef, undef, 0.25);

line no. 62 (0 comments)          $_ =~ /d="([^\"]*)"/;

line no. 63 (1 comments)      $coordat = $1;

```

Figure 4: CodeChat, screenshot, <http://pallit.lhi.is/~palli/codechat/codechat.php>

Importantly, these examples can be considered as symptomatic of a practice that deliberately confuses the firm distinctions between artistic practice, computer programming and curatorial practice. Although in a general sense it is not new for artists to work like curators in organising public presentations of their and other artists' works, the interesting aspect of these examples is that they present an artwork that at the same time possesses attributes of an online curatorial system that relies on public contributions.

The reverse of this holds too. Just like artists-programmers increasingly work like curators, more recently a similar tendency appears to be emerging from the curatorial field per se and there are growing numbers of overtly curatorial interventions in this respect. This tendency that emerged from the shared perception of the Web and the Internet as an increasingly independent and open platform for the production and presentation of art⁶ can be well instantiated in projects such as *Runme* (2003), *TAGallery* (2007) and *Hack-able Curator* (2007), to mention only a few prominent examples.⁷

The idea of ‘software curating’ and ‘software-based filtering’ (that Paul refers to earlier) is developed further in the project *Runme*, a software art repository and an online presentation platform.⁸ [Fig. 5] The repository is structured through a taxonomy of categories such as ‘code art’, ‘conceptual software’, ‘games’, ‘generative art’, and so on, as well as more intuitively through keywords that provide further descriptions of submitted projects. Both the ‘category list’ and the ‘keywords cloud’ are open for public modification through the identification and proposal of new terms. In this case, curatorial control is exerted on the level of setting initial parameters of categories and through a review system that allows editors or so-called ‘experts’ to highlight the perceived ‘best works’ with short commentaries. The curatorial process is based on a relatively open, yet somewhat moderated, database that allows users to self-submit their works - an option almost embedded in the software.

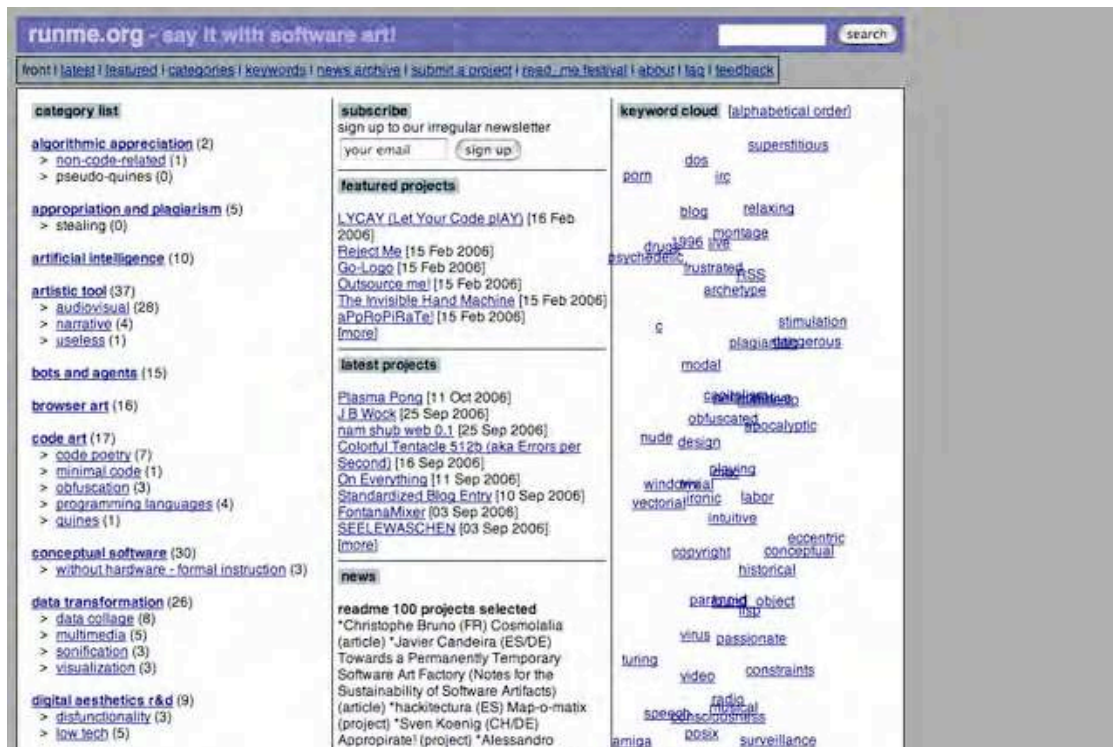


Figure 5: Runme, screenshot, <http://www.runme.org>

TAGallery, an online curatorial platform established by CONT3XT.NET⁹ proposes a speculative idea of ‘tagging as curating’, making reference to web sites such as del.icio.us, a social bookmarks manager in which users can add bookmarks and categorise them through the use of tags to describe the bookmark in more detail.¹⁰ This line of thinking informs the development of the exhibition ‘I tag you tag me: a folksonomy of Internet art’ (for TAGallery) where the method of tagging allows the attribution of artworks to different thematic fields [Fig. 6]. Luis Silva, curator of this online ‘exhibition’ describes it in the following way:

‘If tagging creates meta-data about pre-existing content, it can be seen as the creation of a discourse about it. And if that content happens to be an online artwork, tagging both allows for a subjective juxtaposition of art works and the elaboration of a critical discourse about it. Curating then. But this isn’t new. This is regular curating done in a schematic way, using a different tool to get the job done. But since tagging is a social

activity in its essence, giving birth to folksonomies, it allows for social curating, with social selection of works and social production of discourse about them.¹¹

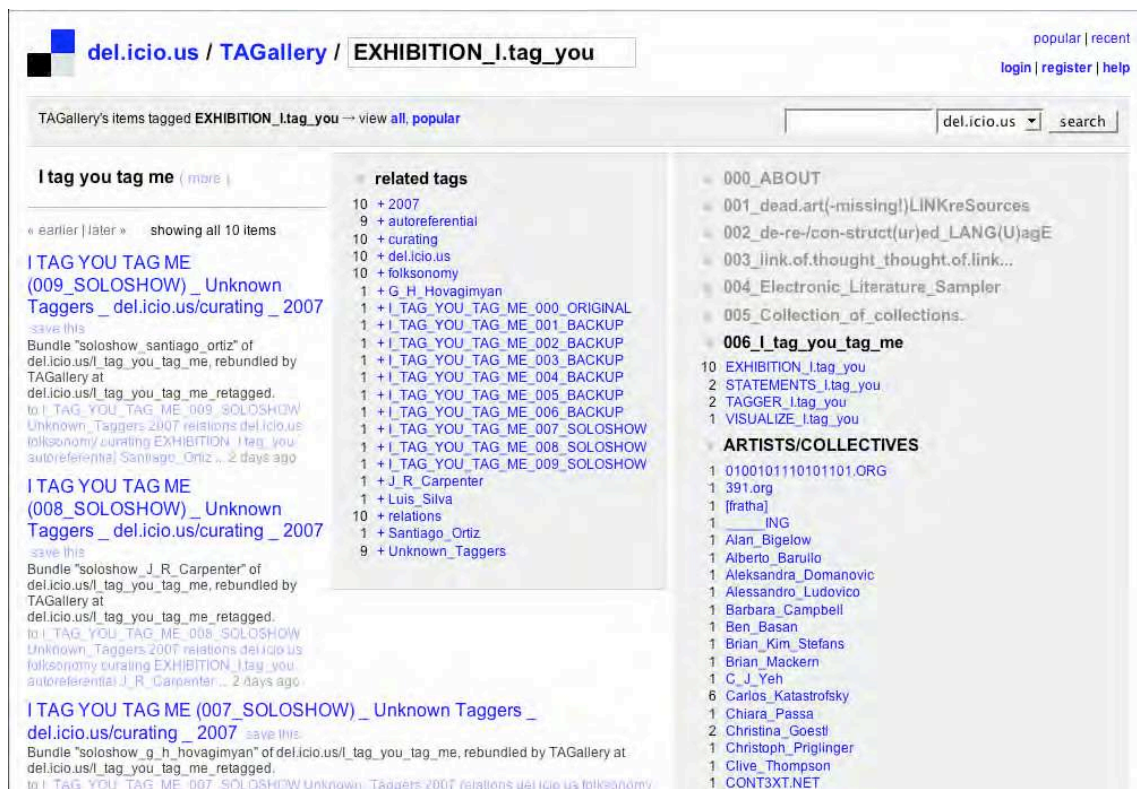


Figure 6: TAGallery/EXHIBITION_1.tag_you, screenshot, http://del.icio.us/TAGallery/EXHIBITION_1.tag_you

The *Hack-able Curator* project (2007) combines curating with robotics, social technologies and the practice of 'hacking' to offer an experimental curatorial system that questions the singular subjective role of the curator and the possibility of democratisation of curating by hacking the curatorial process.¹² [Fig. 7] The robot curator is connected to the Internet so that it can expand the physical space into networks (both social and technological) and the entire system represents the figure of the curator. The curatorial processes involve the following: 'a pre-selected set of tags, the tags to search the social platform Flickr for images for use in an imaginary show, creating a pool of images to choose from, presented these images on a computer screen nine at a time, making a selection of one or more images that fits its curatorial criteria by the robotic arm via a software algorithm, informing the owner of the image about the intention of including their image in the show giving them the opportunity to opt-out, and finally displaying selected images on the project website. Simultaneously, the robot prints label stickers for each of the tags associated with the chosen image.' The intention behind this experimental work is not to replace the figure of human curator (with a machine) but to de-construct it and reflect upon the emerging social tools for curating in a collaborative context.¹³



Figure 7: *Hack-able Curator*, exhibition documentation shot, <http://www.hackablecurator.org.uk/>

The examples mentioned so far are by no mean an exhaustive list in this field but what they indicate is an increasing curatorial engagement with programming and socio-technological networks. This concern reflects a relatively recent interest in software art practice in which computer programming is understood as artistic practice (art-oriented programming) and program code as potential artwork. Consequently, curating is situated within the broader context of software cultures and coding practices.¹⁴ The emphasis of this paper is on the emergence of new curatorial forms that involve programming and software used not only as tool and display platform but also as part of curatorial process that is increasingly distributed over networks and social in character.

What is distinctive about this approach is how the discussion shifts from the concept of programmability and the algorithm as an organising principle of artwork (in a functional and/or technical sense) to a consideration of programming and code as cultural and aesthetic expression - under the broader and more contemporary term 'software art practice'. Central to the discussion is the more general idea that the act of computer programming itself can be considered *artistic activity* and software can be considered *an artwork* as opposed to the activity of programming and software in their functional dimension as a means to facilitate the *production of an artwork*. Such a differentiation, between software as functional tool, and software as cultural production in itself, and as art form, is common to the software art scene. This is explained by Olga Goriunova and Alexei Shulgin in their introduction to the *read_me festival 1.2* catalogue, when they state:

'artistic software is, first and foremost, software created for purposes different than traditional pragmatic

ones. Such programs are not seen as tools for the production and manipulation of digital objects – from online bank accounts to works of art – they are works of art in their own right.’ (2002: 6)

Software represents both technical and cultural processes, and these two aspects cannot be disentangled.¹⁵ In general terms, software is defined as a set of formal instructions, or, algorithms, a logical score that can be translated into a computer program and executed by a machine. It also includes associated documentation concerned with the operation of a data processing system (e.g. compilers, library routines, manuals, and circuit diagrams). There is a distinction made between ‘system software’ (the operating system and database management system (DBMS)) and ‘application software’ (any program that processes data for the user such as a word processor, etc.). In *A History of Modern Computing* (1998), Paul E. Ceruzzi emphasises the complexity of the relationship between software (the set of instructions that direct a computer to do a specific task) and hardware (a general-purpose machine on which software runs):

‘A computer system is like an onion, with many distinct layers of software over a hardware core. Even at the center – the level of the central processor – there is no clear distinction: computer chips carrying “microcode” direct other chips to perform the processor’s most basic operations. Engineers call these codes “firmware”, a term that suggests the blurred distinction.’ (2003 [1998]: 80)

The complexity of these relationships is what I have tried to identify in relation to the concept and description of ‘software curating’: as both a set of curatorial instructions and a networked system (an online software and a dynamic network of users) within which these instructions are executed.

Conventionally, with the installation of digital artworks, the work of the programmer is relatively hidden and under-acknowledged as a creative practice in its own right. This issue is emphasised by Florian Cramer, who states:

‘The history of the digital and computer-aided arts could be told as a history of ignorance against programming and programmers. Computer programs get locked into black boxes, and programmers are frequently considered to be mere factota, coding slaves who execute other artist’s concepts. Given that software code is a conceptual notation, this is not without its own irony. In fact, it is a straight continuation of romantic philosophy and its privileging of aesthesis (perception) over poesis (construction) cheapened into a restrained concept of art as only that what is tactile, audible and visible.’ (2002: 18)

The parallel can be extended to curating by thinking about how on visiting the traditional white cube of a gallery or museum, the work of the curator (or artist for that matter) is relatively hidden from the display of artwork. The curatorial examples offered earlier demonstrate a reversing of this process in which the curatorial process is revealed, much in the same way as the work of the artist-programmer. As a result, the term software curating necessitates an engagement with instructions (the program) and the writing of these instructions (programming) but also the other processes upon which the program relies to run (that includes the wider context or operating system of art). This is both a literal and metaphorical description of software curating.

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Edward A. Shanken (1998) 'The House That Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art', in *Leonardo Electronic Almanac*, 6:10, November, online (<http://mitpress.mit.edu/e-journals/LEA/ARTICLES/jack.html>) [last accessed 16/01/08], reprinted in Roy Ascott, ed., (1999) *Reframing Consciousness: Art and Consciousness in the Post-Biological Era*, Exeter: Intellect.

[all web sites last accessed 10/02/08]

Figures

Figure 1: *Desktop Is*, screen shot <http://www.easylife.org/desktop/>

Figure 2: C@C: Computer Aided Curating, courtesy of <http://www.evagrubinger.com>

Figure 3: FACE, screen shot <http://fundamentalresearch.org/FACE/face.htm>

Figure 4: *CodeChat*, screen shot, <http://pallit.lhi.is/~palli/codechat/codechat.php>

Figure 5: *Runme*, screen shot, <http://www.runme.org>

Figure 6: *TAGallery/EXHIBITION_1.tag_you*, screenshot, http://del.icio.us/TAGallery/EXHIBITION_1.tag_you

Figure 7: *Hack-able Curator*, exhibition documentation shot, <http://www.hackablecurator.org.uk/>

Endnotes

¹The exhibition was accompanied by the Press Release (currently in Tate Archive, VA Pub 179) and an independent publication coinciding with the show - a special issue of *Studio International* entitled 'Cybernetic Serendipity' (1968) edited by the exhibition curator Jasia Reichardt. For further references see MacGregor 2002, Reichardt 1968, Gosling 1968, Brown 1998 (<http://www.mediaartnet.org/exhibitions/serendipity>).

² For further references see (Gere 2005: 156-160), (Burnham 1970) and Eddie Shanken's 'The House That Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art', chapter published by *Leonardo Electronic Almanac* 6:10 (November, 1998) (<http://mitpress.mit.edu/ejournals/LEA/ARTICLES/jack.html>), full version also available online (<http://www.artextra.com/House.html>).

³Further references for examples listed in this section are:

Art and Technology (<http://www.fondation-langlois.org/html/e/page.php?NumPage=706>; <http://www.fondation-langlois.org/html/e/page.php?NumPage=706>); *Information* (<http://www.moma.org/research/archives/EAD/InfoExhibitionRecordsf.html>); *Experiments in Art and Technology* (EAT) (<http://www.fondation-langlois.org/html/e/page.php?NumPage=306>; <http://www.fondation-langlois.org/html/e/page.php?NumPage=237>); *Center for Advanced Visual Studies* (<http://cavs.mit.edu/>); *Tendencije 4* ([Nove] *Tendencije computer and visual research*, <http://www.neuegalerie.at/07/bit/cover.html>).

⁴ Examples cited are: *Desktop Is* (<http://www.easylife.org/desktop/>); *C@C - Computer-Aided Curating* (<http://www.evagrubinger.com>; http://www.aec.at/en/archives/festival_archive/festival_catalogs/festival_artikel.asp?iProjectID=8638); *FACE* (<http://fundamentalresearch.org/FACE/face.htm>); *CodeChat* (<http://pallit.lhi.is/~palli/codechat/codechat.php>)

⁵ The issue of automatisisation in relation to curating that involves technology (as suggested in term 'automated curating') is clearly relevant but is outside of the scope of the paper.

⁶ Historically this process that eventually led to the development of alternative online systems that more overtly integrate curating with online platforms and software (and eventually programming per se) include exhibitions curated specifically for the Web with no physical component, either as part of online exhibition spaces hosted by museums (for example, the Walker Art Center's *Gallery 9*, the Whitney Museum's *artport*, or the Tate's *Online Events*), or independent from institutions dedicated online art platforms (for example, Rhizome's *ArtBase*). This goes hand in hand with the development of online platforms dedicated to emerging cultural practices that initially fall largely outside of interest of more conventional art institutions. These have included online exhibitions of new media festivals (for example, *Ars Electronica* or *ISEA*), and relatively independent collaborative web platforms, networks and online repositories (most current examples include the curatorial discussion list and Web resource *CRUMB*, or *Open Congress*). References include: *Gallery 9* (<http://gallery9.walkerart.org>); *artport* (<http://artport.whitney.org/>); Tate Online (<http://www.tate.org.uk/onlineevents/>); *Rhizome* (<http://www.rhizome.org>); *Ars Electronica* (<http://www.aec.at/>); *ISEA* (The Inter-Society for Electronic Arts) (<http://isea2006.sjsu.edu/>); *CRUMB* (<http://www.crumbweb.org>); *Open Congress* (<http://opencongress.omweb.org/wakka/HomePage>).

⁷ Examples cited are: *Runme* (<http://www.runme.org>); *TAGallery* (<http://del.icio.us/TAGallery/>); *Hack-able Curator* (<http://www.hackablecurator.org.uk/>).

⁸ *Runme* (<http://www.runme.org>), launched in January 2003, is a collaborative project developed by Amy Alexander, Florian Cramer, Matthew Fuller, Olga Goriunova, Thomax Kaulmann, Alex McLean, Pit Schultz, Alexei Shulgin, and The Yes Men. Further members are Hans Bernhard and Alessandro Ludovico. The Runme.org website has been conceptualised and administrated by Amy Alexander, Olga Goriunova, Alex McLean and Alexei Shulgin; and was developed by Alex McLean.

⁹ CONT3XT.NET is a Vienna-based organisation founded in 2006 as a collaborative platform for the discussion and presentation of issues related to (New) Media Art. The collective was founded by Sabine Hochrieser, Michael Kargl (a.k.a. carlos katastrosfsky) and Franz Thalmair. (<http://cont3xt.net/index.php>)

¹⁰ For more information see (<http://del.icio.us/>)

¹¹ Luis Silva further explains the idea of social bookmarking and its relation to curating:

‘Social bookmarking allows for users to easily store lists of resources (websites, for instance) and have them available to the public, allowing people with the same interests (or not) to share and have easy access to relevant information on a specific subject. But the most important feature of social bookmarking lies in the categorization of these resources by the users themselves. Tagging is the word that comes to mind. Tagging consists basically in the possibility these social bookmarking services have of allowing the users not only to bookmark something, but to informally assign tags (relevant keywords) to it, thus creating meta-data about the tagged resources in a collective way, rather than individually, something that can be seen as a second layer of meaning, but determined by the users rather than the original producer of the content. This is what is called folksonomy, a user-generated taxonomy used to retrieve and categorize web content.’ References: (http://del.icio.us/TAGallery/STATEMENTS_I.tag_you; http://del.icio.us/TAGallery/EXHIBITION_I.tag_you).

¹² *Hack-able curator* (2007) is a collaborative project by students of masters programme in Digital Art and Technology (m-DAT) at the University of Plymouth (UK): Anita Barwacz, Lindsey Bedford, Andy Bennett, Anaisa Franco, Martha Patricia Nino and Richard Wilkes. It was first shown as part of *SLOW* exhibition (January – March 2007) at the Plymouth Arts Centre, Plymouth, UK (<http://www.hackablecurator.org.uk/>).

¹³ There is a distinction here to be made between the term ‘hacking’ and what some refer to as ‘cracking’. While hacking (performed by a ‘hacker’) describes a computer expertise and skills used to solve difficult technical problem without causing computer harm, cracking (performed by a ‘cracker’) implies using technical expertise to break into computer systems for malicious purposes causing harm (for instance shutting computer systems) (Barabási 2002: 116).

¹⁴ Of particular relevance to this discussion are for instance Goriunova and Shulgin (eds.) (2004), or Fuller (2003).

¹⁵ Adrian Mackenzie (2006) in his book *Cutting Code. Software and Sociality* (2006) reiterates the point: ‘Despite appearing “merely” technical, technical knowledge-practices overlap and enmesh with imaginings of sociality, individual identity, community, collectivity, organisation and enterprise. Technical practices of programming interlace with cultural practices.’ (2006: 3-4)

Art Transformation: A Dialogue Between Old And New Media

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Presented here are several versions of computer art pieces that express the digital artistic process and show how technology both relates to traditional techniques as well as enables a new freedom in art making by fostering a dialogue between old and new media. A sequence of digital works has its own rhythm and flow and naturally reaches a point of rest which may be the final image, serve as a beginning point for another piece, or become a constantly changing work that continues to grow. As a result, this process expresses harmonic completion in relationship to time; if viewed as a cinematic sequence, the pieces relate to each other as frames in a scene of a film or as notes in a chord of a musical composition.

Connections

The *Connections* sequence is an example of this process. There are more intermediary stops than the ones presented here, but *Connections I, II and III* rhythmically reach the turning point of the concept.

The sequence originates with a single oil painting of a woman which was inspired by Renaissance paintings. After completing the painting I processed it through a Xerox machine creating various black and white collages of the same image. Several individual small Xerox collages were assembled to create one large art piece which I hand colored and painted again. The resulting hand-made art piece looked as if it were generated by a computer. I created several of these art works and then photographed and brought them into the computer to be digitally recreated by adding new elements of photography and digital art.

The mediums of painting and hand crafted art making, mixed with the digital possibilities allow greater freedom in decision making. The original images in *Connections* have undergone many changes, morphing into a series of images and then joined again into a single entity. The one image of a woman went through multiple replications, becoming intertwined with her many other selves as if she is both inside and outside herself as well as being a multitude of other women. In *Connections II and III* the entire group of images gradually fades, becoming a backdrop for a singular precious stone. Incorporating the leaves of a tree photographed in autumn is symbolic of the transformations that occur in the world of nature and links nature to humanity, womanhood and beauty in its varying stages from birth to decay as well as connects individuals and groups as one precious entity.

In my art work I investigate issues of essence and explore various possibilities for reality and its meaning. The computer is a perfect medium for creative experimentation and facilitates examining the same idea from various points of view. However, often I find that the digital process takes on its own artistic life, leading me down a path which I cannot predict. Without material constraints the intuitive and the unconscious part of the artistic process directs and energizes my work. This process has infinite possibilities and satisfies my interest in exploring ideas of finite and infinite, macro and micro perceptions, time and timelessness as well as concepts of identity, individuality, community, globalism, wholeness and oneness.

Possibilities

The sequence *Possibilities* is based on an acrylic painting showing a child sitting on his mother's lap. The painting was transformed through several steps utilizing the Xerox hand made process I describe above, creating a large art piece that was hand colored before any digital application was applied. Once it was brought into the computer I applied various filters and processes and combined it with a photograph that I took of spring flowers. The expressive possibilities seemed endless; which element should take the front stage? Which colors should be chosen to allow for certain ideas and atmosphere to permeate the work? The process of altering the painting into a digital composition can resemble the process of growth; as a child becomes aware of others, he may assert his own individuality or be overshadowed by events of life.

Preparations

The sequence *Preparations* began with creating an acrylic painting showing a classic mother and child image. Standing in front of a beach with a palm tree, the mother hugs her child with one hand and points to the heavens above with the other. This piece is about the ideal sheltering of love and harmony between mother and child contained in a world of nature and as part of one creative force. It is about the preparation of a child for his future when independently he will make his mark upon the world. Once I brought the image into the computer I felt it could be further enhanced by illustrating over it the universal image of the peace dove with an olive branch and blending in a photograph of blossoming tree branches. The cold color scheme and the warm color scheme throw a completely different light on the subject.

Secret

Despite the speed associated with digital tools, the process that I apply involves a deliberate slowness requiring hundreds of steps for the artistic image to emerge. If the viewer were to consider the evolution of the image through the various versions, layers and repetition, he would relate to the contradiction of speed and slowness entailed in working in an artistic digital environment. By presenting the artwork as sequences I am showing the time transformative experience that is part of creating my art, whether it is by hand or digital. The *Secret* sequence is about the many layers of reality, some of which we are aware of and others which occur beyond our conscious awareness. This sequence attempts to capture the poetic and pastoral world as a magical dream in which all stories exist, only sometimes they are clearly recognizable and at other times mysteriously allusive.

Secret was developed by combining several photographs of trees, the flame of a candle, multiple images of women and a close up of a child's face. By the time the final image was completed, some of these elements were no longer clearly visible, hidden within the layers and peering through post-processes. Thus, *Secret* is about the unraveling, the erasure and the overlapping of memory; a unique process that embeds new layers of experiences and carries the essence of the images forward.

It is the reflection of art that we see now.



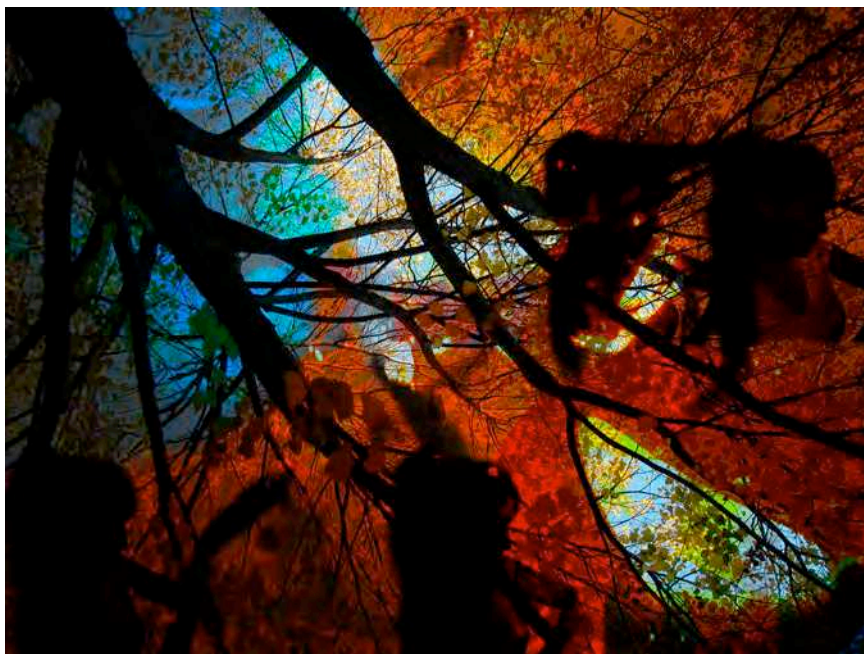
Connections I



Connections II



Connections III



Secret I



Secret II

Workflow For Animation

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The organization is really important for the work in 3D animation, every day the studios all over the world create complex processes to low the cost and to obtain the best results. In Latin America is really complicated work with a manual, because do not exist a culture of the animation and the producers normally decide to suppress some parts in the phase of preproduction to lower the cost, but on the contrary this one increases the cost in the phase of production and the final results are not the awaited ones.

For this reason I decided to do a workflow manual for my own animation studio, the goal is to maximize quality, minimize and attach costs to each and analyzes the time needed for each task and how to best schedule the production. I create a workflow in three phases involved in creating animation: preproduction, production and postproduction. And mix the development phase (normally including in some manuals) into the preproduction phase to less significant time, personnel and costs. All three phases of the process are interrelated because the amount of time and money devoted to one phase affects the resources that can be earmarked for the other stages and influences the overall budgets, for that the director and his assistance check all phases and connects them, like a general link.

Preproduction

In the first of this phases involved in the project the concept is creating, the producers seek and negotiate financing deals, acquire rights and generate a adequate budget, it's best to do it on as low as possible estimating the number of personnel needed (what their responsibilities are and salary range) and physical requirements in terms of hardware, software, furniture and all kind of resources to do the project. Furthermore the art department finish the conceptual and style guide to design the character, props, background and buildings 3D modeling with their completing color guides and textures.

In preproduction involves task such as finalizing the script, storyline and storyboard (the storyboarders complete all scenes before production begins), voices recording (the animators use to track to create the animation to capture body language, expressions and the lip-sync used by the actors), music and audio FX (some times used music libraries and other times a composer develop songs) and the materials needed to sell the concept to start the animation in the production phase. This is the most important step in the process, in witch the producers and the director need to check again and again, because every mistake in this phase increase the final cost.

1. Brain storm.
2. General investigation of the project.
 - a. Cultural situation.
 - b. Physiologic situation.
 - c. Social situation.
 - d. Historical.
3. Creating a budget for an Animation property.
4. Creating image reference file.
5. Character designed and conceptual art.
6. Script.
7. Storyline.
8. Buildings maquettes.
9. Storyboard.
10. Animatic and cámara animation.
11. Production plan.
12. Audio recording.
13. Illustration.
14. Model, UV's y Motion Graphics.
15. sell the Project and do the marketing plan.
16. Setup y Textures.
17. Creating the work groups for the animation sequence of the project.

Production

After preproduction comes the production phase. In this step the animators work with every character and cameras in all sequences of the project in base to the creation of the workbook, which essentially blocks out all the instructions for the animators, based on the materials developed during preproduction. If the

preproduction phase is correct, the flow in the production phase is fast. The publicity and marketing executives need materials, scenes, character and drawings to promote the project. If licensing, publicity and marketing executives are involve in the project, they should be kept informed of progress periodically during the production phase. They also may need marketing materials, scenes, character drawings, or other information from the production in order to begin their selling process.

18. Workbook.

19. Character animation.

20. Camera animation.

Postproduction

This is the last and the decisive phase in the process. This stage includes the illumination, render test, final render, VFX art, compositing, color correction, edition, the music premix and final mix and picture editing. The director oversee the process with the help of a postproduction director. All phases before depend to this to make a great project.

21. Illumination and render tests.

22. Final render.

23. VFX art.

24. Compositing.

25. Color correction.

26. Edition.

27. Final Post.

28. Mix VFX y music.

29. Final edition.

30. Master.



Thread And Carbon, Oil And Steel

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Technique employed: Digital technology was used to capture (by scanning) and integrate (using Photoshop) the various parts of the images, which come from a wide range of sources. No camera was used (except the scanner, which, like a camera, records with light), and the final prints are made from a digital file.

Technical material used in the production: The final prints are archival, chromogenic prints made from a digital file.

Presentation support: There are no special requirements for hanging the artworks.

Description of artwork

This work focuses on the realm, both physical and implicit, where unapologetic human indifference intersects nature's sublime display of resilience.

As imaginary landscapes assembled from reproductions or representations of nature (for example, trees and sky as represented in a painting [oil], an insect as represented in metal [steel], and flowers as represented through embroidery [thread]), they are meant as a meditation on our collective need to possess and reshape what we seem not to understand or fully appreciate, in this case the vital legacy of the natural world.

Relation to digital art

As a visual artist/filmmaker I operate on the assumption that art is both derived from and reflective of the world (and the time) in which we live, and that technology in and of itself is not an art form, but rather a tool to help us document (immediately and permanently) our collective and individual experiences.

The artwork presented here follows in the long-established tradition of collage, of fusing seemingly disparate images to form a unified whole. In the past, an inherent challenge lay in making the whole appear seamless. Now, however, because Photoshop and other software to facilitate this is readily available (and advanced: a higher quality, more polished output, for example, has become indigenous to the digital process itself), the challenges reside elsewhere, and technology can be effectively eliminated as an issue/subject altogether. In other words, the means have become secondary to the intent, freeing artists and others to move beyond the technical and into active, critical engagement with the world.

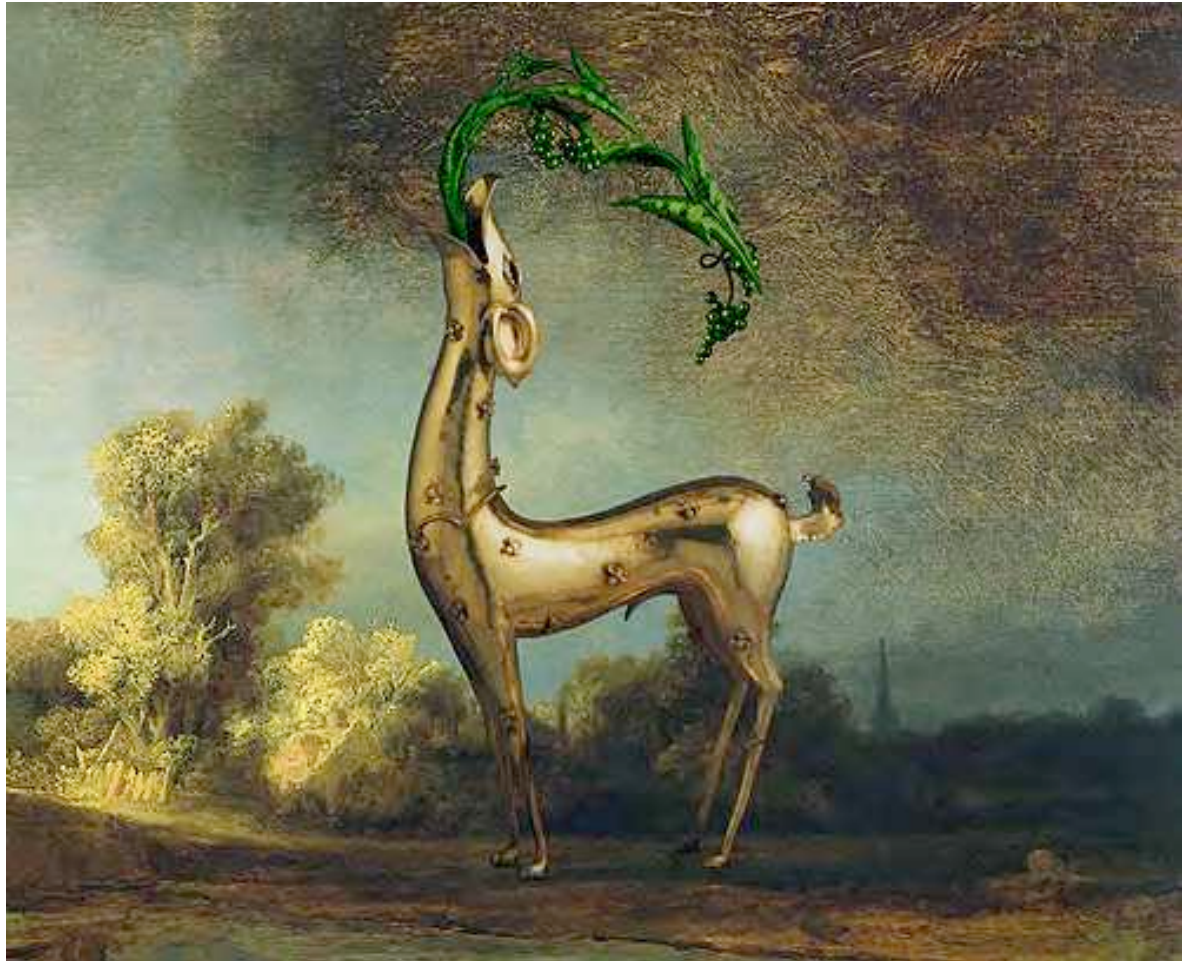
images of the artwork



No. 56 from the series Thread and Carbon, Oil and Steel, 35 x 26 in., 2007; courtesy of the artist



No. 19 from the series Thread and Carbon, Oil and Steel, 20 ½ x 35 in., 2007; courtesy of the artist



No. 99 from the series Thread and Carbon, Oil and Steel, 25 x 30 in., 2007; courtesy of the artist

A Cycle In The Arts And The Technology

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Synopsis

This text talks in first place about the way culture in general and particularly the art assimilates technological innovations. After, it is explained how this assimilation brings with it new communication codes that are integrated by our knowledge sphere day by day. Finally, there is an analysis about how interactive installations handle this assimilation.

1. The Assimilation

It is not unusual that a wide artistic population area rejects the technological innovations. This attitude is based on different arguments, one of the best well known is to think in the art as a classic practice, where the technique that is used should be considered as traditional. Both, old and new techniques have resistance in the art. Paul Brown [1] explains us how Michelangelo was criticized because he used stone as a medium, a non-conventional, out fashion element in his time.

Now, If we considerer the different techniques that works handle today, which are considered traditional, we will see that many of those one day where estimated as novels and in their moment there was an opposition to accept them.

This is possible to see in the industrial revolution, when the new machines and techniques appeared. Which are ones of these? Let us take the photography for example. Its beginnings started with the obscure camera many centuries ago. In the XVII century some artists started to use this object to picture images, but it was not until the XIX century with the creations of people like Nicéphore Niépce, who made *The First World Negative* [2], Henry Fox Talbot with the *Calotype* [3] and Louis Daguerre with the *Daguerreotype* [4], that the photography started to have a sufficient level of technical development.

Why sufficient? The process to obtain printed images was at people's disposition, with an increasing diffusion, it was not something for a small number of persons. This media included people because it was not expensive. Different artist started to experiment with this media with creative aims.

However, it is not necessary for a technique to have a high diffusion for it to be used with creative aims. There are works where the technique is expensive and exclusive, so only a narrow proportion of artists can have access to it. *Cloud Core Scanner* [5], a project that experiments with the activities of aerosol at 8500m of altitude where there is not gravity, or *Ballet Mori* [6], a work where dancers interpret the Earth's movement in real time using the information being send by a seismometer at the Hayward Fault, are examples of exclusive techniques.

The photography generated resistance by some schools of art, for considered that the essence of the painting, the one of representing the reality, it was being replaced by a physical process. In response to this issue, subsequently appeared the impressionism, with Gauguin, Van Gogh and others, who demonstrated that the painting had a field of action much more wider than the one to paint directly what it is being watched.

Now, if we examine what happened with the film, we will find something similar. A considerable amount of artists attacked this, because it was seeing less valid than the theatre, for being an act repeated employing a machine and not a live act. They had the argument that the performance's essence was lost. Even in film, when it started to have sound, we saw in the biography movie *Chaplin*, how he had resistance to use it [7].

Actually, if we look at the first greatest filmmakers of the Russian school, we will see that the discourse that they managed was purely political, they used elements from the music and other arts, but their root was firmly linked to the ideals of the Russia post Bolchevique Revolution. For illustration, Eisenstein saw the film as a powerful and international art, that have the power to bring up "... new ideas and new ideals that have made sprout from the screen new social ideas and a new social ideal of the victorious Revolution of October" [8].

After more than one century of film development, we observe how many other artistic disciplines have got feed back from this media, like TV, theatre, music or video installations. And these disciplines got feed back from the film too. Currently we find cases from actors that prefer to do film instead of theatre. Gary Oldman says that film is not monotonous, that an act should not be developed several times. This happens because in the movies the machines are in charge of the reproduction.

We can see that film has more elements than theatre, like the camera position or the duration of every shoot, that multiply the possibility to develop an independent language. Artaud saw in the cinema an art with a lot of possibilities not yet exploded: "It is possible to imagine certain number of progresses that the camera will have, for example, stability and mobility that it does not have yet. Probably, in a close future, film will have textures and even colours" [9].

Other medias that came after the film have more elements. The TV had the possibility to reach a bigger audience; the video was cheaper to produce. With the video camera Sony Portapack Nam June Paik shot images of Pope Paul VI in New York and the same day he showed these video material. That day is usually known as the born of video art. Then the video cameras started to be known as a tool that has the ability to do art with.

The battle that film gave to be accepted, one century ago, in the artistic field was given also from the video more than 40 years ago. But what is the difference between both medias? It could be argue that film allows a bigger image quality, but the results that are possible to get with high definition cameras are quite good. Many films are made today with this technology and the public in general does not complain about the quality or the projection's essence.

The other difference is that film is treated with a chemical process and the video with a physical one. But that lacks of importance watching a movie at least the film emphasises directly on this concept. For instance, if the movie is about people using drugs to get chemical reactions in their bodies and that has a relation with the image, then I would understand why to use film instead of video.

The video has on its advantage the production, because it is more cheap and handy than the film. Today festivals support the development of video productions and plenty of artists choose this option.

The use of computers and the interaction in the art's pieces have the same destiny; they are technological tools that offer new possibilities for the realization of works, rejected by some circles. According to DAM

[10], the art with computers started in the fifties with pieces like *Oscillon Number Four* [11] by Laposky and, in 1954, with *Oscillogramm* [12] by Franke; and the first computer art competition was in 1963 sponsored by US Journal Computers and Automation. With the time artists started to have interest in the possibilities giving by the computers. One of those is Harold Cohen, who in 1973 developed *AARON* [13], which is software that draws human figures and other images by itself.

Let us take a look at the festivals of art currently taking place, that are starting to include the called *new medias* as a part of the normal events but with some resistance. It is not yet clear what is new media art or art based on computers. Is it work made with computers, like the digital video, or work that needs the computers to be shown in real time or pieces that are an algorithm or something else?

With the time that question is going to be solved. Probably it is necessary to answer other questions first. Like: how is the process by which art involves the technology? Let us try to answer this enquiry.

As we have said, after the apparition of a technological innovation, first there is a resistance to integrate it to the art and there are people who start to use it and propose it as a medium to create aesthetic works. This innovation would be absorbed on the every day live of the people and its diffusion increases. Then the innovation is considered part of the culture, it is no longer an invention or something new, but something that is in the elements that we consider part of the world. For Rokeby "...the technology reflects ourselves back recognizably, it provides us with a self-image, a sense of self." [14] If the technology is new, if we have not seen it before, we are not going to recognize ourselves easily, but once we are used to it, then it is something natural, a part of us.

I will bring up a personal example. As a kid I grew up with the colour TV. For me this is a media that belongs to my cultural context, I did not consider it an innovation. But the previous generation, my parents, saw how it appeared. The same happened to me with the video cameras. It was something that I grew up with, that has always existed in my idea of the world. But there are things that I was not familiar with, like the creation and spread of technologies like Internet, cell phones or laptops. With the time these inventions are part of my live, but for today's kids those are something natural.

People can do art more easily with something that they consider innate. That is the case with the new technologies today. For the recent generations Internet or coding are something ordinary, not new, it is part of the way they see themselves *reflected*. Now, one of the tasks is how to introduce the technology, for those who are not less than twenty years old, in our lives to produce art. We might have the advantage of seeing how a technology like Internet came to birth and think with another point of view about the consequences of its existence.

2. The Interpretation

The Japanese theatre Nō is based on the code's use. The public and the actors know that a gesture means something in particular. For example *Shiori* is a particular gesture that symbolises the act of crying, where the actor usually covers his face with his hand in diagonal way [15].

Something similar happens with the technology, where the interaction codes are known and there could appear new components users could get to know if they count with the elements for doing it.

Let us see the technological innovations case and let us take the mouse as an example. Engelbart made this invention in 1968 [16] and it was not popular until the eighties. Only twenty years later, after the diffusion and the optimization of the computers, the public was ready to assimilate this tool.

Let us take a look to a more recent case: the blue tooth keyboard. Where the keyboard image is projected on a surface, the user could use that image like it was a conventional computer keyboard. By pressing the image of a projected key, the computer recognizes which was one has been pushed. In this moment, 2008, this invention is being spread; but an interface very similar was created in 1993 in USA call *The Digital Desk* [17]. It was possible to interact with a computer's desktop projection on a table.

We can see that the people cannot assimilate new technological elements if they are not prepared for it. This preparation requires communication recognition codes. To be clearer, let us take the mouse example again. Let us imagine one person with an average knowledge of computers. The person has worked on a computer with mouse that has two buttons, a keyboard and a graphical interface (the desktop of *Windows Vista* [18]). Now, we give to this person one of those mouse used in design, which has one button for each finger, and we set functions to every button. This person probably would be disoriented with this situation. It would be different if first the person gets a mouse with three buttons, then four and finally with five. So he would have time to be familiar with the new possibilities.

With the technology, generally, one element is presented at a time to the users, after they assimilate it, is shown another. As it was said before, with the technology and, in this case the computers, happens the same. Let us see the chat example. These are some symbols from different pre-established codes found in the daily contact with the computers:

Symbol	Signification
Underline text	Hyperlink
Cross	Close window
Arrow to the left	Go back
: -)	Happy
: -(	Sad

Easily, if I chat and I write “:-)”, people would interpreted that as a smile, because it is a pre-established sign of that emotion; but if I write “:-))”, that is not usually used, a person would interpret that with the elements he recognizes: “:-” two eyes, “-” nose and “))”, that is the new element, would be read it from the own user's knowledge. Maybe I could say that it is an open mouth or a very smiley expression. That would depend in the context that appears.

Now with the art based on computers or needs the computers to be shown, there are similar facts. The video interactive installations need to explain how they work to the public. This can be done either by words or by the experience of interacting with it. When I think about it, ideally, an installation is created to be in a particular place [19], to have a reason to be there. So this is the first issue: why is it there? What is the relation with the space? In the second place: how is the public going to interact with the work?

The example of the mouse could be applied to this, where the spectators should modify the course of the piece. If the public is confronted to one that employs diverse forms of interaction and these are unknown for

him, it would be difficult to observe the work itself and he would be dedicated to decode the interface, how it works. His attention is not going to be in the concept or ideas of the project, but in the technology.

Many artists have solved this problem by using detection camera algorithms. One of the first to do it was Krueger with *Video Place* in 1970 [20]. In this piece, the public interacts with the silhouettes from other members of the public that are in another physical space. The interface, even though, it is complicated, it is not strange for the people. It has been used for 38 years with artistic aims. A recent case is Utterback, with *Untitled 5* [21], where expressionist images are created and projected in real time according to the public movements. The piece gives a good example on how the people relate with the work, putting attention to the images because the interaction is easily understandable.

With these pieces there is the danger that the people put attention just to the way they interact with the work. The average of time people take to see the Mona Lisa is 15 seconds [22], also because is very crowded. We cannot expect to have more than that of people's attention. That is why it is a risk to overload of elements an interactive installation work. It has several things by itself already, like might be video, space's use, sensors, audio or text.

Maybe in some years the public will assimilate the interactive works with complicated interfaces because those will be pre-established. Until now there is the need to be clear and direct.

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Everything

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Synopsis

Left to itself for an infinity the script would say everything. Everything that has been said. Everything that will be said. Everything that could possibly be said.



Everything installed at CERN, Geneva, Switzerland for the Young Artists at CERN exhibition.

```
s dica shucda bdjp w f
s dica shucda bdjp w f
s dica shucdab d j pwf
s dica shucdab d jp wf
s dica shucdab d jpw f
s dica shucdab dj p wf
s dica shucdab dj pw f
s dica shucdab djp w f
s dica shucdabd j p wf
s dica shucdabd j pw f
s dica shucdabd jp w f
s dica shucdabdj p w f
s dicas h u c dabdjpwf
s dicas h u cd abdjpwf
s dicas h u cda bdjpwf
s dicas h u cdab djpwf
s dicas h u cdabd jpwf
s dicas h u cdabdj pwf
s dicas h u cdabdjpw wf
s dicas h u cdabdjpw f
s dicas h uc d abdjpwf
s dicas h uc da bdjpwf
s dicas h uc dab djpwf
```

Everything screenshot.

Description

Scrolling up the screen of the monitor is the output from a Perl script. This script works its way through the English alphabet. Combining each letter with every other letter in all possible ways. In addition it runs spaces through each combination. This composes all the possible words in that combination, and consequently all it's possible sentences. The program is open-ended. Working up from single letters it lengthens the sentence one letter at a time.

Video documentation can be found online at www.p000m0000.com.

Technical

Perl script on Linux box.

Presentation Support

Older 14" monitor and older beige IBM PC compatible computer, preferably matching. Older meaning from around the mid-90's. The computer something like a Pentium 2, running Red Hat Linux 7.4 if possible (although other flavours of Linux should work fine). Very plain office desk. Beige formica top would be perfect.

Musical/Visual Color I: Music Composition for visual translation

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In the Western art-music field, the relationship between stimuli perceived by humans through the sound or visual senses exists in respect that a music activity also includes visual communication by way of the performance actions included in the music making. In a narrower sense, rhythm ties sounds structured in time with visual movements happening simultaneously, with artistic products such as dance and video art. There are many other techniques to linking music with visual movement. The intention to integrate music with a logically corresponding moving visual expression has been a challenge to artists, producing many symbolic and personal solutions throughout history. One way to achieve this aspiration, which is the focus of the presentation, is to relate musical color or timbre with visual color.

The correspondence between the audio and visual fields in respect to color has been expressed in different manners, from the use of words occurring similarly in music and visual arts such as “texture” and “chromatism,” to more vague descriptions of “bright” or “dark.” In programmatic music, descriptions of colored scenery, whether real or imaginary, expanded the link within the realm of individual fantasy. Mathematical, esoteric and experimental spectral systematic relationships have been forwarded (von Helmholtz, Souriau, Eulalio, Lagresille, Lucy, Fourier, Murchie), with relative success. Composers such as Skriabin and Messiaen, and specially Schönberg with his concept of *Klangfarbenmelodie*, have produced works which deal directly with the association of musical and visual color.

Persons with a sensory-perceptive disorder known as synesthesia have the experience of involuntary seeing colors, among other things, when listening to music, or the other way round. Word expressions such as Kandinsky’s on Wagner’s *Lohengrin Prelude* are examples of this fortunate disorder. Synesthesia can also be induced artificially through the use of hallucinogenic drugs, which indirectly caused the development of a synesthetic entertainment culture from the seventies onwards, of live concerts with light shows, to the MTV video-clip presentation of music with an obligatory visual counterpart. Natural synesthetic artists have produced many musical/visual related works, such as Skriabin, Klain, Messiaen, Grimaud, Süskind, Raff, Bliss, Gershwin, Ellington, among many others.

Important achievements in the film and video art domain with the intention to present simultaneously a work of music in a visual form can include the well-known Disney’s two *Fantasias*, Kubrick’s *2001: A Space Odyssey*, Fricke’s *Baraka*, as well as the works by Fischinger, Lie, Kraftwerk, Cunningham, Rutterford, Abbado, Alexander, Alves, Baillie, Bailly, Image Savant, Wladimir, Baranoff-Rossine, Battey, Beauvais, among others. Mechanical devices have also been invented to achieve the musical/visual conversion, such as the Clavecín Oculaire, Organ Virtual, Clavilux, Visual Mobilcolor, Music Phonograph, Fischinger’s Lumograph, among others.

Tone painting, a term which includes a word from the visual arts, is a different musical technique that does not apply in our subject of study. It deals with the musical description of a word or a literary sense in the music.

The paper presents the steps for the creation of a highly integrated musical and visual work of art using musical/visual color as its structural device. It is based on a composition by the author named *Secretos* for wind sextet which was made specifically to achieve a structured music only through the element of color, that is, with no melodic, harmonic, spatial, dynamic, nor rhythmic change. The composition evolves only through the performance of a four note chord (Bb, D, E, A) by the change of six different wind instruments, where the change of instruments for a given note is always smoothly interlaced. In this way, the sounds and the structure of the piece are effectively transferred to a visual form by the fact that the composition only includes pitches and timbres. This is achieved by a computer-animation rendering of the work with a logical interface between its sound and visual elements.

Eigenrepresentante: A Metaphor of Representative Democracy

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Technique employed: Preprocessed with Matlab; final application created with Processing, using the OpenGL and JMyron libraries.

Technical material, presentation support: PC, LCD monitor and a webcam in a dim environment lighted from above.

Eigenrepresentante is an installation piece which consists of an LCD screen, a PC and a webcam. When viewers look at the screen they see two different real-time projections of their captured face image side by side, one being constructed from statistically calculated face features of all members of the Senate of Mexico, the other from the members of the Chamber of Deputies of Mexico. The viewer looks at the screen as if looking at mirrors, only to realize how limited he or she is represented. For the sake of generalization, political representation, mathematical representation and artistic representation all blur the features of the subject represented. Using these different types of representations, the piece points out a problem in representative democracy.

The technique chosen to be used for the reconstruction of the camera images is the eigenface method which, along with other similar face recognition techniques, is mainly used in surveillance systems for finding blacklisted or wanted individuals computationally. Countries such as US, Canada and some EU countries require biometric passport or visa photographs which are taken according to strict rules and guidelines in order to be stored in the governments' databases in a standardized way. This way, the appearance of a person who gets in front of the camera can be compared to the people previously stored in the system. In this project, the previously stored face images are those of the members of the parliamentary chambers. The face of the viewer in front of the camera is reconstructed by computer algorithms as if that viewer were one of the members although he or she does not resemble to any of them and the result is directly shown on the screen.



Reconstructions of a sample face image, using the face databases of the Senate of Mexico and the Chamber of Deputies of Mexico



3D Sketch for the Installation Setting

Presencia De La Animación Digital Española En Las Esferas Artísticas

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Es obvio que en los últimos tiempos, la producción de material relativo a la animación ha aumentado considerablemente. Lo cierto es que basta con navegar por Internet o asomarse por los festivales para comprender la gran cantidad de animaciones y animadores españoles que nos encontramos en la actualidad. Otro tema sería hablar de la calidad de los mismos, no siendo éste proporcional a su cantidad pero, en cualquier caso existe y se realiza trabajos muy buenos que ponen de manifiesto el enorme talento de estos nuevos realizadores, y más, cuando las instituciones culturales muestran un mayor interés por ellas, otorgándoles espacios en sus exposiciones.

Comenzaremos, definiendo lo que entendemos por animación española, para saber a que nos referimos cuando empleamos dicho concepto. Así atendiendo a la autoría, delimitación geográfica y temporalidad, entendemos como animación española, a toda aquella producción realizada por un autor español aunque éste se encuentre en el extranjero durante su realización, a aquella realizada en territorio español aunque la dirección o producción fuera extranjera durante el siglo XX hasta nuestra más reciente actualidad.

Una vez delimitado el campo, señalamos como elementos vitales, para el importante desarrollo y difusión que está sufriendo en nuestros días la animación española, por un lado, la evolución en la formación de los profesionales dentro del campo de la técnica de la animación, desde el aprendizaje individual a través de la experimentación de los avances técnicos que se producían a principios del s. XX, después el propio de los estudios de animación, hasta el reglado en escuelas y facultades actuales. A partir de los años 90 la formación en animación se inicia en academias, escuelas y facultades, que ofrecen una variedad de programas: desde cursos iniciales cortos, cursos profesionales hasta masters especializados en técnicas digitales. Estas enseñanzas han proporcionado el nacimiento y aumento de nuevos realizadores y, el ascenso de la calidad de las animaciones realizadas.

Por otro lado, el espectacular avance técnico en las herramientas empleadas para su realización y en la cada vez mayor facilidad en su acceso. Además de la aparición de nuevos ámbitos de divulgación. (Internet, museos y salas culturales,...).

Todos estos elementos son piezas esenciales para un manejo más sencillo, rápido y fácil que ha desembocado en un aumento del interés y valor por el mundo de la animación. Son por tanto, elementos claves para que hoy en día podamos gozar de la buena situación de nuestra producción animada nacional y, a su vez, no sorprendernos de su frecuente presencia en salas de arte y museos, lo que nos lleva a pensar en su ascendente valorización y en su aceptación por parte de la crítica como arte.

Sin embargo, y haciendo un poco de memoria en la historia de nuestra producción nacional, debemos señalar que la ascendente posición actual no siempre fue así, ya que normalmente solía pasar desapercibida, exceptuando ciertos períodos de nuestro pasado siglo XX, y no ha sido hasta hace poco más de una década cuando su suerte ha cambiado.

Como hemos dicho anteriormente, la aparición de nuevos ámbitos de divulgación han llevado a una mayor difusión de la producción. Hasta la aparición de la TV en España, la animación tendrá como único medio de divulgación las salas de cine y los escasos festivales existentes en aquellos años. En los que, si existía la suerte de que participará alguna de las producciones animadas, éstas se incluían junto con otros géneros y, por tanto, sin sección específica. Tal era el caso Festival Internacional de cine de San Sebastián¹ o La Semana Internacional de Cine de Valladolid². Además gracias a ella, la década de los 50 fue uno de los periodos más productivos de la historia de la animación en España, la TV supondrá el centro de la producción para los estudios y su salvación frente, a la falta de producción de películas de animación. Con el paso del tiempo y a medida que crece la importancia y popularidad del género, la animación se ha ido incluyendo como sección específica en los festivales de cine. Ejemplo de ello es el festival Sitges³, Festival internacional de cine de Cataluña, comenzó en el año 1968. En 1993 se celebra la sección denominada Anima't donde se proyectaron animaciones. En 1994 se han realizado retrospectivas con homenajes de diferentes animadores reconocidos internacionalmente en el panorama de animación. En el 96 aparece un jurado específico para la sección Anima't y aparece el Palmares al mejor cortometraje de animación exaequo. En el 97 Mejor cortometraje de animación. Posteriormente, en la segunda mitad de los años 90, surgirán festivales especializados en cine animado como Animac⁴, Animadrid⁵, Xinacittà⁶, Animacor⁷, y, en arte digital como Artfutura⁸, Resfest⁹ y CiberArt¹⁰ (cuya última edición fue en 2004).

Pero, sin duda, la aparición de Internet ha supuesto un gran avance para la animación como espacio libre donde exponer y difundir lo que anteriormente sólo podía mostrarse en limitados espacios muy específicos (festivales, cines de autor y congresos o certámenes) a los que sólo accedían los profesionales y un público escaso y selecto. Generalmente, esta situación conllevaba que no llegará a conocerse la producción animada por el gran público, a excepción de las grandes superproducciones como las de Walt Disney.

Por otro lado, Internet ha supuesto también una gran posibilidad para el autor independiente de difundir su propia obra sin intermediarios y con un gran alcance a cualquier lugar, persona y en cualquier momento. Así nos podemos encontrar con web individuales o colectivas que actúan como pequeñas salas de arte.

Todos estos elementos han propiciado que actualmente, sea más frecuente visitar exposiciones con obras animadas en salas de arte y museos. La consecuencia de que cada vez es más importante el lugar que ocupa la animación en el arte contemporáneo tiene que ver con una sociedad dominada por la cultura visual y de la divulgación de programas de animación por ordenador que cada vez utilizan más artistas. Éstos aprovechan estas nuevas tecnologías para crear obras inmateriales y participativas, pues el espectador a menudo interactúa y llega a modificar las propias obras. Por ello, estas exposiciones nos permiten conocer en profundidad la trayectoria de algunos de los artistas más destacados que utilizan este medio de manera

¹ Festival Internacional de cine de San Sebastián en www.sansebastianfestival.com

² La Semana Internacional de cine de Valladolid en www.seminci.es

³ Sitges en www.cinemasitges.com

⁴ Animac en www.animac.info

⁵ Animadrid en www.animadrid.com

⁶ Xinacitta en www.xinacitta.com

⁷ Animacor en www.animacor.com

⁸ Artfutura en www.artfutura.org

⁹ Resfest en www.resfest.es

¹⁰ CiberArt en www.ciberartfestival.net

principal (en muchos casos de forma única) sustituyendo el lienzo por el ordenador y el pincel por el teclado o el ratón.

A finales de los años 80, comienzan a surgir algunas exposiciones donde se muestran obras de arte animado y que se han realizado en diferentes museos o salas de arte de España hasta nuestra actualidad, como las que a continuación enumeramos.

La primera que vamos a señalar es *Procesos*, exposición realizada en el Centro de Arte Contemporáneo Reina Sofía en 1.986, donde se tuvo la oportunidad de contemplar *Menina*, de Juan Carlos Eguillor, una obra totalmente generada por ordenador y que puede considerarse pionera en España dentro de lo que ya se conoce como arte electrónico, arte virtual o arte digital.

Posteriormente le seguirán otras exposiciones museísticas de gran importancia, donde también tuvo cabida la animación como: *Arte electrónico en España*, *Bienal Imagen y movimiento 90'*, *Bienal Imagen y movimiento 92': visionarios españoles* o *Señales de vídeo: aspectos de la videocreación española de los últimos años* celebrada en 1995. Entre los artistas participantes se encontraba la animadora Isabel Herguera con su animación de óleo sobre cristal titulada *Cante de Ida y vuelta*.

Con el inicio del nuevo siglo han ido aumentando las muestras o exposiciones donde la animación adquiere un papel relevante, con variedad plástica, de formatos y de géneros. Como *Monocanal* en el 2003, *Sesiones Animadas* en el 2005, *Històries Animades* en 2006, *Fantasmagoría. Dibujo en movimiento*, *Geopolíticas de la animación*, éstas dos últimas realizadas en el actual 2007.

En ellas diversos artistas internacionales han mostrado sus animaciones digitales y, entre ellos, destacan algunos españoles como Manu Arregui, Jordi Moragues, Carlos Amoraes, Ruth Gómez, Cristina Lucas, Sara Serrano, Eduardo Balanza, Vicente Blanco y Juan Zamora.

Todos estas exposiciones que acabamos de enumerar son algunos claros ejemplos de lo que supone y se ha convertido la animación dentro del mundo artístico no sólo como herramienta sino como lenguaje de comunicación que adquiere un valor igual que respetable como la pintura, escultura,... y propio de su tiempo contemporáneo.



The Meta-Plastic Constructor

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Abstract

The abstract art languages and their complexity create new metaphors in the virtual space.

This project aims to add new complexities of Art and Technology through fuzzy logic engine.

The Meta-Plastic Constructor is a conceptual 3d visual language which builds the virtual space through formal elements expressed with balances of light, chromatic and sound values.

Keywords: Aesthetics, Interactive, Online, Algorithmic, New forms of Computer Art

1. Archetypes of virtual reality

The technological innovations and the artistic interests has been closely linked in the first years of the twentieth century. During that period, different plastic movement designed the machine as their icon, a symbol of modernity. In the fervidness of those years, artists got involved in different ambles and experiences like, several ambles and common thematics in a process of creation of shapes and of new disciplines that will turn out later on into virtual reality languages.

2. Project description

The art project is related to abstract art languages applied to the virtual world concept.

The media arts fields review many works representing software concepts and modelling systems which creates art. I propose a meta-language for the virtual environments description through visual codification. This model tries to implement its conceptual language within creating new virtual environment. The conceptualization of the metaplastic theoretical model of virtual space leads to the defining of a fuzzy dynamic system, constituted through a visual formal language and puts into effect the composition rules of abstract languages. The following indications introduce three necessary levels of theoretical specifications:

- **The Meta-Plastic virtual design** is the specific field that defines models of virtual worlds through the abstract art languages rules.
- **The Meta-Plastic languages** are the conceptual models of cyberworlds which uses visual symbolic formalization.
- **The Meta-Plastic Constructor** is a complex virtual spaces which directly interact and solve specific works within the applied metalanguage rule configurations.

3. The metalanguage structure

The meta-plastic virtual space uses a visual formalization of the rings which are linked between them, compose the grammatical rules of the metaplastic language. The groups of rings define the signs of the language set, the selected token and the relations among them. The settings vary with rotations of their axes.

Different rings structure configuration define new kind of visual language. The abstract plastic figure is composed with the following form function expressed as:

Rhythm_Form = f (DE, W, D, S, P, V, C, B, Co, H) and the following elements:

- Form_Rhythm structure: is a structural equilibrium composed with dynamic relations of form_weights, distributed along figure's dimensional extensions;
- Form Sequences(S): are structural patterns for figure definition which identifies a basic unit of points within the form volume;
- Form Variations(V): are rhythmical balance relations between form weights. The form variations and sequences are the components of the Rhythm_forms;
- Form Aspect: are appearance qualities of the figure determined with:
- Color qualities(C): indicate the chromatic qualities;
- Consistency(Co): indicates the level of qualitative consistency of the element;
- Brightness(B): indicates the light quality;
- Hermeticity(H): indicates the element different degrees of accessibilities to reach the contained informations.

4. The dynamic process of interactions and behaviors

The metaplastic engine is a dynamic system(FSM) driven by abstract art rule relations that transform sequences of user's sensory inputs, which produce feedback and send them as a response to the output of the system. The sensorial result is a fuzzy truth value that activates the decision making process of the virtual space. The visitor during his own visit experience, differs his emotional states with the virtual environment, which change from "Sensing" to "Feeling" through recursive cycles of feedback. The transitions of sensorial states are activated by proximity to the objects. The activation level of the system is calculated by the following general rule:

$$VS_i \text{ new} = f(\text{Proximity}_i (VS_{\text{state}_i}(\text{Object}_k \text{ state}_i))) + VS_i \text{ old}$$

$$\text{Proximity } f(P_x) = f(\text{User.position} - \text{Threshold});$$
 Dialogue State changes:
 if $P_x > 0$ Then $VS = VS.\text{rules}[\text{Sensing interactions}];$
 if $P_x = 0$ Then $VS = VS.\text{rules}[\text{Feeling interactions}];$
 if $P_x < 0$ Then $VS = VS.\text{rules}[\text{Acting interactions}].$
 $VS = \text{metaplastic virtual space}; f = \text{trigger function}; i, j = \text{state}; k = \text{item shown};$

The "human-machine" interaction process is analyzed by the system through sequences of feedback. The initial state of "dialog system" (Sensing state) starts with the human emotional states induced by the artificial environment analysis. Every stage of the process is compared with the previous experience. The response produces a consequent system behavior. The final phase is produced from a human action towards the environment (Acting state) that at the same time induces in himself emotional consciousness (Feeling). The behaviors of the system base its processes on the rules matrix of relations among dynamic form elements. The interaction within the dynamic cycle unifies sensorial states of the form, creating complex behaviours of space elements and assign meaning through movement codification of figures in the "Red and Black" semantic space.

$\text{Balance}[i] = \sum_i (f \text{Senses}(\text{weight}) * f(\text{interp}(\text{RBk}, \text{RBk}+1)));$
 The whole system processes are defined by:
 $\text{VS}_{ij} \text{ new} = f(\text{semantic}_i(\text{syntax}_j(\text{Dproximity}_{ij}))) + \text{VS}_{ij} \text{ old}.$

Table 1. Human remote senses.

Remote Senses	Senses Weights [0..1]
Vision	Visual depth
	Haptic vision
Hearing	Intensity
Smelling	Intensity breadth
Touching	Contact state
	Temperature
	Pulse - Frequency
	Pressure - Intensity
Body skin	Gesture - movement

Table 2. Complete model processes

System phases → [1] → [2]		
Results:	Feedback	Inferential / Behavioural
	Dialog state	Balance relations
	Sensing Feeling	Static Dynamic
	0.0 0.5 1.0	0 0.5 1.0
Form elements		
Structure elements		
Appearance elements		

5. The virtual world engine

The virtual world architecture consists of a virtual environment based on VRML Java3d applet running on the web browser. The software engine is based on a 3dGraphic Library that guides the system capabilities to draw the virtual space contents in real-time mode, through the meta-language setting rules. It runs with the following step process:

- A. The scene control begins with the user sensorial input analyses through the proximity function of the fuzzy dialog control system;
- B. The Fuzzy state machine (FSM) makes the evaluations, previously defined from membership sets and fuzzy rules;
- C. The Balance function makes its evaluation with previously calculated values. The Balance results activate all interaction processes and behaviours of the entire system;
- D. The resulting values compose the semantic codification of virtual space;
- E. This step provides the 3d calculations to build up the virtual space model;
- F. The virtual space scene is visualized with the system drawing functions.

Within this phase, the system communicates with the web server to update the system states and gives the resulting feedback to the Fuzzy sensorial decision-making process (A phase). Finally, all the output results are combined with the user inputs into a new interaction cycle.

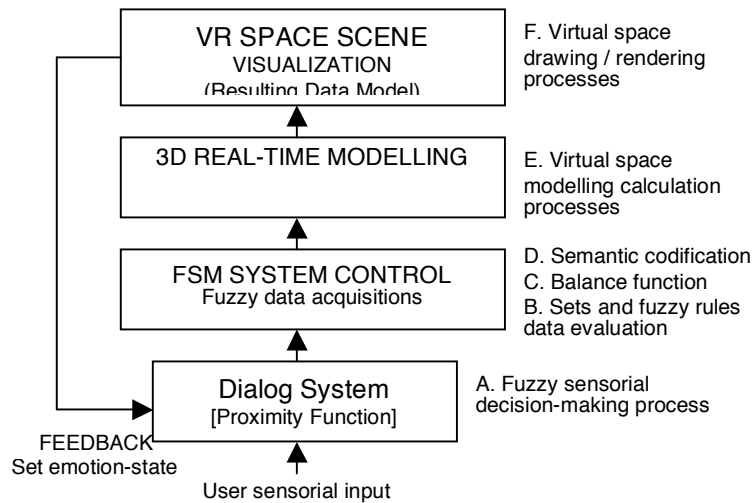


Fig.1 System architecture processes

6. The metaplastic exhibition project

The metaplastic virtual world is a complex space which directly interact and solve specific functions within the applied metalanguage rule configurations. It is composed through its Form Rhythm structure within the dynamic relations equilibrium function of form weight elements along the figure's dimensional extensions within its Rhythm Form rules:

$$\text{Rule Form}_i = (W+D) * f_{\text{FORM}}(\text{interp}(P, V, S))$$

$$\text{Rule Light-Color-Sound}_i = (W+D) * f_{\text{Apparence}}(\text{interp}(C, B, Co))$$

6.1 Human sensorial experience

The center of the virtual environment is simultaneously the center of the human space where the kinematics rules generate the human sensorial perception processes. In fact, every direction of movement in the illusory space relates with the natural sense of orientation which is characterized with the same center of the space.

The images are perceived with the oculomotor muscles changes of position, that leads to the simultaneous composition of the figures, dynamic relations, and the objective antithesis. The sensorial results coincide with the composition of a human behavior model developed from cybernetic studies¹. The human perceptions decision-making processes are divided in sub-processes, structure or interconnection, with complex cycles of feedback, and a set of possible sensorial responses. On the basis of our artificial cognitive system called "Dialogue System"² the human emotional state changes the "human-machine" interaction processes. This fuzzy function relations produce a synaesthetic feedback results to the human interactor. The synaesthesia is a particular emotional-feeling state that involves mutual influence between sensorial representations. Certain qualities of feeling, may be linked to other qualities of imagination and, as result, the system gives a high-level human feedback quality of synaesthetic perceptions.

6.2 The synaesthetic effects

¹ Carver, C.S., Scheier, M., On the Self-Regulation of Behavior, Cambridge Univ. Press, London, 1998.

² Ibidem 8.

The intensity of a Feeling state may be linked to the brightness of an Figure; the color may influence the level of Feeling; some kind of movements may feel with the interactor. The quality of the synaesthetic effects depends of fuzzy functions as connecting or overlapping of our sensorial are representational systems. In traditional psychophysics, the term “fuzzy function” were defined as “Any modelling involving a representational system and either an input channel or an output channel in which the input or output channel involved is a different modality from the representational system which it is being used”³. In this way, the “fuzzy function” are typically characterized by terms such as “see-feel” or “hear-feel” circuits. In the extended “Dialog System” this concerns means a particular application of the fuzzy-state machine. The behaviors of the system base its processes on the rules matrix of relations⁴ among dynamic form elements. The interaction within the dynamic cycle unifies sensorial states of the form, creating complex behaviors of space elements. The system acquires knowledge during its processes from all of the elements. At the same time some part of the ontological knowledge base is shared between the entities. The structure of elements are described in term of group and individual roles hierarchy.”The visual language is made up of related meaning and events dynamics within the space. The movement is determined from the qualitative relations and quantitative elements between the environment and the user. These dynamic relations establish the equilibrium of the virtual space determining the meaning representation through its shapes and spatial relations”⁵. The interaction process developes through dynamic rule configurations. The system constructs an emotional path, which guides the user through the virtual space and helps him to understand and to acquire informations in the best possible way.

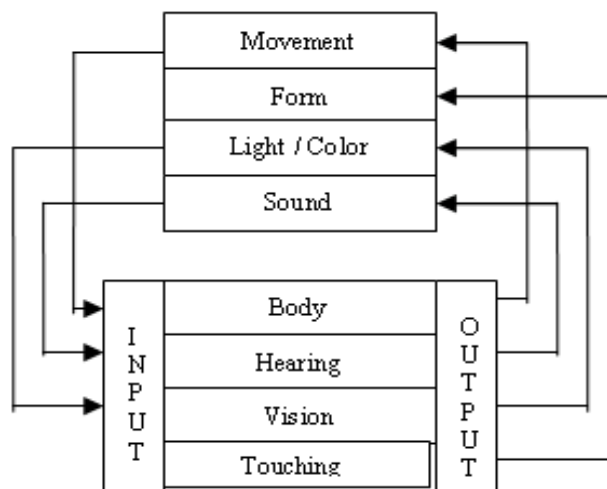


Fig.2 Synaesthetic effect combinations

³ Grinder, John, Bandler, Richard, The structure of Magic, Vol.II, 1976.

⁴ ibidem 1, “The balance function”, pag.186.

⁵ Ibidem 1, pag.184

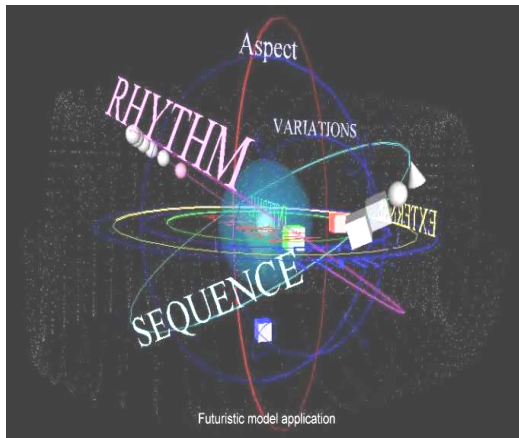


Fig.3. The Metaplastic Constructor

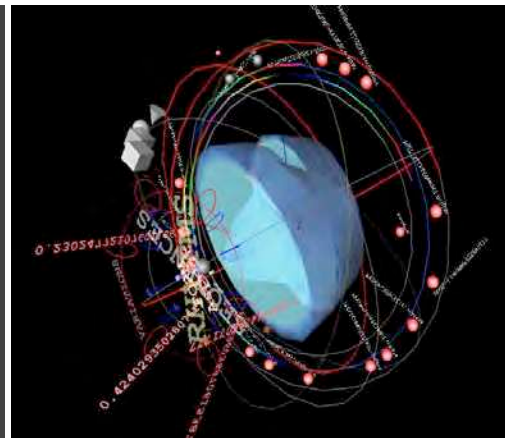


Fig.4 A Cyberspace configuration

$$Rhythm [variance .56 + seq.4n + chroma .6]$$

6.3 system implementation

The system proposes a complete virtual system implementation, and uses different standard technologies of communication, each with distinct functions. The process runs with external input devices activated with user's interactions, times or scene states (dragging, visibility, proximity, touching, collision, etc.) integrated in a readable VRML file standard format (Virtual Reality Modeling Language). The architecture of the system is given by the classical web system model used on Internet that manages the whole activity of the virtual environment. The system cooperates online between the client browser and the server through various plugged in software components. The system provides the virtual space to the Client and connects it to the network. The output results are projected locally on the screen where on the stage the interaction between the human actor and the virtual world happens.

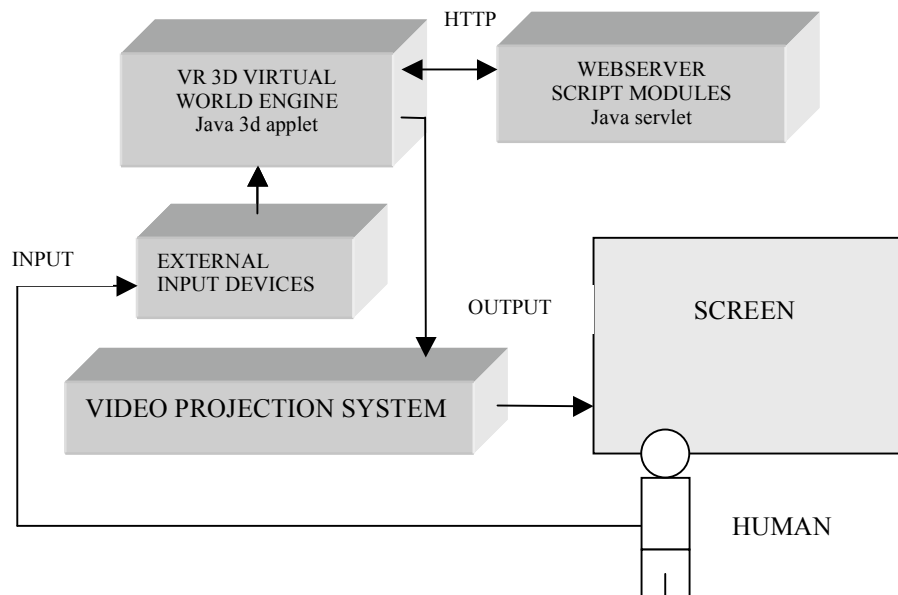


Fig.5 Exhibition system configuration



7. Conclusions

The art project describes a semantic space methodology. This approach creates cognition with new aesthetics of virtual space. The new modality of creation virtual spaces uses human sensorial inputs and customize it within artistic machine metaphor for communication of knowledge. This new knowledge and aesthetic spaces uses standard web cross-platform technologies.

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Game, Game, Game And Again Game: Artwork Statement

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<http://www.secrettechnology.com/gamegame/gamegame.html>

Game, game, game and again game is a digital poem, retro-game, an anti-design statement and a personal exploration of the artist's changing worldview lens. Much of the western world's cultural surroundings, belief systems, and design-scapes, create the built illusion of clean lines and definitive choice, cold narrow pathways of five colors, three body sizes and encapsulated philosophy. Within net/new media art the techno-filter extends these straight lines into exacting geometries and smooth bit rates, the personal as WYSIWYG buttons. This game/artwork, while forever attached to these belief/design systems, attempts to re-introduce the hand-drawn, the messy and illogical, the human and personal creation into the digital, via a retro-game style interface. Hovering above and attached to the poorly drawn aesthetic is a personal examination of how we/I continually switch and un-switch our dominate belief systems. Moving from levels themed for faith or real estate, for chemistry or capitalism, the user triggers corrected poetry, jittering creatures and death and deathless noises. In addition each level contains short videos from the artist's childhood, representing those brief young interactions which spark out eventual beliefs. Game, game, game and again game is less a game about scoring and skill, and more an awkward and disjointed atmospheric, the self built into a jumping, rolling meander of life.

1. Anti-design within the design

1.1 Hand Drawn Software

Software such as Adobe Flash or Photoshop largely dominate the appearance and feel of images and artworks. This is partially due to the software's data processing methods (Flash with vector drawings) and the limited range of tools and filters. The mouse (or data pad) also constrains the artist's ability to escape the software's over-powering aesthetic, and thus removing or at least submerging much of the individual from many net artworks.

Therefore this game/artwork began on paper, with charcoal and colored pencils, each level born from the immediacy and error/curve/(e)motion of electricity-less drawing. This hand drawn approach breaks the artwork away from both the oppressive control of software and much of design culture. In essence, this artwork/game was created as if the audience consisted of only the internal self, an offering of the personal with all its incongruities and confusions and small beauties.



Figure 1 Hand Drawn Aesthetic

1.2 Marked out/up/over

Technology is often used to remove the errors and mistakes of the human creation, with a prevalent emphasis on usability and glitch-free user/viewer operation. And while this artwork follows those conventions in function, it revels in the quirky, immediate corrections of the marked and corrected environment through the artwork/game. The poetic texts and animated drawings, triggered by the user/reader's movement are incomplete and in process of being edited and altered. Thus the work itself becomes a notebook or sketch pad of personal ideas and insights into what falls away from "finished" creations.



Figure 2 Marked/Corrected Poetics

2. Game as interface and self

Perhaps the most direct method of inviting the user/reader to invest the self into their experience, is to offer them direct control of how the artwork is experienced. In this creation that user inhabited space is contrasted with the creator's personal journey through belief systems. The user might then feel simultaneously enthralled and alienated, which mirrors the individual's experience with all group think cultural constructs. In addition, the direct connection between action and content, between direction and poetics, encourages the user to rethink the images, drawings and poetics in the light of the actions that opened that content.

3. Poetics and personal belief

Each of the levels within game, game and again game are themed/centered around a particular belief system. These systems of belief are not so much based on religious grounds as they are on the filters the individual uses to interpret their surrounding culture-scape. The game play and poetics extend from these various belief systems. For example within the Chemist level, which examines drugs as worldview, the syringes open surreal texts and rave-like graphics, and the game play path is largely illogical and deceiving. On the Faith level, the user has to choose between the two sides of the cross, with one choice offering a deathless death and the other continuing the path. The poetics on this level are written as satirical and irreverent bible passages, with each stanza inspired by personal events/encounters with Christianity.



Figure 3 Personal/Autobiographical Video Level Prize

4. Sound as mood and remember

Adding to the mix of personal artifact, journey and art game, are the family audio commentary embedded into the level prize videos. These videos, shot in 8MM by the artist's grandfather, were digitally captured by a handheld camera with the audio coming from family commentary about the events within the videos. These remembrances are directly related to the belief systems each level explores, and extend the personal, intimate thoughts into the meta-poetics of the artwork/game.

As most games have constant soundtracks and sounds/noises which clearly identify with the action or object that triggers them, this artwork/game uses sound to disjoint and translate the experiences. All levels use a different loop which uses speed, cadence and tone to play on emotional and physical responses, and to contrast or compliment particular level themes.

6. Technical/technics

6.1 Low Tech/High Tech

The game interface used in this artwork is more than twenty years old, dating back to early Mario Brothers and before. This familiar game play and interface was important in the creation of this artwork in that it provided an immediate and nearly invisible game play environment. And this familiarity allows the user/reader to immediately identify with the digital space they explore. The game becomes less about deciphering the conditions and rules of play and more about the contrast between what is a well known format and the content, both poetic and drawn, which is quite personal, a direct extension of the artist's ideologies and self.

6.2 Game Conventions Play

With the game play being so familiar, the artwork recontextualizes some of the main features of the game. For example, the score, replaced with arrows/characters, continually spins, responsive to game play but numerically meaningless. There are unlimited lives within the game, with the only consequences of encountering enemies being pushed back to the levels starting point, and announcing in a disembodied voice "come on and meet your maker". Some levels use the "warp" function to transport the creature to certain locations. This warping is taken to absurdity in the levels where the character cycles through falling, and represents the fruitless personal investigation of belief and the always altering lens.

6.3 Creative Process

Game, game, game and again game was born from the skeleton of a retro-game engine and 13 hand-drawn levels. Instead of thinking about game play and level design, the approach was to draw personal impressions of belief systems on paper and to use those drawings to create the game play of each level.

Vholoce: Weather Visualizer

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1. From wind and pressure to color and aesthetic

Vholoce: Weather Visualiser is both net artwork and digital tool. It is a cultural and scientific filter designed to stretch the way we understand weather data and its relationship to place and aesthetics and a data visualiser for building strange and interactive arts spaces. Vholoce (the Native American tribe Creek's word for cloudy) utilizes the abstract numbers of weather RSS feeds and uses that data to drive a series of artistic, poetic, cartoony and chaotic spaces. And with every small change in temperature or wind the artworks evolve/devolve, interactive virtual worlds built from storms or snow. In addition, this artwork was created to bridge our understanding of landscape and time with singular spaces of the web.

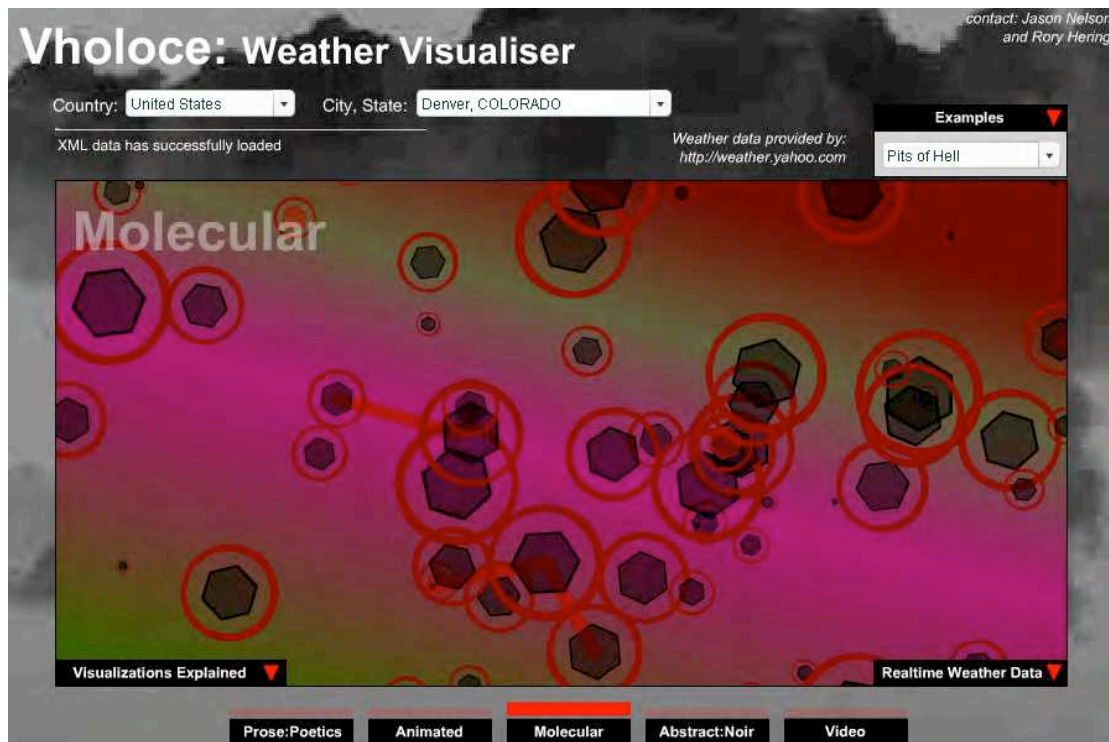


Figure 1. a warm and molecular day visualized

2. Building an artwork from the weather

If one stands outside the weather is immediately apparent. But when reading numbers for temperature or humidity or pressure, the abstraction forces most to associate recollections of weather data with experience. In creating Vholoce: Weather Visualiser the intention was to separate the numbers from remembered experience and replace those memories with colourful interactive worlds, molecular movements or mouse following shapes. And while weather RSS data packets come with dozens of descriptors, I combined the

most prevalent predictors of temperature, humidity, wind, pressure, with forecast text descriptions. Then I attached a broad array, depending on which visualization you chose, of actions, colors, speeds, sounds and other variable to create unique weather worlds, new aesthetic understandings of meteorological conditions, or creating new conditions (available. under examples).

In addition to the first visualizations of Abstract and Molecular, I extended the artwork to incorporate humor, whimsy and poetics through the other three visualizations. The videos, fifty in total, were created as anti-weather forecasts, to further remove the user/viewer from their traditional understanding of weather and weather data. The Animated section was added as a foil, a small island reprieve towards what the user might expect for weather data. Lastly, the Poetic sections is a rather simple text field replace system. And while it is less developed artistically, it does point towards new directions for creating poetry from real time data.

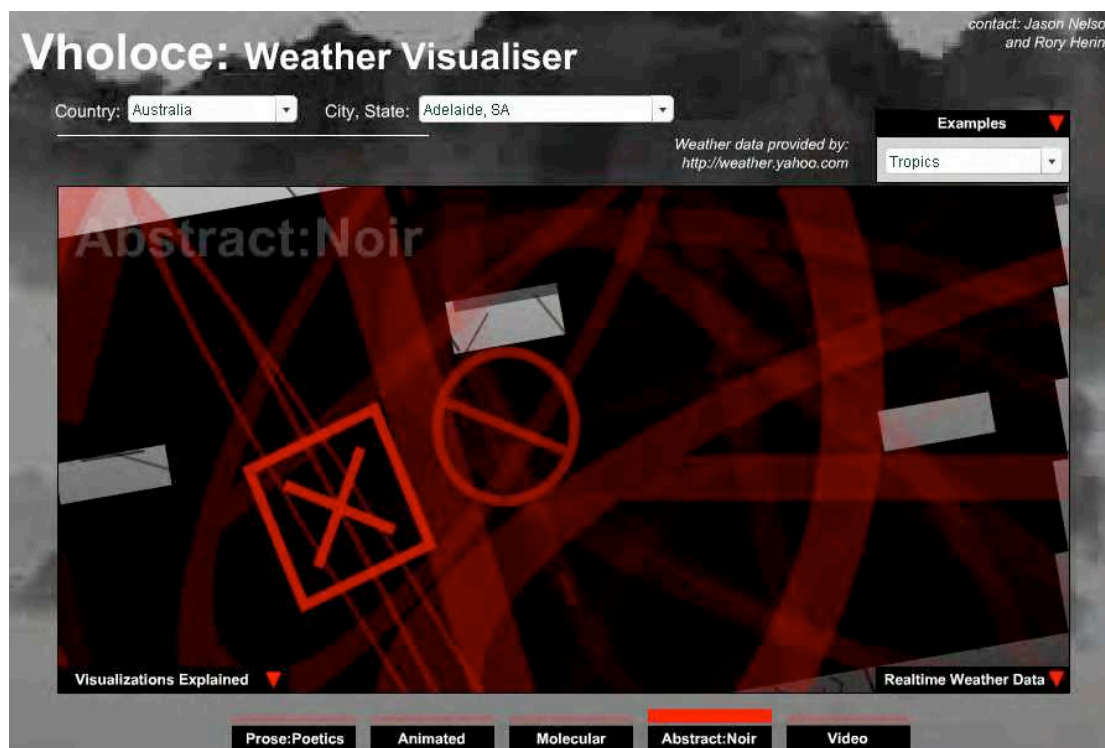


Figure 2. something like an abstract thunderstorm

3. data or paint by numbers

Built using a combination of Macromedia Flash action scripting, animations, videos, Vholoce uses a real-time weather RSS feed to load the data packet into the SWF file. Once loaded it searches through the data, and identifies the numbers it will use to drive the various visualizations. And although only a few data sets are used from the RSS packet, they are remixed to create cross combinations with each of the five visualizations. Every element on the screen is controlled by the real-time numbers. For example, the molecules change speed, size and shape/covering, along with varying background gradients and magnetism all based on that particular places current weather. And because this work is dependent on an outside provider for the RSS feed, examples were added to allow for user experience outside of a network connection.

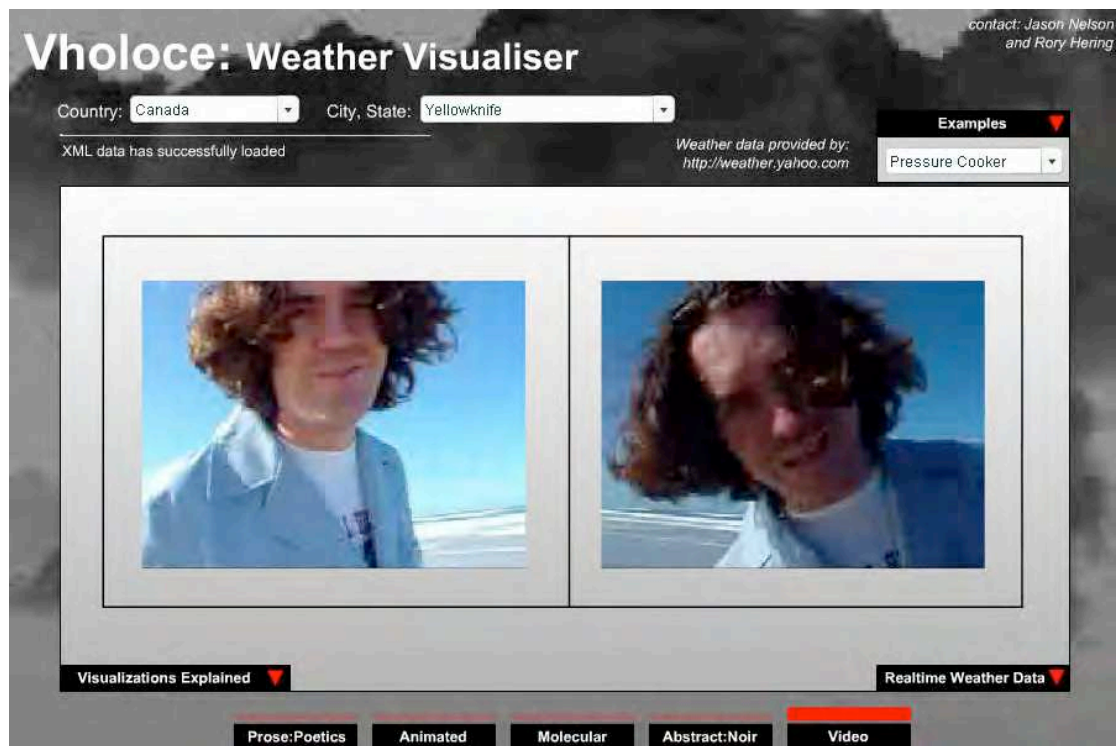


Figure 3. the artist built from rss

The Body As Database

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Introduction

In *Mind Children*, Hans Moravec offered us ways to download our consciousness into the datascapeⁱ. Although fantastical to some, Moravec's suggestions posit a pressing question: if the consciousness could be downloaded to the datascape, what would happen to the physical body left behind? Could technology also allow the body entrance to the datascape and if so what are the processes of translation necessary? In a world where so much around us is being digitised and we ourselves are increasingly becoming digital subjects, can seeing and understanding how our own bodies can be digitised help us to understand who/what we are becoming?

My practice based research looks at medical and laser imaging technologies that scan bodies and breaks them down to bytes. I examine from an artist's perspective, the processes needed to convert flesh to pixel (digital photography), flesh to voxel (MRI, CT and PET) and flesh to xyz co-ordinate (3D laser scanning). Body scan data is allowed to move freely from medical imaging to image editing to computer-aided design to data processing software. The 'Scanned-In' body is manipulated and processed until the body bears scars of the virtual world. Ultimately, my major and quantitative research aim is to create new and bespoke methods for exporting the processed data as figurative sculpture in the real world allowing data to become object/relic.

In 2001 I made a sculpture called *I Know You Inside Out*. *I Know You Inside Out* is a reconstruction of a 39-year old convicted murderer named Joseph Paul Jernigan, who prior to his execution, was persuaded to donate his body to medical science in order to become the 'Visible Human', a dataset of cryosections, CT (Computer Tomography) scans and MRI (Magnetic Resonance Imaging) scans. My desire to create a sculpture of Jernigan was not anatomical nor medical – I was fascinated by the virtuality of the Visible Human – in becoming 'visible', Jernigan's body was converted from flesh to voxel: in order to create the dataset Jernigan's corpse was frozen and sliced so finely that it disintegrated to mush, leaving only digital photographs and scans. The images of his body were uploaded onto the Internet allowing him to be viewed at anytime and any place (but never all at once), he was under constant threat of being copied or translated. I downloaded images of his body and printed them onto sheets of acrylic and then 'put him back together again'.

After making *I Know You Inside Out* I was inspired to preserve as well as resurrect so sought out technologies that offered images of the inside of the living body. I soon found the photographs of cryosections of Jernigan's body, which I used to make my sculpture, were mimicking the axial (cross section) scan of MRI and CT scanning. After some initial research into the different scanning methods and seeing that a dataset similar to the Visible Human could be created harmlessly with MRI, I embarked on making *Family Portrait* – a series of sculptures of my family made from MRI scans. In making *Family Portrait* my engagement with medical imaging was firmly established and I have since worked with a number of different scanning technologies to create artworks including CT and laser scanning.

This paper will discuss through a number of artworks the different methods of digitizing the body. The first sections will concentrate on the medical scanning technologies MRI and CT followed by a discussion of

laser scanning. The different scanning technologies will be contrasted and compared as both processes and results. As well as sharing insights gained from my own art practice I shall also draw from a period of observing clinical scanning at the Paul Strickland Scanner Centre in 2006.

Magnetic Resonance Imaging – *Family Portrait*

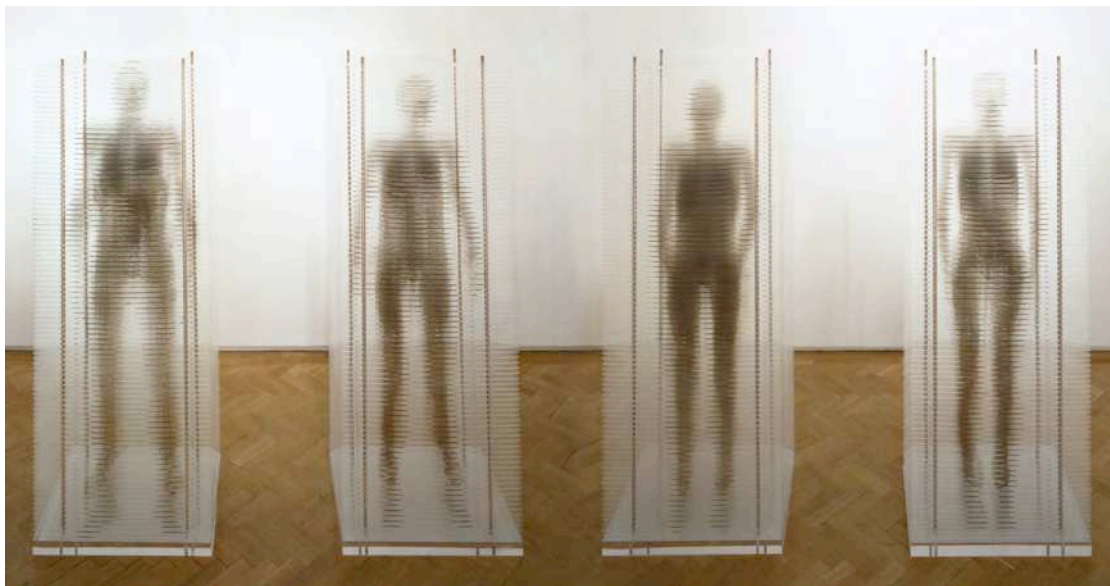


Fig. 1 Family Portrait 2003, silk screen on acrylic, each sculpture 50x70x192cm

Family Portrait (Fig. 1) is a series of sculptures of each of my family members – my father, my mother, my sister and myself. Each sculpture is a stack of 90 sheets of clear acrylic onto which an MRI scan has been silk screen-printed. The scans when printed and stacked in correct order give the illusion of a ghostly figure, which appears and disappears depending on your view point.

MRI is a non-invasive scanning technology, which works at an atomic level in the body in order to create images with very high soft tissue definition. Generally the two extremes of contrast in MRI are fat and water. As its name suggests, MRI involves altering the magnetic field surrounding the body so the patient / subject has to go inside a large magnetic coil. The scanner works by applying a hydrogen specific radio frequency pulse through the coil. The pulse causes the protons in the part of the body being scanned to absorb energy, which makes them spin, or precess, in a different direction (called resonance). When the radio frequency pulse is turned off, the hydrogen protons begin to slowly return to their natural alignment within the magnetic field and release their excess stored energy. When they do this, they give off a signal that the magnetic coil picks up and sends to the computer system. What the system receives is mathematical data that in most cases is converted into a grayscale image. Depending on when the computer hears back from the unwinding protons the image either shows fat as dark and water bright (T1 recovery) or fat as bright and water as dark (T2 relaxation).ⁱⁱ

In clinical scans patients normally only have small sections of their body scanned at a time, such as their brain or knee. For *Family Portrait* I needed a set of full body cross sections scans at 20mm intervals which was a challenge for the radiographers as it meant they had to take four sets of scans making sure they

overlapped correctly. It was equally challenging for the subjects being scanned, as the resulting scans were very long: my mother the first to be scanned was in the scanner for two hours. Although the scan was long, it was not an altogether uncomfortable experience. The radiographers both at Queen's Medical Centre in Nottingham where we had the *Family Portrait* scans done, and at PSSC where I shadowed radiographers in 2007 did everything they could to ensure the patient / subject in comfortable inside the scanner. At PSSC they ask patients to bring music to listen to whilst inside the scanner (to disguise the noisy clanging of the magnets) and there is a mirror above their head reflecting a picture of dolphins for them to meditate on.

The reason the scanning takes so long is not only because the scanning takes a long time (although scanners increasingly have stronger magnets so scans can be acquired faster) but also because all scans are bespoke – the radiographer alters the scan parameters to each patient/subject. Like with flat bed scanners the MRI scanner first takes a 'preview' or 'scout' scan which allows the radiographer to scan the exact area needed and at the correct angles. The radiographer can set the intervals of the scan but the closer together the scans are, the longer they take.

A few weeks after the scanning the data was available for download on the radiologist's website. For each of my family members there are approximately ninety images or slices. In order to be able to print these images onto acrylic sheets and then reassemble my family the images first had to be translated in the computer. Images were imported into Photoshop, sized back to true body size, contrast levels were altered and the scans were isolated from their black background. Finally to prepare them for screen-printing a halftone was applied to each image. This then allowed for each image to be screen printed onto an individual sheet of acrylic. The whole process took approximately two months for each figure and throughout my family's bodies were fragmented and either computer or silkscreen based. Only after more than half a year of screen-printing, and then a three-day long installation process was I able to 'put them back together' again as life size, standing, space occupying figures.

My parents divorced twelve years before I made *Family Portrait* and at the time of the scanning my sister lived in Beijing, my mother in France, my father in Essex whilst I was living in London. Although what you see when you stand in front of *Family Portrait* is a row of reconstructions of my family members which operate as a 'family portrait' we were never together in its making. We all entered the scanner individually and at different times. My mother stretched out her hands in the hope ours would join hers. Through digital processes and my artistic invention it may seem we are a family, but in reality it is only the digital copies of our bodies that star in the portrait.

Digital media has the intrinsic ability to perform tricks seamlessly: in a relatively short space of time we have come to accept that we can never believe what we see. From the model on a cover of a magazine to a feature length Hollywood film the computer splices, layers and fuses images (both moving and still) together with no trace of a cut mark. *Family Portrait* also boasts these characteristics both in its content and in its visual effect. The bodies are hollow; they have 20mm gaps in them yet from many angles they look whole and complete. Our eyes accept the trickery very easily, I have overhead viewers saying the *Family Portrait* bodies are made of smoke and it is most common for them to notice the gaps last and not first.

Family Portrait sculptures have in their intention not only a desire to unite a fractured family but also to preserve it for eternity. Ancient Egyptians believed if they preserved the corpse it's soul would return and find it. Cryo preservation technology claims to 'suspend' the body until a future when technology will find a way to bring the body back to life. In *Weird Science*ⁱⁱⁱ two teenage boys Wyatt and Garth, create their perfect woman by scanning in various images (such as Kelly Le Brok's face and Einstein's brain) and connecting to

the mainframe of American computing. If Wyatt and Garth can do it by scanning in images of the exterior of the body, surely images of the inside of the body would be even better. If MRI is able to convert the body to data, how more far fetched than cryo preservation is the possibility that a future technology might be able to convert the data back to body. Converted to data, the body is freed from its physicality, its aging, its physical vulnerability. The data body is however open to new vulnerabilities; mutation; duplication and infinite transformation. As Laura U. Marks explains in *Touch - Sensuous Theory and Multisensory Media*, digital data allows us, the computer users to give our digital images, video and I argue DICOM, 'this kind of body, for now'^{iv}. In my experience of working with MRI I have found that MRI resists playful transformation as the scans are so subject specific: it was no easy feat to organise to have the scans of my family done, nor for a subsequent work called *the Kiss* was it straightforward for my husband and I to be scanned kissing. As MRI allows non-clinical subjects to be scanned with bespoke parameters the temptation to then mutate/transform the pixels the data is displayed as is less great, unlike with CT as will be discussed in the next section.

Computer Tomography - *Dervishes*



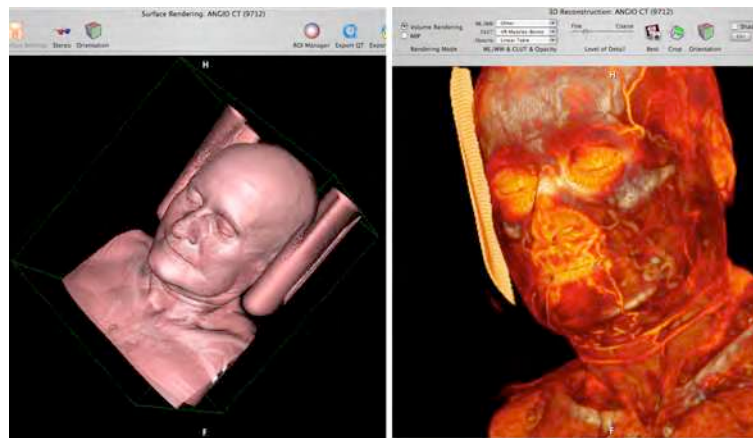
Fig. 2 *Dervishes* 2007, inkjet on film and acrylic, each sculpture 50x30x200cm.

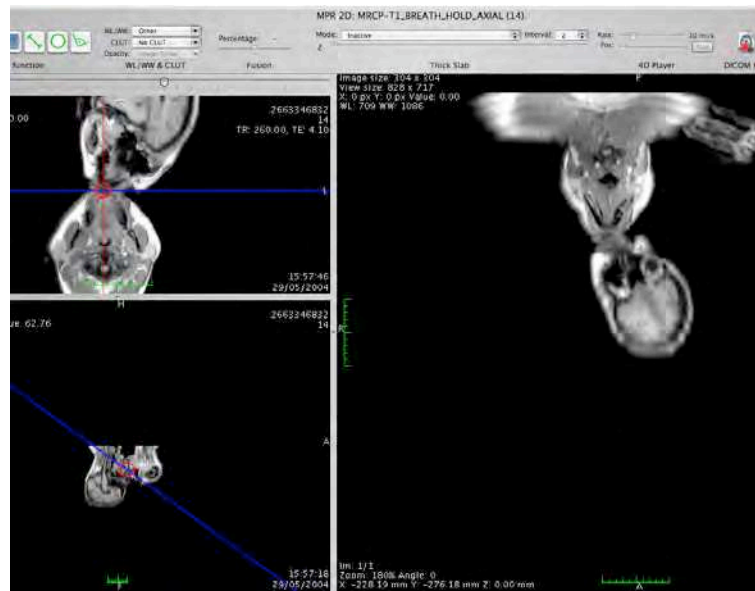
Unlike MRI, CT scans cannot be performed for non-clinical research as the body is exposed to radiation during the scan. CT uses the same technology as the x-ray, a beam of light with a very small wavelength (smaller than UV and invisible to the eye). When x-rays travel through the body they are absorbed by the tissue and bone (different kinds of atoms); the harder the tissue (the bigger the atom) the more is absorbed. In a CT scanner an x-ray tube emits a fan of x-ray beams. This x-ray tube rotates around the subject of the scan. Outside the rotation sphere of the beam is a fixed ring of detectors that measures how many of the x-rays are

being absorbed by the body. Rather than spin around the body, CT scanners now spiral around the body allowing dense and continuous datasets to be acquired. In recent years there has been a rapid development in CT scanners and the latest 64 slice machines boast being able to scan at sub millimetre intervals.^v

CT scans are much faster to acquire than MRI scans and as a result many more people can be scanned in a day. Although this is a positive for NHS targets it does not make for a pleasant scanning environment. Whereas in MRI the radiographer has the time to ensure the patient is comfortable and relaxed, the radiographer in CT needs to make sure they scan their patients as quickly as possible so as not to get behind on their long lists of patients. Because CT takes such high-density information of the body there is no need for the radiographer to spend too much time setting up the scans – they just need to make sure the body is in the scanning range and then they perform the scan, which takes approximately two minutes. The data is post processed in order to give the radiologist/consultant the images of the body they want. To make organs more visible almost all patients are asked to drink a contrast agent before they have the scan as well as an injection of iodine during the scan.

As it is not possible to commission CT scans I have had to look for existing CT datasets to work with. Through extensive research I have identified and worked with a number of datasets such as the Virtuelle Mummy^{vi} (a dataset of an 2300 Egyptian Mummy), Ötzi the Iceman^{vii} (a dataset of a 5300 year old ice mummy found in the Oetztal Alps) and most recently a set of anonymised datasets available for download via a DICOM software website called OsiriX^{viii}.





Top left Fig. 3 Surface rendering of CT dataset

Top right Fig. 4 Volume rendering of CT dataset

Bottom Fig. 5 Mutliplanar reconstruction of MRI dataset.

As well as allowing access to CT datasets, OsiriX has revolutionised my art practice: until OsiriX all DICOM software ran either on UNIX or PC platforms and was prohibitively expensive but OsiriX runs on a Macintosh platform – traditionally the artist's computer of choice and is free to download. The addition of OsiriX to my tool palette with its multitude of export functions has opened up huge possibilities and allowed me to experiment with data in a myriad of ways; OsiriX allows the user to slice up body in any direction; it allows the user to create journeys through the body; alter colour values and even export 3D surfaces (fig. 3, fig. 4 and fig. 5). One striking feature of working with DICOM data in OsiriX is that scans can be exported as animations, which in make the bodies dance or more precisely, pirouette around internal or external axis.

One of the datasets available for download from the OsiriX website is called MELANIX. MELANIX is a woman who was scanned with her arms above her head. There is no information as to who she is, where she is or when she was scanned. MELANIX has been severed from her original physical body and now exists, much like Jernigan the visible human waiting to be manipulated, sliced, rendered and surfaced.

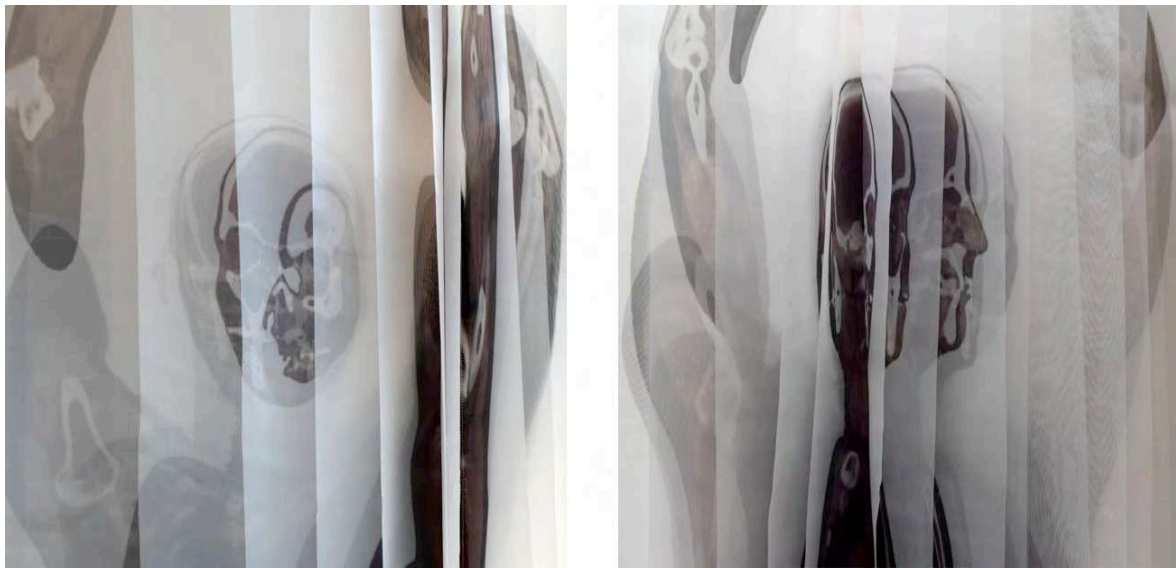
A tool in OsiriX that which is particularly engaging is 2D Multi-Planar Reconstruction. 2D Multi-Planar Reconstruction allows the user to choose axis points in the body to pivot around. This function allows the body to spin around different axis within itself; it can pivot around its nose, its heart, its stomach, and its brain. The Mutliplanar reconstruction tool enables a disembodied vision specific to virtual 3D space. The 360-degree pivot function exists in computer games, in 3D modeling software, Social networking sites such as Second Life and now radiology software.

The Panoptic allows us to see all from a hierarchical vantage point. It is a God's (or Big Brother) eye view of the world. In 1990 Baudrillard argued that the Renaissance panoptic had been replaced by the *trompe-l'oeil* where '*objects fool the eye (trompent l'oeil) by a sort of internal depth – not by causing one to believe in a world that does not exist, but by undermining the privileged position of the gaze. The eye instead of*

generating a space that spreads out, is but the internal vanishing point for a convergence of object. A different universe occupies the foreground, a universe without horizon or horizontality, like an opaque mirror placed before the eye, with nothing behind it. This is, properly speaking, the realm of appearances, where there is nothing to see, where things see you.^{ix} I argue that the emergent space of vision granted through 3D virtual space is a merging of the panoptic and the trompe l'oeil, which I shall refer to as the *Pivotoptic*. Unlike with the Panoptic and the trompe l'oeil we are not longer bound by having eyes in our heads but our eyes are in our fingertips, in our mouse clicks that allow us to enter into the trompe l'oeil space that Baudrillard describes. In fact, the more agile we are at entering and pivoting inside the database the better we perform, the better we know our data, the better we become at making and knowing our virtual worlds. Laws of perspective are replaced by density of information around the axis. The more we pivot, the faster we spin, the more information we acquire (and also the dizzier we get). The Panoptic rule of standing out/above and looking in is no longer relevant in virtual space – it is impossible to get an overview of data, the only way to find the information we want is to go inside it. It is impossible to stand outside of the Internet and look in – the obstructions and distractions are too dense. The same is true of the DICOM body – a radiologist has go inside the body to see what they want to see, to go inside the data to find the knowledge. From outside looking in there is too much other information blocking the view.

Dervishes (Fig.5) is a series of five sculptures made using the Multi-planar Reconstruction tool which I have made in attempt to expose this new vision and to offer a new body politic. As explained briefly above, the 2D Multi-Planar Reconstruction tool allows you to set an axis point in the body and then pivot around it. OsiriX allows export of the 360-degree rotation as an animation from when them imported into Adobe After Effects could be exported as 360 still images. Each *Dervish* is made up of 36 slices of the body around a certain axis – every tenth frame of my animation / every 10 degrees in the body. Each image is then printed onto a sheer organza and bound at the centre like a book before being attached to a hanging system which allows each page / scan to fan out and from a distance give the illusion of a figure and from close up offer an entrance to the core of the body.

Dervishes comprises of five sculptures, one has its pivot point through the centre, one through its spine, one through its belly button, one through its left side and the final through its right side. The resulting sculptures offer differing encounters with the body. The central axis (Fig. 7) is where the information is most dense and information gaps or openings increase (equally) the further from the axis point you are. When exhibiting these sculptures people responded best to the left (Fig. 6) and right axis and least well to central axis (Fig. 7). In conceiving the work I had assumed that Central axis would be the most successful for not only is the axis symmetrically placed, it also yields the largest amount of information and allows the body to be seen equally as you walk around it (or as it turns in front of you for the fabric on which the images are printed are so light it catches air currents of passing viewers). Reflecting on this I wonder if the success of right and left is that it allows you stay outside looking in for longer; It is only when the viewer is standing to the left of Left Axis or right of Right axis that they are faced with the gap, the cut which allows them to see the density of the axis.



Left Fig. 6 Detail of Left Axis Right Fig. 7 Detail of Central Axis

As the creator of the work, I see it as being a model of disembodied knowledge and encounter of information to such an extent that I have become blind to the body that facilitates it. At first I felt uncomfortable using dataset of a person that I didn't know but now I feel it is the most appropriate situation when I am post processing the scans so heavily. Freed from an emotional link to the original (or 'the truth' as one radiographer once referred to the scanee as) I have been able to invest myself and my ideas into it. I identified MELANIX as having the qualities I wanted from a digital body (it was more or less whole and high resolution) and from then on I used it for my own goals. I was not interested in trying to create sculpture which represented a body, I wanted to create a sculpture that explores how it feels to work DICOM data, a sculpture that exposed not the body itself but that exposed the Pivotoptic vision that is seeing that body.

Heart and Womb Axis

Heart and Womb Axis were also made using the multi-planar reconstruction tool but in this instance were combined with the colour and density modes available in the OsiriX software. CT scanners detect a range of tissue densities from -1000 to 1000 (called the Hounsfield Scale), which the computer screen cannot display with its limited colour palette. OsiriX therefore allows the user to see different anatomy / pathologies in the data, for example, OsiriX allows the user to view a set of CT scans in order to look for bone (between 970 and 1000), skin and organs (between 20 and 80) or pulmonary detail (between -1000 and -800). In addition radiology has its own standard CLUTs (Colour Look Up Tables) allowing the body to be displayed in colour ranges such as Hot Metal, GEcolour, Rainbow and Spectrum.



Fig. 8 *Heart and Womb Axis*, inkjet and screenprint on acrylic

With *Heart and Womb Axis* the intention was to concentrate on a subjective viewing of the DICOM data. By playfully setting the axis through various organs such as the brain, the heart, the womb, the liver or the spleen the aim was to create abstracted and alternative structures for my print based sculptures. In making maquettes, I soon found that these horizontally placed axis transformed the body into acrobatic arches, reminiscent of Jean Martin Charcot's drawings of his 'hysterical' patients in the Salpêtrière in the late nineteenth century^x, transforming the body through gesture into something that could be read emotionally and psychologically. As with *Dervishes* Melanix performed pirouettes around internal axis' from which stills were exported to create a sculpture. With *Dervishes* materials were chosen that would allow the stills to be put back again in the form of a sculpture in order to enable a degree of accuracy – a fabric was chosen that would 'hang right'. With *Heart and Womb Axis* a material was chosen so that it should arch and bend physically as desires, pleasures and guilt arch, contort and twist.

By combining various density settings and CLUTS, colours and transparencies were selected purely on aesthetic grounds in order to heighten the abstraction and anthropomorphic possibilities of the work. The scans were further manipulated through colour and texture of printing by using specialist colour changing inks. The prints are made up of a number of layers – the main layer, printed with UV cured inkjet is the standard 'abdomen' setting. On the positive side the same scan in 'brain mode' is printed using metallic interference ink. Additionally on the positive side is a layer printed with optichromic ink (optichromic inks change colour depending on your viewpoint). This layer is a hand drawn layer of decorative wood-grain like doodles. The same hand drawn layer is printed on the reverse of the print in the interference ink.

These multiple decorative layers of printing are much like cosmetic makeup: features are enhanced in order to visually please the viewer. In the ever growing world of *YouTube* and *Flicker*, there are a number of instances where the DICOM body has been animated through colour and transparency with software similar to OsiriX, where it is obvious that through a subjective choice of colours and textures a certain identity had been applied to the body. One somewhat alarming example is a video on the OsiriX website called Spock.^{xi} Spock is a 3D rendering of a head, which as its title suggests has been made to look like a science fiction character (Fig.9). Dental fillings cause image artefact that create serration-like features in CT scans, which when rendered look like spikes coming out of the mouth. The density levels have been set so that the skin and flesh have become a transparent green revealing a tracheotomy tube. There is another tube running from a control patch on the left shoulder down behind the left lung (a pacemaker?). The colours chosen are otherworldly and the up-turned John Travolta-esque collar gives Spock a strong self-assured presence. 'Spock' displays a desire to transport the subjects of the scans into fictional space – like a child would *dress up* a doll, the creator of Spock and other similar movies are playing with the possibilities of *dressing down* (a copy of) the body in order for the subject to take on new personas that (in the instance of Spock) we recognise from science fiction. DICOM bodies are becoming characters, they are changing their physical appearance and donning sub-skin costumes in order to potentially become performers of an unknown parallel fantastical narrative.

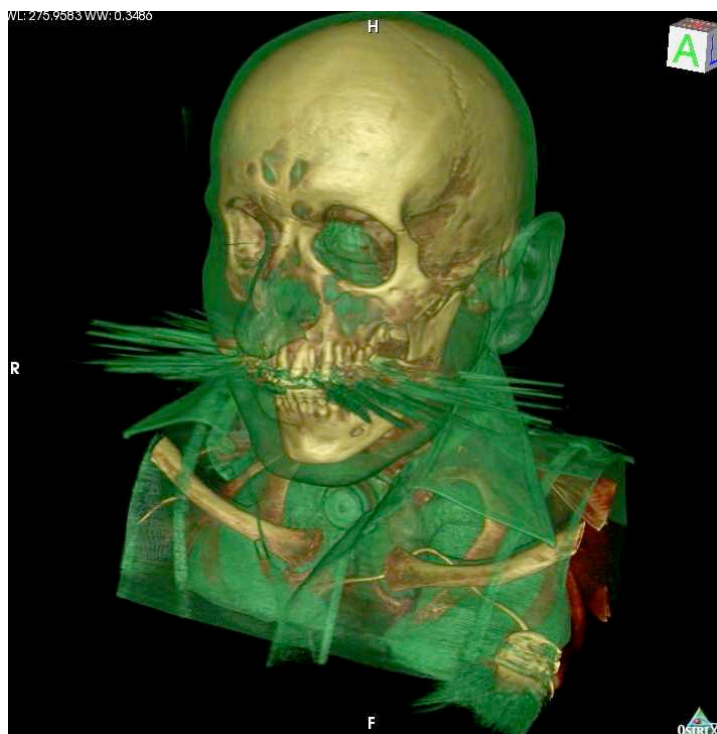


Fig. 9 Spock

MRI Versus CT – Wet and Dry Versus Hard and Soft

As an artist using datasets created from these different scanning techniques I have found they lend themselves to exposing and exploring different ideas. MRI, which is a bespoke and allows bodies into the scanner for non-clinical reasons, has the most potential for subverting the cold, distanced medical gaze. By

putting my family into the scanner, sentimentality and romanticism entered a space normally reserved for objective pathological diagnosis. *Family Portrait* suggests that DICOM can become relic; DICOM can be used to create images and objects from our loved ones for us to cherish and covet.

CT and software designed for its post-production offers huge amounts of possibilities through small degrees of transformation. CT data is so dense and holds so much information it needs to be processed in a number of different ways before it can be understood. CT datasets demand an investment from the radiologist/ artist – information needs to be teased out of the data. I first started working with CT data at around the same time I first started making my first avatar on *Second Life* and just as I can modify my avatar to have any colour of skin, hair, clothes, any shape nose, mouth or legs, so too my CT dataset can any colour kidney, heart or skull, so too it can be only bones, skinless or only lungs. Until the next click of the mouse and then it might become something different – a Spock look-alike perhaps? Just as my *Second Life* is an avatar on which I display signs, so too is a CT dataset. The difference is the level to which this can be done – my avatar in *Second Life* is all surface: pierce the micro thin skin and it is empty whereas CT datasets are densely and exhaustingly full.

CT data and the software created to use it facilitate a ritual of performative dress up (or dress down). CT is also encouraged to dance – by displaying scans that radiate around a set axis point as animations, CT bodies present themselves pirouetters. Once these animations have been exported from DICOM software they can then enter new digital arenas and show off their dancing skills to the different audiences (from the medical). In my art practice I have taken them into the arena of potentially kinetic sculpture and animation, others are posting movies on YouTube.

On a materialist level what the datasets are actually displaying are fundamentally different. MRI images hydrogen therefore MRI scans display the body as a system of fluids of varying viscosities. MRI scans show us as Medieval humours; we become soft and flexible; wet and slimy; feminine and abject. MRI scans show us the body as a Kristevian horror^{xii} – our thin skins only just containing our ever torrenting lipids, bile, phlegm and blood. CT images density so shows the body as hard and soft matter, the areas are clearly defined and sharp. The CT body is contained, male, strong and resourceful, erect and hard. Yet to see ourselves like this we must first be defective and the acquisition is brutal.

Laser scanning – Flowering

In order to try and understand alternative and contrasting ways of digitising the body in 2007 I embarked on a project with laser scanning. Unlike medical imaging, which requires either medical referral or a substantial financial outlay, 3D laser scanning is relatively easy to access when working within an art institution. The Royal College of Art with which I am affiliated has two 3D laser scanners, both of which I have been able to experiment with. One is relatively old and the other a ZScanner 700, was purchased by the college at the end of 2007. In this paper I will concentrate on experiments done with the older of the two scanners as the process is less mediated by software and shortcuts and therefore allows the process of scanning to be more transparent.

Unlike a medical scan, a 3D laser scan can be done almost anywhere as they are portable and increasingly hand held. There are many different kinds of 3D laser scanners available but all work on the principle of reflected and shattered beams of light: the scanner emits a laser beams which when it reaches the subject is reflected back as shattered light. The scanner then senses this shattered light beam and is able to compute the original point where it shattered as an XYZ co-ordinate.

In order to scan my subject she was covered in little white markers, her painted eyebrows were painted white and she wore white swimming cap. She was placed a rotating table and asked to keep as still as possible. In order to achieve a good workable resolution she was scanned in sections – from her head to her elbows, her elbows to her thigh and her thigh to her toes. So that a full body scan could be acquired, she was scanned from eight different angles (she was rotated 45 degrees on the turntable). The result was 32 scans that needed to be ‘stitched’ together in a 3D application called GeoMagic.

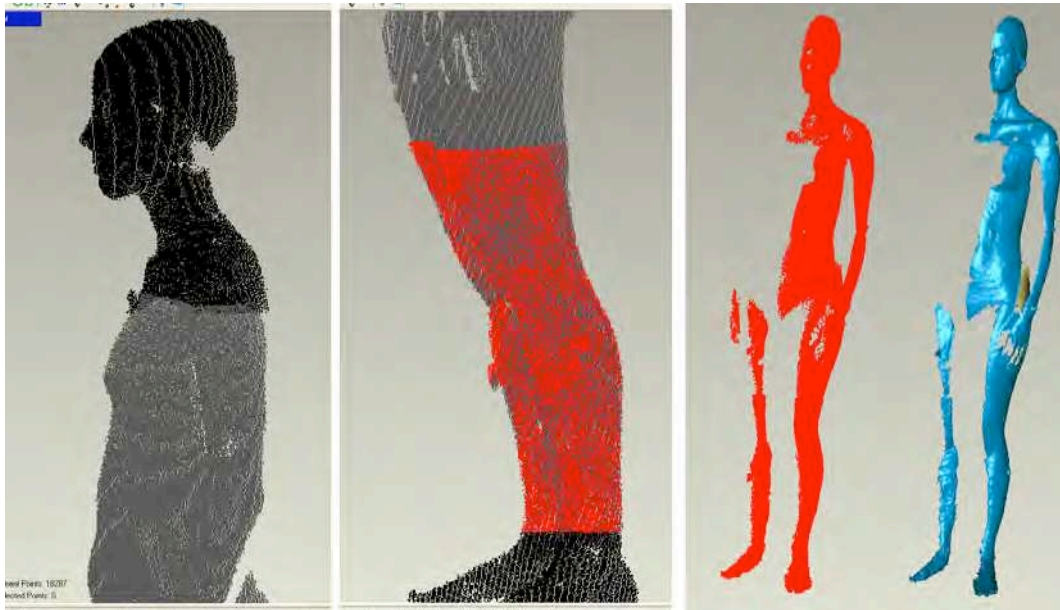


Fig. 10 Screenshots of GeoMagic showing the sets of point sets being matched up and on the right a point cloud before and after it has been converted to a polygonal surface.

3D laser scans are sets of point clouds – datasets of XYZ co-ordinates which need to be cleaned up and converted to surfaces before they can be put together to make a whole surface which relates to the original object. In order to ‘clean up’ the scans the software detects a set number of ‘stray points’ detected by the laser. Stray points can be caused by a number of factors such as a reflective surface, movement or uneven lighting conditions. By setting parameters within the software, points, which are more than a set distance from any other point can be automatically deleted. Once this has been done the remaining points can be converted to surfaces and then smoothed to hide any undeleted stray points.

The age of the scanner and art college set up required a long-winded process which has long been mastered by many professional scanning companies. Companies which offer laser scanning to film, fashion, engineering and medical industries such as Rapido 3D in London, boast having special rigs of numerous scanners which simultaneously take scans from multiple angles resulting in an optimum level of accuracy when matching up the scans. The Zscanner 700 surpasses the needed to stitch and surface entirely; ‘Z Corporation has solved the 3D laser scanner mobility problem with the ZScanner 700 - the world's first real time surfacing, self-positioning 3D laser scanner that brings much needed speed and mobility to the world of 3D laser scanning. With the ZScanner 700 3D laser scanner, you can create a 3D scan of any object - even those in the tightest spaces - and do it in one continuous scan that requires no post-processing.’ By using four lasers and reflective adhesive points the Zscanner 700 scans, stitches and surfaces in real time.

Although for the majority of users these advancements and refining of the technology welcomed, for the artist trying to understand and experience the process they hinder intervention and invention. By working with the older scanner and putting the scans together myself I was able to create images and learn about the ‘laser scan body’ in a unique way.

Laser scans are grafts of what digital media theorist Lev Manovich calls ‘sampled reality’^{xiii} The laser maps the surface of the body in sections and the user (me the artist or subsequently the scanners intelligent software) has to try and fit them together. With an inanimate subject this is relatively straightforward but with a living subject it requires a lot of filling, stretching and smoothing. My attempt to make a full figure more or less failed – I was unable to match my scans up convincingly and resorted to importing the model to 3D Studio Max and create large areas by hand (or by mouse). When explaining this to Rapido 3D, the professional laser scanning company they agreed that 3D scanning always requires some creative patching up – the under arm can never be scanned, nor the inside of legs as the laser cannot get to them. Hair is also a problem for it absorbs light and therefore does not reflect the laser so hair often has to be grafted on digitally.



Fig. 11 Flowering

Once I had made the full model I then returned to the original scans in order to make images/animations, which explored and exposed the process of laser scanning. I made a series of works called *Flowering*. Here the sides of the figure do not fit, they insect and cross each other waiting to blossom into place, and then wilt away to be replaced by new surfaces.

The most striking observation I made when working with laser scans was the very simple and obvious fact that they are all surface, they have no depth, no interior: pierce them and you fall straight through. As Gary

Hill's series of 2005 works (*Church and State*, *Spoonful*) so eloquently showed, digital surfaces do not resist each other, like spectral ghosts they can travel straight through each other untouched. To those working with experience of working with 3D digital software this is nothing new but in contrast to DICOM bodies it is entirely different. DICOM datasets are surfaceless; they are all interior, all substance. They are densely packed cubes of information. Pierce the skin of a DICOM body and you are confronted not with a void but with a dense mass of voxels. Pierce the skin of a polygonal model and you fall into nothing. Dutch artist duo Jodi show us the shock of the hollow body in their *Max Payne Cheats Only*^{xiv}, an internet work where characters of a computer game jump up and into the 'eye' of the game to reveal their paper then skins. The hollow Second Life body has similarly been explored by artist Paul Sermon in his Second Life Gallery called *The Sylgrut Centre*^{xv} where he has placed an action ball, which allows your avatar to see inside the artist's avatar's head. (Fig. 12)



Fig. 12 Avatar trapped inside Paul Sermon's Second Life avatar head

Jodi and Sermon's images are far more uncanny than those of inside DICOM bodies – in the 21st century we are all aware of our anatomical structure and x-rays have long been part of our visual vocabulary. When we open a body, we expect to find something inside, blood, bones, and organs: anything but nothing. Yet these empty bodies are those that populate games and social networking sites that we most often encounter in digital virtual space.

Conclusion

As an artist, I work with DICOM and laser scanning not only to discover its potential for making artworks that can be enjoyed aesthetically but also to try and make sense of an increasingly digitised world which the physical body is not allowed access to. The more time I spend working with and through computers the more I feel I they way I interact with others and even myself is changing. I definitely have both a physical and a virtual reality but I am still not confident about who I am in the virtual reality – am I a digitised version of who I am in physical reality or someone very different? In a future which promises to be even more digital



and when the current generations are growing up developing their on and off line selves simultaneously what will the relationship between them be? I look to DICOM, which is a direct digitisation of body to data to give me clues and suggest answers.

In a lecture given at the Courtauld Institute in February 2008, Raphael Cuir^{xvi} argued that desire to “Know Thyself” as anatomical knowledge is now been replaced with a desire to “Know Thyself” as matter, as space, as an object of science, an object of science fiction. Digital medical imaging and laser scanning facilitate this kind of knowledge and the technologies discussed in this paper certainly fall into Cuir’s “Know Thyself” categories. These technologies allow us to convert our bodies to data that enable to plot our inner and outer physical boundaries, measure and chart our physical matter, experience ourselves as objects of science and animate ourselves as objects of science fiction.

The introduction for this paper asked whether knowing our bodies as data can help us know ourselves as digital subjects. I argue that it does. MRI and the artworks it allows shows us as fluid, hovering, elusive, CT shows us as inexhaustible, transformable, unfixed, densely complex and with a multifaceted interior. Laser scanning shows us what we currently reflect ourselves as being; superficial, hollow, paper-thin and with ill fitting skins.

‘.....we are insecure in our understanding of ourselves, and this insecurity breeds a new preoccupation with who we are. We search for ways to see ourselves. The computer is a new mirror’^{xvii}

I, like Sherry Turkle, argue that the computer screen reflects images that help us understand who we are becoming as our lives become increasingly digitised. At present the images/simulations/representations of our online identities are severely limited yet there is a pressing need (witnessed through sites such as Facebook, YouTube, Second Life) for this to change. I argue that DICOM is a rich resource, full of possible metaphysical interpretation which should be harnessed and explored in our ‘search for ways to see ourselves’ and ultimately to “Know Thyself”.

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The Ball In The Hole

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Abstract

"The Ball in The Hole" is an interactive video installation, running on GPL homemade software, which uses the principle of tele-presence.

Two rooms are showing a projected mirror, where the user can see and recognize himself. On the floor there is a spiral, containing a luminescent ball. When the user grabs the ball, spontaneously attempting to play with it, the projected mirror will start erasing, showing the other room. The ball, as an interface, will act on the video as an eraser on a pencil drawing. The two rooms / spaces are symmetrical.

After the complete erasure of the image, the mirror will show the remote room only. At this point the game flips: the ball, rubber and pencil at the same time, gets the capability to erase the other person / space / video. Therefore this deletion of the Otherness corresponds to the redrawing of the Self. You draw as much as you erase, in direct proportion.

The process continues endlessly rendering the installation a social happening where the user becomes the main character of an improvised performance.

<http://theballinthehole.net/>

1. Introduction

The ball in the hole is easy and fun.

Using a colorful ball you can delete your projected image to see what (or who) is in the hole.

After recognizing and discerning your representation, the image of thyself, you can understand and reveal the other through the erasure of the self. The person behind the hole will appear to disappear again. The emphasis is on the line separating and connecting the visual to the concrete world. The ball and the hole. The person's movement is his deletion.

The ball in the hole is a social installation/performance where the user becomes the actor of metamorphosis. The discovering of the self and the legendary mirror to other dimensions is experienced through a real-time tactile digital environment.

The deformation shown is a constant force that the user can apply to his virtual figure.

The image becomes fragile and shows its temporary value[1]. The reflection of identity, reality and representation becomes a playful, intimate and dislocated game of drawing and deleting limits and borders.



Illustration 1. Two children playing with the installation.

2. The Mongrel

According to Greimas[2-3]' semiotic square, the opposition between Self and Alius entails the existence of two other concepts which are in relationships of contradiction and complementarity: these are neither Alius nor Self (Ipse). These two domains of non-Alius (Idem) and non-Self (Alter), which are in a contrariety relation, open a semantic field which 'the ball in the hole' is visualizing. Non-Alius, in relationship of contradiction with Alius, represents, in our case, fragments of non-discrete Self, but yet appearing. Non-Self represents scraps of Alterity overlapping the self. This generative process in progress creates the hybrid figures that this installation means to point: the mongrel, a contradiction tending to complementarity. Identity, Self as an Entire, and Alius as a Unity, are nothing else than an instant; all the rest is deformation, migration of significant, dynamic transformation. This innovative characteristic of the Ball in the Hole makes it peculiar: the superimposition of images of "self" and "other", as the creation and visualization of contrariety, renders the game of drawing and erasing filled with philosophical implications.



Illustration 2. Visitors creating a mongrel.

While γνῶθι σεαυτόν (gnothi seauton) is an assumption at the base of knowledge and socialization, it can become a cage, limiting the experiment of something that is not you. The Self can become a blindfold. The perspective, then, is static.

On the contrary, in this work, the distance between Alius and Ipse is a continuous journey augmenting levels and layers of signification.

This evolution in time is a cycle in the form of a spiral. The generation of sense and images implies a subject actively and physically involved, moving the ball. The user enters the show, the user becomes the show.



Illustration 3. A hybrid mongrel composed of the authors.

2.1 The Continuous

The cyclic process of discovery and exploration, drawing and moulding Self to Alius, passing through Alter and Idem, is a spiraling continuous that requires a constant physical and mental energy.

This is one of the reasons rendering children perfect users of this work.

Their spontaneous instinctive approach as their immediate understanding of game dynamics makes it possible for them to have a full, complete 'the ball in the hole' experience. These subjects, devoid of a ultimate awareness of the limits between themselves and the surrounding environment, present a thoughtless, light-hearted and carefree behavior, playing, mixing and superimposing the video images of representation.

An adult human presenting a fully forged self-consciousness, will tend to act in a hesitant, doubtful, wary, and suspicious way.

3. Technical Details

The technology is as hidden as possible to render the game spontaneous and playful. This invisible origin of the mechanism, preserving surprise and magic effect, creates a fairy tale, dreamy atmosphere.

3.1 Software

The algorithm, using thresholding on YcbCr colorspace, is really simple to keep the effects of raw deletion ed superimposition of images. The installation uses Cimiano streaming engine, a custom software made by Silvano Galliani and released under GNU GPL License. Video is sent through an ethernet cable between the two computer (one in each space) and the software recognize the ball using one camera on each side.

3.2 Space

"The ball in the hole" needs 2 separate spaces with the following dimensions in meters (height x width x depth).

Minimum: 160x160x200

Maximum: 300x300x500

To realize this installation at the best of its capabilities it's best to put it in crowded places.

Budget to be discussed. The material should be provided by the hosting institution.

4. Conclusions and future work

The Ball in the Hole is a representation of the continuous transformation from the Self (Ipse) to the Alius, passing through the non-Self (Alter) and the non-Other (Idem), in a generative spiraling trip exploring levels and layers of Identity and Otherness.

The representation of identity is a narrative process rather than a static fixed image, nor are there static values. The endless movement depicts a hybrid monster, the mongrel out of the cage, a new mythical figure, the morphing daemon composed of alien and self, alter and idem.

The next steps for Ball in the Hole include:

Developing an audiovisual version of the game.

Releasing a stable version of the software, make a bootable linux distribution including the game, so that the installation is usable and can be reproduced by users.

Play with different spaces and social reaction: integrate the work in different contexts and observe the phenomenology of the reactions (ex: 'the ball in the hole' in the underground, in a airport toilette, in a queer party...)

Improve the streaming engine, install the work in two remote places (a fast internet connection is required).



Illustration 4. Tbith at ACM-Multimedia.

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Musical Education and Creativity in Computer Arts *Hyperscore* Project in Schooling

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Abstract

This paper aims to present a critical reflection on the interventional work developed by “Hyperscore in schooling”, a research project created to explore the ICT – Information and Communication Technologies in a creative perspective, using music as a communication language and the computer as a digital technology tool mediated by internet. For this purpose we have foreseen music language and its specific ways of artistic expression and communication, intersected by digital language within the capabilities of *this* software and the internet. This project was carried out in collaboration with ten Portuguese basic schools, where *hyperscore* software was previously installed, and it involved 360 students, 16 teachers and 7 researchers. The music composition software allows students who are not familiar with the music language not only to acknowledge its coding but also to experience a type of learning process in an autonomous and inventive way. This analytical perspective opens a very stimulating standpoint since it opens the debate on the pedagogical relationship between student/teacher and student/knowledge within a learning process. Furthermore, and due to the connections it created with other learning areas, this project had the advantage to open up new horizons and to create a new ‘cultural tuning’ within the teaching of music in basic schools that allowed a deeper proximity with the new generation of students.

Keywords: Music, Communication, Technology Autonomy, Creativity

The Project

Hyperscore is a software designed for music composition, developed by Tod Machover with MIT collaboration (Massachusetts Institute of Technology). This software enables young people and adults with no experience on music to meet the world of music composition. It is an easy procedure software which combines sound with visual effects both designed by each one’s intuitive musicality, sensations, creativity, in short, all the knowledge they got in their common and daily life experiences. These short compositions can be listened, mailed, commented, selected and used over and over again. It makes easier the dialogue between teacher and student, by their mutual involvement in the discovery path and negotiation process of work composition. Also, and in a larger sense, may also improve student/teacher communication as well as learning conditions in school environment. In this sense it helps either to reflect everyday practices in the class, as to reflect upon curriculum development issues, since the music teacher has to adjust curriculum contents to a new technological frame, the *Hyperscore* software. For this matter, the music teacher may have to review his pedagogical methods along with the students preferences and wishes, and may also now feel more at ease to make individual adaptations according to each one’s rhythm of learning. This turns out to be possible as this software is a very flexible one, allowing that the basic elements of music language can be learned accordingly with each one’s cultural background, taste and motivations. This software gives also interesting clues about student’s general idea on music composition. In fact, students sense they can easily make real music compositions, by selecting and creating new sounds and finding new ways to combine

them. In this sense this software gives to the young students more easiness, freedom and autonomy in music and composition making and learning. In academic context, however, this software gains a new and different dimension, than anywhere else, since it has to be evaluated and the students got to have final marks.

Most of the 360 young people involved in this project come from urban surroundings and do not belong to any private music school. Their social and economic backgrounds are rather 'low' and therefore they don't have much music culture either. Although we're conscious that social and culture parent's outcome is a strong and main factor on children cultural and academic growth, we are also acquainted with the big influence their pairs, or other adults (as teachers) or other contextual environment (as the media and internet) may have on their individuality and identity development. In fact we may state that nowadays both music and personal computer have an important role on young daily life, and this is the reason why it's crucial that schools also take pedagogical advantage of this technological tool, in order to accomplish not only curriculum matters and academic issues but also to diminish major inequalities due to those background differences. Is visible the interaction granted by this music program since these students are able to listen, to change and to combine different instrument's sounds (piano, guitar, flute, sax, drums, and so on) so to create an singular melody of their own. Despite all the possible existing recording tools, as the use of tapes in class, the interaction pattern created makes all the difference. In this sense all the students were able to guide their experimental work - through several attempts and errors - exchanging with each other solutions and questions, finding easily and in less time all functions they needed to accomplish their tasks. Furthermore, for some students this was the first opportunity they had to deal and learn with a computer.

To learn with this software, 2nd grade basic students in groups of two, had access to a computer and a pair of headphones. The 3rd grade classes were divided in two groups, and therefore it was possible that each student could work with its own computer, whereas in club activities that number was unsteady, depending on students number present. Usually the students most trained in computers turned out to dominate the colleges work. But this fact wasn't sensed as an obstacle since all the required negotiation made the learning process centered on students general growing competences on listening and sharing during the whole guiding process of creation. Also the fact of not having a computer at home, and a short acquaintance at school, increased the wish to participate, even for those who usually show less interest about school matters and feel bored anytime they try to accomplish them.

This project took into account the individual, every social and cultural identities involved, aiming either cognitive as affective dimensions of human development. The social and symmetrical interactions got a central position on project analysis and development. Whenever possible we have analyzed every possible intersections between music curriculum for each grade and the autonomy boundaries given by this program both to teachers and students. In several group reflections was emphasized each intervenient educational course in their own professional or academic roles showing group intention and competence by uniting different acknowledges, values and cultures. Teachers attended not only their curriculum programs but also their relationship with the young in terms of equilibrating its social dimensions: authority, cooperation, affectivity and conflict. In the beginning, some registered problems due to the lack of equipment (computers and headphones) were gradually solved as some student's bad conduct was also decreasing as long as the young got acquainted with this software.

Work methodology

As actor's implied on this project, it was through daily interaction, and on a real context of social production, that we guided this investigation as a social intervention. The observation worked out by teachers brought to this research a great deal of complexity. Teachers implication marked highly most of the interchange in classes and clubs as among school community members. Moreover it has turn out as a self education dynamic process, improved by experience interchange on every regular meetings that were held among teachers and investigation Centers researchers.

The methodological and analytical perspective has been inscribed in a comprehensive paradigm than in an explanatory one, since social phenomena require a comprehensive approach to take notice of social interaction complexity, and must pay attention to all institutional factors entangled on daily life and actors actions put into translation. This standpoint emphasizes its richness by the growing general implication of every research participants, who were assumed as authors rather than research subjects. But this position was neither a direct one neither was it immediately assumed by research-teachers. In this process it is necessary to overwhelm all doubts and all mistrusts, as much in what concerns academic institutions and their researchers, as the needs and interests of *hyperscore* experience proposal. It was also very interesting to perceive how students were reflecting on their learning processes: asking for doing it over again, keeping on doing it, or looking for improving some music compositions already done in class. Students computer adhesion - a tech instrument that gained a very important role on young present time interests - makes them wanting to do it fine, puts them in the center of all attentions and makes them real actors of their own learning process. The ways they accomplish their tasks leads them nearer from youth world than from the school one. In this case, it seems to us that we face a new order on youth status. We see a young person with its own aspirations, with its own willingness, who doesn't seek only to satisfy adults representation, and where young social role exceeds the student one.

The project began with an education session guided by *Kevin Jennings* with all the project team, that aimed to create learning and exploring conditions about the *hyperscore* software. It also provided contacts with other countries and schools that had experienced this software, namely in Ireland. This was essential for further definition of pedagogical action and general procedures. On a second phase, we looked for the conditions that could develop a conscious reflection, from all social and educational experiences in presence, so that it could go far beyond a mere techno musical software application. On a third phase and based on previous work, teachers and researchers designed this project focusing on learning-teaching processes, on creativity, and on teachers education. The several themes that came about, according to everyone experiences and acknowledges, helped to structure work strategies and to enlarge initial observation and listening perspectives. This also contributed a lot to develop a much less stereotyped intervention. On the project development, it was chosen in group, three different observation worksheets: "*Ficha de caracterização sócio-demográfica*", which also included information on musical experience and acknowledges from all students and parents; "*Ficha de registo de sessão*", which included all observation items: concentration, motivation, confidence, general attitude towards music, persistence, autonomy, critical sense development; "*Ficha de registo individual*", which aimed to record each student evolution during all work done. The major difficulty in collecting data came from 2nd degree students, as classes surpassed 20 students. It was analyzed students involvement and interpreted their euphoric adhesion whenever they explored this software. For a wider view of *hyperscore* experience teachers made open debate and have shared with each other not only students conduct and reactions when involved with *hyperscore*, but also shared new ways of learning and teaching according to curriculum, to the program, to social and professional conditions, and so on. In this sense, enlarged meetings appear to be most useful, as they allowed to find many solutions for the coming

problems, and brought about much more understanding features over social intelligibility and schooling work performances.

In brief

We now live in a society strongly based upon technology and information, demanding ‘global literacy’. But we live also in a society based upon the citizenship social values which lead us to some new perceptions about traditional schooling functions. This same society puts forward a school education that is pointed to rationality rather than to affectivity with all its richness that are a bigger guaranty of a more complete development of all human faculties (Carasso, 2006) and in an education system whose discourse values artistic education but seems to ignore them when we look deep into practice. Artistic creation is a foundational experience for any citizen and the new technologies help to create new communication codes. Artistic activities play an important role in the world and the technology will always be a dominant part whereas these activities are exercised in tight connection with science and Popper’s technology (1980). *Hyperscore* project is both a research and intervention one created in order to explore ICT - Information and Communication Technologies in a creative perspective, where music art took the part of communication language and the computer as a digital technology tool mediated by internet. This means that this project made possible to gather artistic education with the ICT’s.

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Photorealistic 3D Digital Faces Creation - New Fast Workflow and Techniques

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Photorealistic digital doubles have become a common element in films and video games. 3D Digital faces offer exciting tools to achieve innovative shots, narratives and production processes in the film and games industries.

Special techniques and workflows must be applied to create photorealistic digital faces that are technical and aesthetical usable to substitute actors in close-ups with arbitrary illumination conditions in both, real-time and pre-rendered materials. Quite often this techniques and workflows employ high quality technologies that tend to be expensive in terms of time, money and know-how.

In this article we propose a fast and comprehensive workflow to inexpensively create high quality 3D digital faces in an iterative fashion in very short timeframes.



Fig1. Alfredo Ceballos digital double in shaded 3D viewport and final skin shader.



Fig2. Nanzui Palomino digital double in shaded 3D viewport and final skin shader.

Our workflow is divided into six stages:

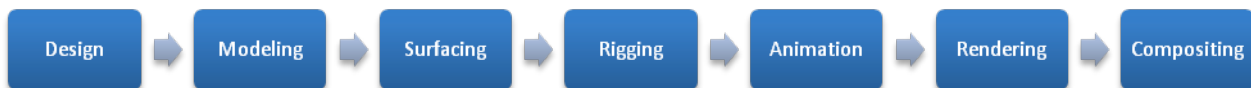


Fig3. Digital doubles production process

The stages are iterative in nature and can be efficiently linked to any existing pre-production/production workflow for films and video games. The stages of the workflow are described next.

Design

During design the objectives and qualities of the final product are defined. Later stages of our workflow are aligned to these objectives. Some key decisions taken in this stage includes:

Performance / Expression

The degree of expressiveness of the 3D digital face according to the performance objectives. Some subtle expressions like sadness require special technical and aesthetical considerations to be convincingly achieved.

Shots

The shots in which the digital face will be used are mostly long, medium of close-ups. The type of shots defines the quality and detail of the texturing work.

Illumination

At what kind of illumination set will be exposed the digital double and what kind of ambience is mimicking that set. Color palettes and shadows contrasts for the surfacing of the skin are defined to match the illumination and ambience objectives.

In this stage a photographic study is taken for the referenced live actor. These photographs are used to identify anatomical features and muscle and skin characteristics for later stages.

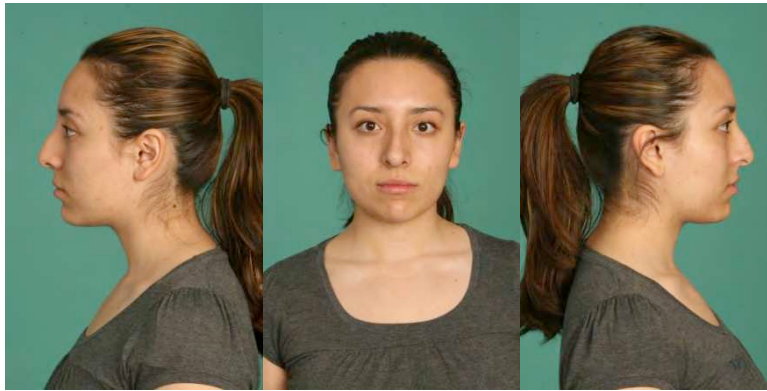


Fig4. Photographic references for Nanzui Palomino's digital double production

Modeling

In our workflow, modeling is a two-steps stage. Topological and Morphological attributes of the 3D model must be achieved in order to reflect good aesthetics and convenient technical characteristics for later stages.

The way vertices are connected to form a 3D surface represents the **topology** of the model. The first step of our modeling technique is to identify the topological structure that the face requires and reproduce that structure using primitive polygonal surfaces. The polygon edges in the resulting structure match the actor muscular fibers orientation and lines of expression.

In order to achieve correct skin deformation only quadrilaterals are used to represent the surface and T and 5+ stars junctions are avoided in areas of the face with lot of muscular mobility.

Once a good topological structure is achieved physically correct features are configured through **morphology** work. We use techniques based on the reproduction of anthropometric characteristics of the referenced live actor. Surface vertices are tweaked and extra resolution is inserted to conform the live actor physical features.

Topology and morphology work makes our technique suitable to produce 3D geometry that is easy to deform in natural ways for posing and animation.

Surfacing

The surfacing stage is probably the trickiest of all stages in our workflow. Based on best practices and our own experience, we use techniques for surfacing at three specialized sub-stages:

Texturing

Textures are normally generated from high resolution actor photographic references. The photographs are post processed in terms of noises, scratches, color balance, saturation, contrast, brightness, etc. The UV layout for 3D digital face is also generated here. First, a cheap cylindrical projection is used to quickly unfold the 3D geometry into UV texture space, in order to apply textures and baked them to facilitate its adjustments in texture space. A high quality UV layout is generated by disconnecting certain areas of the 3D digital face.



Fig5. From left to right: Final UV Layout, Specular Map and Albedo Map

Shading

Sub-surface Scattering (SSS) is the *de facto* illumination model for skin simulation. The ease of use and gorgeous results of SSS are paid with great computation load and extended rendering times. Our technique uses a computational lightweight shading tree that effectively mimics the attributes of skin shading at a fraction of the computation load and rendering time required for SSS.

Our shading tree uses Phong as its base illumination model. Diffuse component is controlled through 3 layers: albedo map, warm-cool incidence mapping, ambient occlusion map; reflection is controlled via Fresnel map; while specularity is defined through a realtime modulated specular map.

Shadows received in the skin surface are modified in the shading tree to mimic the reddish edges commonly observed in SSS.

Finally, skin pores and imperfections are reproduced via a realtime modulated bump map.

Detail is everything!, that is why eyes, teeth and tongue also have its own anisotropic based shading tree that carefully reproduces specific features like sclera humidity or teeth enamel.

Illumination

We use a modified key, fill, rim, kicker illumination set. Certain lights affect specific components of the shading tree, some lights transmit specularity but not diffusion and some other produces shadows with reddish gradients at its edges.

Rigging

Taken from the motion capture techniques, in this stage an inexpensive live video of the actor performing specific expressions and gestures is recorded. The face of the actor is decorated with special markers that let us evaluate expressions in terms of skin deformation, tension and stress attributes.

These skin attributes are then transferred to an array of weighted controls that, as the actor's face markers, equivalently deform specific areas of 3D geometric digital face.

Animation

In a similar way the rigging stage is performed, in the animation stage a video of the actor performance is taken. This time the actor's face markers are corrected to match the array of controls present in the 3D digital face rig.

The video is used as a reference for the animator to transfer the performance from the actor to the 3D digital double. In our workflow, minimum or no tweaking of the 3D model is required since its UV topological structure matches the actor muscular fibers and lines of expression.

Rendering / Compositing

Rendering / Compositing is a critical step to achieve the aesthetic qualities in an economic way. Our rendering stage decomposes the render of a shot into five different passes that are composed *a posteriori* for extra flexibility.

Using our technique, tweaking to shadows, reflectivity, color balance, and so on, does not represent a rendering step, instead a composition activity is used to tweak and recompose the final shot very quickly, adding great control to the final imagery result without paying back long rendering times.

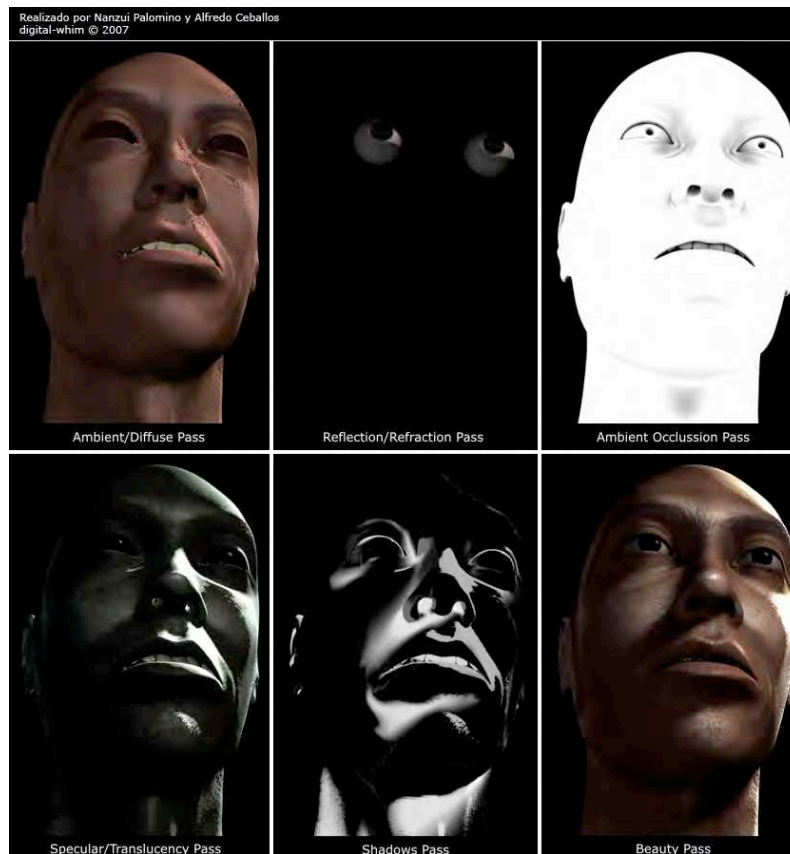


Fig6. Render passes and final composition (Beauty pass)

Final Words

The process of photorealistic 3D faces production can be both inexpensive in terms of time and high quality in its results. The key aspect to achieve this is to configure and adopt an incremental workflow that continuously produces gaining quality results.

In our digital face production process quality is gained in a progressive fashion. This approach can benefit almost every film and videogame studio since shortest times and budgets are needed to obtain exactly the required results

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Ideasonair.net is a web project that serves digital artists. The site promotes artistic ideas, created by me in various fields, especially for digital art. Therefore: “Dear artists, poets, architects, designers, critics, curators and ‘lovers of the trade’, if you are short of ideas this is the site for you!” Here, the ideas from ‘Hyperurantium’ have landed and found a place or better a virtual factory. Ideasonair.net creates for you a lot of different ideas ready to be developed. Ideasonair has a particular theory about ideas and how we perceive them: “ideas are in the air and the earth is spinning around connecting with these ideas at various places. So an identical idea could land or be had in New York and Rome at the same time”. This site could be considered somewhat like entropy. It puts in order and gives shapes to ideas. This ‘online factory’ is continually updated to always give artists new ideas.

Ideas appear in the site in three different stages. The first stage is purely preliminary and the idea is just a clue in their primordial state, maybe not yet able to be developed. The second stage we can call (as Freud would call it) the ‘daydream’ stage. This is the stage in which the various elements that constitute an idea come in contact and come to realization. The third stage deals with the complete idea ready to be developed. The three stages are marked on title by their respective colours: red when the idea is in the initial stage, orange when it is in the ‘daydream’ stage and green when it is ready to work.

Using Ideasonair.net and also many other Internet participatory media applications as web 2.0 platforms, artist is free to choose and remix cultures and ideas as prefer.

Finally artist doesn't need to fight for any ‘copyright’, ‘copyleft’, ‘copydown’ or ‘CC’!!!

Ideasonair is a conceptual artwork in progress that puts in evidence the concept of ‘open artwork’ getting ideas and waits for their realization. Moral of the fable: The ideas are the artwork and they can be transmitted... just like the thought!

Some ideas

The first idea is “The random trip-Kit of the imaginary traveller”. “The random trip” is a psycho-geographical trip without destination, where time and distances are not calculated but improvised. It's a trip without traveller. In fact to move it's just a sort of ‘kit of the imaginary traveller’ that determines a map whose accidental trajectories establish various points in the world, where the people never meet themselves but they receive and they send a suitcase. Therefore they can decide a stage of the travel. The space where all that happens does not exist, or better, it exists like ‘a process’ that visualizes the stages of the travel through the virtual space of a web site; in which an ‘individual nomadism’ crosses it without moving or travelling.

With “The random trip” the territory is dissolved in ‘nodal points’ and enters into a wide networking space.

The kit of the ‘imaginary traveller’ means to reflect the people on a very deep experience—that is to move on just your own territory. Therefore, the most important trip that anyone should complete is the intimistic one.

The sixth idea “Essential language” proposes an elementary way to communicate not through the words but through a primordial symbol: the circle, that derives from the point and is its origin. This artistic abstract language modifies itself on the base of different alphabets and is applicable to all idioms. In fact, each letter of the alphabet is identified by means of a circle with a specified colour defined by a RGB code. As in real alphabet the different letters are assembled together in order to form the desired word, in the artistic abstract language the different circles are assembled together in concentric circles whose diameter is defined on the base of the length of the chosen word. The assembled circles shall be read from the inside to the outside in a centripetal movement. A sentence will be constituted of more compositions of concentric closer circles, separated by punctuation that is constituted of different coloured points.

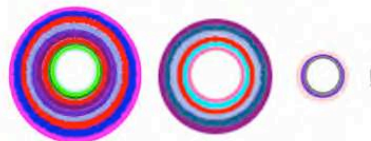
As an example let consider the “essential language” built on the 26 letters of the English alphabet by associating 26 coloured circles to the letters.

6 idea "Essential Language"

letters	RGB code	capital	punctuation
a	FF0707	A	Apostrophe - ' • AB2323
b	FFC000		Colon - : • 918C0F
c	F6FF00		Commas - , • 0B5319
d	54FF00		Dash - - • A6BEAB
e	518E24		Ellipse - ... • 0C83AF
f	25AD9F		Exclamation Point - ! • 6D029A
g	00FFE4		Hyphen - - • E68CDA
h	00DEFF		Parentheses - () • E90063
i	C4FF00		Period - . • 860139
j	007EFF		Question Mark - ? • B14A4A
k	1E5286		Quotation Marks - " " • 3423B2
l	0020E4		Semicolon - ; • 1B125C
m	453067		Underlining - _____ • 393939
n	98A2E1		
o	6D37C7		
p	C4A0FF		
q	FF00FF		
r	FF00F0		
s	871080		
t	FB62B9		
u	FFC000		
v	960808		
w	FFFFFF		
x	B5B4B4		
y	787777		
z	393939		

phrase example written with the "essential language"

ideasonair thanks you!



The eighth idea is a psycho- geographical journey of a cloud.

A satellite following...

A fake cloud roaming in the sky...

Which is piloted in a random way through a PC and contains a GPS device receiver...

The cloud leaves SMS for different places...

It takes the mobile-phone numbers from a website where is possible to leave the own number... therefore the adrift cloud passing across your city could leave for you a special *sms*...



The twenty-third idea proposes an itinerant way to show digital art all over the world. Somebody feels Digital Art as a mission? “Digital Truck” is an idea to curate a travelling Net-Art exhibition in public spaces. A glass window as a parallelepiped will be installed in the main squares of European cities to close people to Digital Art.



To view the realized project inspired by ideasonair:
<http://www.ideasonair.net/realizedworks.html>

Main web reviews on Ideasonair

<http://www.rhizome.org/fp.rhiz?id=2971>

<http://www.artforum.com/links/>

<http://www.random-magazine.net/modules/news/article.php?storyid=887>

<http://rhizome.org/text/?start=781>

<http://www.turbulence.org/blog/archives/001608.html> http://en.wikipedia.org/wiki/User_talk:Ideasonair (“Essential language”)

http://www.reblog.co.uk/archives/2005/12/ideasonair_blog.html

<http://www.timmatheson.com/blog/>

http://www.noemalab.org/sections/art_focus_more.php?page=5

<http://www.pixelart.org.uk/community/deficit.pdf>

<http://www.newmediafix.net/daily/>

<http://netzvelle.blogspot.com/2006/01/look-what-i-found-ideasonair-blog.html#comments>

http://interactive.usc.edu/members/jbleecker/archives/2007_03.html

<http://www.nearfuturelaboratory.com/?p=307>

<http://uber.tv/envisioning/clippings/2005/10/008787.html>

<http://mbf.blogs.com/mbf/2005/10/ideasonairnet.html>

<http://www.memefest.org/2006/si/index.php?meme=gallery&submeme=beyond>

http://www.spudart.org/blogs/links_comments/3526_0_4_0_C/

Ideasonair was selected at the best of the web 2006, for category “innovative”.

<http://www.archimuse.com/mw2006/best/list.html>

Video Pong : Breath me out

Conception : Djeff Regottaz - Paragraphe, University Paris 8

Programmation : Michel Davidov - Ensad

Movie : Thomas Israël

Actors : Zhou Mu Jie and Nonglak Yingsuksantisuk

Technique employed : Director, quicetime, photoshop, assembleur

Technical material : Dv camera, Pc computer, serial interface

Presentation support : P computer with serial, Video projector screen.

Description

"Vidéo pong" is an enriched version of the famous arcade game : PONG.

This installation support a confrontation between video and video game. It tests the game in terms of an engine of narration. In the context of an interactivity associated with the emergence of an interactive cinema, this work space explores particularly relations between game and his relation with video narration. The association of "game play" with the video writing offers a transformed space by the new spectator space, in wich the game allows the appropriation. It draws a new relation between game and cinema/video suggesting questions as for results of those interactions.

Version Breath me out

On the screen two loneliness evolving symmetrically, two lost souls in captivity in the hard of a heavy shanghai atmosphere. The film - slow and meditative - functions like a counterpoint with the pong game - nervous, connected, active. The players will read the film differently, will meet differently through the images, if they play to win or evolve in synchrony on both sides....up to them to choose their objective.



Video pong at Future cinema festival - Quebec 2007



Video pong at Villette numérique - Paris 2007

Loosening limits

Luis Ricaurte, Visual Artist
Independent Artist
a_rasdepiso@yahoo.com.mx

Jaime A. Tamayo Gómez, Curator
Independent Artist

Searches in the development of a experimental aesthetic

LUIS RICAURTE is an artist born in Colombia and now a Mexican citizen. He has two Master's Degrees, the first one, in Fine Arts from the University of Illinois, U.S.A., the second one, in Plastic Arts from the Instituto Departamental de Bellas Artes, from Cali, Colombia, and he worked on a Master's Degree in History of Art in the UNAM, in Mexico City. Based on this firm education, he soon obtained a place within the New York artistic circuits, performing a number of exhibitions in the Mangel Gallery.

Time later, attracted again by his Latin-American roots, he moved to Mexico to obtain the Master's Degree in Art History by the School of Philosophy and Literature, of the Universidad Nacional Autónoma de México (UNAM). From these experiences, he strongly got closer to the richness of the different artistic and cultural manifestations flowing in this country, specially the graphic, which happened to mark his experience and perception on art, arousing his interest for taking part in the artistic movement of Mexico with a series of works of graphic creation.

The deep and broad creative expression of Ricaurte has been directed towards an aesthetic experimentation and to a theoretical reinforcement, through an "experimental aesthetic". Searching for new alternatives--- experimentation, theory, and technique experimentation in graphic, lead to Ricaurte to create, in the year 2003, the Taller de Experimentación Gráfica. This is a place where artists and new technologies converge, allowing the expansion of the limits of the creation through of the redefinition of these.

In this way, the daily construction of his knowledge in his work, becomes into one of the main initiatives of the experiment plastic, from which the main result it is constituted by his work in the last ten years, with different techniques and supports in the graphic language, printing paper procedures, and varied forms of incidence of model materials, together with the methodological development of his searches. Finally, under those circumstances, his artistic researches leads him to the technique he called Lasergraphy, in which the image is totally digital, observing processes of high tech..

Technical contributions to the language of the graphic

I

The possibility of materialize forms by using inks such as chrome, made possible that Ricaurte constructs images by processing the cotton paper through different techniques, such as digital printing in order to integrate it, afterwards, as an intaglio and to proceed to oxidize it with nitrates, in order to undergo the artistic piece to a constant change, as well as the devastation of this one through of the incision of laser, creating dimensions inside the image and textures of daring characteristics, as well as exentric formats which allow that the paper stop being so-called "blank page", that demonstrates the possibilities of clear and

obscure tones, for being a part of the composition, not only in relation to the perspectives led to the texture, but to the new dimensions in terms of color due to the combustion of the constituent material.

II

His creative system is based on drawing, as well as in a total process in terms of digitalization. This is due to the suppression of traditional materials towards the integration of the image, using technology like the PENNPAT. Hardware and the software can give him diverse tools, expanding the possibilities of creation, getting into the digital language with total conscience of it, taking the pixel as raw material of his work, and leaving out the useless comparison to the "analogous". He also introduced the development in the application of other technologies, such as digital printing, using ink of chrome in the construction of images. This by means of a series of process and its application to the color image, digitally designed through affections of procedural kind, like the application of acids and diverse pressures on the torculo and immersions into different liquids with different intentions, from the possibilities of printing with traditional inks, (which, when they are moistened with water, allow a better retention of ink), to the affection with acids that will oxidize, in some time, the first ink layer of chrome. Graphite, through the digital pantograph, allows that the digital draw, made up of pixels appearing as lines, find the exit with a specific form with the use of these technology, allowing a stronger dimension to the line. Lasergraphy, technique created by Ricaurte, deserves a special chapter.



Luis Ricaurte drawing Profilaxis

III

To approach the process that originates the image from the photographic opens the door in order that new forms of interaction develop inside the languages. In this way, the visual and the plastic are intermingled to construct complex forms of epistemic and semiotic development of the idea, generating creative phenomena according to the complex thought of his time. So, in this form, a development of the hybrid processes has been initiated in the creative construction of his aesthetic objects that have allowed the captation of the light inside the xylography technique. The nature of the historical technical work of incision by gouge to create clear-dark possibilities of the textures is limited in this form of work, so the work developed by Ricaurte

changed drastically---positively--:inside the incision of the wood to the thread, it is been taken advantage not only of the texture of the threads, but also in the pixel of the image, as well as the image textures inside themselves, being a process that has contributed to revolutionize the graphic worldwide.

IV

The formats in which Ricaurte forms his work are of a continuous heterodoxy, his possibilities and knowledge for composition have allowed him to dominate the possibilities of working in diverse formats, from the miniprint to murals with diverse techniques. In traditional printing, Luis Ricaurte has realized, using tórculos designed ex profeso, printings for artistic work, all of them created in the Taller de Experimentación Gráfica, place where is possible to obtain printings of 17 linear meters and 32 square meters, which from a digital o traditional point of view, are special in terms of using space. These pieces have been exhibited in different places throughout American Continent by means of xylographical characters or formats of direct digital printing in monumental size.

V

The non stop incursion of Ricaurte in the path of obtaining new technologies, has allowed a new utilization of novel publicity techniques in graphic arts.

In his experimental daily he has new possibilities as the “the fifth wall” concept, that means to use the floor to exhibit the artistic graphic work, done from drawings of big formats duly cartridge shell treated are placed on the floor, to be walked by as it happens with rugs, from a speech achieves the debunking of the artistic object and the master piece, so the icons of the Art History speech, which dominates the Occidental and Cristian World as the measure that determines what and who do art, from the fetish and the uniqueness of the work as representation of its axiológico value determinant in the consideration of it as art as art and its superiority in opposition to another aesthetic manifestations called “popular”.

VI

Since three decades ago, the forms in which the graphical image has been constructed from technology are under discussion. Nowadays, the problem keeps being if form is more determinant than substance. Due to the contribution of the searches in technical solutions by means of the language expansion to develop the graphic work, Ricaurte make to prevail in his work the speech of the conceptual matter, where the synthesis of form and substance creates a balanced dynamic. Then, we can already talk about specific pieces where these concepts reach harmony and completeness.

Laserxilography

The possibilities of the materials and their limitations have been explored throughout seven centuries, the forms in which this is modified by means of elements that allow the devastation it is this and his forms of devastation, the wood as support has been excellent the historical way for the engraving, to the degree of being calling it the clearest office of the plastic arts for any type of "trick" not to allow in it to indemnify misprints, provided that the know-how of the engraver was put as supreme value of the aesthetic fact, this affirmation caused two things: one was the search of technical development as for the traditional method and

other one, a severe resistance to the possibilities of developing technology that was allowing to search the expansion of the limits of this plastic form.

Luis Ricaurte concient for his theoretically training of the language and artistic technologies that the conceptual weight of the ideas and the technical forms has to look for a balance and free of the historical prejudice of the idea of technical skill as the unique value, he looked for tools of incision since in his time the varillas of the umbrellas was used to affect in the plates, being with the reuter lasser as a tool more for this fact that thsnks to the software and the possibilities of use can be used to the aesthetic creation that nowadays continues with the develop by this artist.

Nevertheless it is not necessary to lose of view that the image formation derives from a conceptualization, the tool is only a way as in a moment were Zalce's rods to devastate the counterfoil.

Thus the xylographic images receive another sense and the technical language is renewed adding to traditional tones, plots, and brightness, likewise the development of hybrid elements developed from the images of character or photographic origin



Lasser on wood

Development of materials and supports has allowed the integration of these ones into searches of forms in which is transformed the use of caloric tool, such as printing images---through direct heat---on paper fixed previously to different surfaces, and in this way to extract the pictorial values contained on it. All this is due to a previous pigmentation and the result of applied ignition, like in some series of works such as LooKumi and Profilaxis.

Another example is the transparencies integration and diverse depths of devastation on cotton paper to produce or to provoke the effects of depth and luminosity needed in a way that allows the appreciation of the richness of color blending that takes the piece from laser incision.

The development of the searches of Ricaurte are related with several directions which have persisted in his work, mainly towards the possibilities of technology in the artistic work, and the reflection about the

conceptual essence of language inside all this process. The interest about social matters through human forms---based on a firm poetic--- has the basis of the drawing work: in fact, all the his work its determined by drawing as a conceptual form. Finally, we have to remark that the plastic and conceptual education is his possibility of resolution inside a phenomenon created by himself, using technology as a tool, not allowing that his fascination for technology transforms his work into a vain illustrative exercise.

In the same way, the development of this technical application has allowed to extent the horizons in graphic, setting it as one of the more contemporary art, and in a contextual process of total vitality.

The constitutive forms of video by means of the possibility of creating many layers, resemble the form in which the image is developed in an engraving or printer. Thus, all these tools and languages are subjected under a conceptual perception and theoretical tools for the construction of the image, in order to create diverse combinations where texture, time and light are mixed elements through their design, in order to evocate a poetic where experimentation is less important and opens diverse discursive paths, from metaphor to chronology, and that at the same time make to prevail concepts in a kind of synthesis of language.



Luis Ricaurte and back Profilaxis work

Lookumi

In a series of work called LookUmi, Ricaurte developed his idea during his stay in Cali, Colombia, where Afro-American culture and African ethnics, still persist on assuming into their names the surnames as Lucumi or Carabali, and its very peculiar way of assuming their eroticism. Thus, Ricaurte works with a series of characters that subdue to his own vision, making them to enter into a game under the ambivalence of a object of pleasure and the subject of the same pleasure, leading to a whole society gets into the dynamic of thinking about the body and its eroticism, evoking the poetic developed by his world view.

Dark Kiss

In the diverse forms and styles of representation of the human body in the East World, nude has a place of glory and splendor for artistic work. However, the interpretations from the power and its cannon of beauty reach and put under the racial prejudice the aesthetics of other places.

The representation of the wife in the Song of Songs seems secret and usurped for the idea of the mystical sensuality in a white virgin. We know that the Song of Songs is a poetic piece dedicated to the Saba's Queen, woman of obscure skin who captivates to the biblical poet, to whom the Judaeo-Christian culture, in this story, becomes in the most wise man of the world, who is taking in by his own passion and ends becoming into a simple and common man. The woman turns into an object of desire, now mythical, of Solomon, probably his great treasure.

An example of the fascination for the cultures of ebony is certainly the presence of the African cultures in the American Continent, and also the form in which they represented the accidental forces of nature, establishing the santería and the "Palo Mayombe". The languages Lucumi or Yorúbá are used in prayers and invocations for blessings of saints and the dead.

Sensuality is one of Ochun's attributes, called Orisha Mayor: owner of the sweet waters, rivers and springs. Orisha of the feminity, sensuality, memory and love. Goddess of honey, gold, beer and money.

Probably the main attribute of the black races is the exuberance in all their senses, from his genotype, nearness and congruity with nature to her attraction for jewels and colors.

Luis Ricaurte does not hide his constant fascination for the third root, a culture- form of expression which prevail in first place in the integration of his work. The sensuality of the feminine forms, with the possibilities of his outline and the technical resources inside engraving, the lenticular and video projection, create a speech based on the dynamics inside the graphic, and certainly the new limits of xylography, results of his searches and findings. His passion for the Afro-Caribbean thing determinates his dialog with "the other", in the construction of a imaginary of mirrors, of mystical-earthly origin in the poetic-sensual matter.

The supremacy of the results happens already into an intercultural poetic, in which the mythical look and the digital order are affirmed into the Eros.



Work from the serie Lookumi/Lasergraphy on paper



Work from the serie Lookumi/Lasergraphy on lenticular

OverCrowds

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Abstract

“OverCrowds” is an interactive installation consisting of a system for simulation and rendering of large 3D crowds, in real time, with various different high level behaviors and animation, using a crowd counter sensor system. Crowds recreate several different behaviors, such as flocking, congregating for a protest, following a leader, or taking the colors of flags or Warhol’s Mao paintings.

Crowd Simulation

Simulation of crowds of agent-based characters has many different applications. For example, in architecture, a simulated crowd of autonomous characters may provide valuable information on the capacity of the building and of its access routes. Crowd simulations can also be used to evaluate the success of different strategies to evacuate and assist people in the case natural disasters, such as hurricanes, tsunamis or earthquakes.

Large crowds of characters are also becoming common in motion pictures to convey the illusion of grandeur in epic scenes. A scene of ancient Rome may produce a different impression when a few persons are present than when the population of the entire city gathers to receive a victorious army.

However, the simulation and rendering of such large crowds presents a problem of enormous complexity, which is usually solved by setting a dedicated cluster of computers for a few days to render these scenes. Resources are more limited in videogames and other interactive applications such as interactive art installations, where a single computer or console must update and render both the environment and the characters in just a few milliseconds. Hence, the use of crowds has usually been restricted to a few hundreds of characters. Many simplifications have been proposed for crowd simulation.

For example, instead of evaluating the behavior of each character, the behavior of the entire crowd has been simulated using abstractions such as fluids or particles. Nevertheless, these techniques have enormous difficulties in defining characters with individual goals and objectives, and are thus not suitable for many purposes.

Many different approaches have been used to simulate groups of characters sharing a common behavior. Perhaps the first paper in the area is one introducing “boids” by Reynolds [Rey87], where the overall motion of a flock of boids, or birdoids, is produced from a small set of local rules. This work has been widely extended, achieving interactive rendering of up to 15,000 characters in modern gaming hardware [Rey06].

Since then, crowds have been simulated in many different ways. An interesting concept is social force [HM95], which models pedestrian movement as a combination of different force fields, guiding pedestrians to their goal while attracting them toward objects of interest and keeping them away from obstacles and other pedestrians.

Another possible approach to simulate a crowd is using grids or maps to specify different attributes from the environment. Tecchia et. al. [TLCC01] used different map layers for collision avoidance, attraction, repulsion and to specify custom actions. Treuille et. al. [TCP06] used discretized potential fields to conduct a crowd through an urban environment. While characters cannot be individually controlled using this approach, as their behavior depends only on their location on the scene, combining information from different maps may result very useful for agent-based approaches.

Finite State Machines, or *FSMs*, are simple rule-based systems which consist of states and transitions [Toz02], where agents perform particular actions within a state, and switch to a different state when a transition is triggered. FSMs are popular for agent-based characters, as they are easy to program, to understand and to debug [Rab02]. Different variations of FSMs have been used for crowd simulation; these include describing high level behaviors using hierarchic FSMs [UT01], using hierarchic and concurrent FSMs to select and combine actions [CKP95], and using a hierarchy of FSMs to control crowds, groups and individual agents [MT01], or using a combination of hierarchic and probabilistic FSMs to control crowd behavior [RM05]. FSMs have also been used to produce more realistic animations for characters, synthesizing motion from motion capture databases [LK05,SKG05].

Graphic processors have increased their speed to become a great alternative for general purpose computations, and there have been some attempts to use this additional power for crowd simulation. Some path finding techniques have been programmed using a discrete propagation technique in cells between the initial and the destination points [Hen04,Ly04]. Boid behavior has been programmed on the graphics processor, including dynamic obstacle avoidance, within a 3D environment [DEST04, DES06]. Information of the flock is stored in textures, and four rendering steps are used to update separation, alignment, cohesion and obstacle-avoidance information. Steering behaviors are then summed, and used to produce the acceleration for each character.

We first implemented a FSM simulation on the graphics processor [RMH05]. In our approach, FSMs used to provide information on the environment. Although the simulations are extremely simple, the results presented show that a simulation for a crowd of over 260,000 characters runs at 137 frames per second. It allows a user to interactively simulate and render large crowds of characters using existing graphics hardware where each character in the crowd was simulated by a finite state machine, allowing different reactions for different characters in the crowd. Behavior of this finite state machine was affected by a single world map. Finite state machines were then evaluated by the graphics processor using a combination of image maps and shader programs (Figure 1).

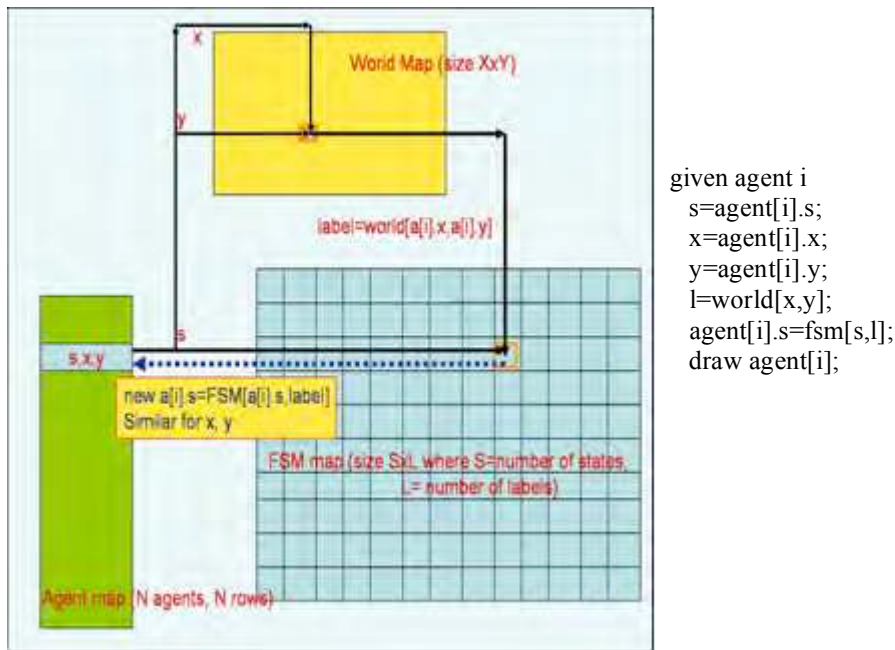


Figure 1. Basic mechanism involving agent, world and FSM maps (left). FSM evaluation algorithm (right)

In addition, we showed that it was possible to interactively render such large crowds using certain level-of-detail techniques [MR06]. While these results seem promising, the complex process of manually creating FSM maps and shader programs for a custom simulation reduces the usability of this approach. Creation of FSM maps involves pixel-by-pixel editing of custom images, which results too complex if more than three states are required for a simulation. Furthermore, this approach lacks the capacity to use and combine different sources of information from the environment within a single FSM simulation. A simpler way to design this FSM map, as well as a mechanism to evaluate custom FSMs and to combine information from different sources in the environment would greatly improve the benefits of this approach.

Automatic Translation

We developed the use of a scripting language (in XML) to configure a generic Finite State Machine engine running on the graphics processor. The use of such language greatly simplifies character behavior definition, making the graphics processor an alternative for simulating custom agent-based crowds. This approach also allows us to combine inputs from different image maps in a custom manner specified within the same scripting interface, making the system suitable for use by artists.

So, instead of coding FSM image maps by hand –using a paint program–, we read the FSM description from an XML script file. From this file, a set of image maps is created and loaded. In addition, a custom shader program is constructed to work with these maps. The image maps created in this process include a FSM map, which contains information on transitions for every state in the FSM, as well as a weight map, which specifies how world maps affect the resulting behavior of each character according to its current state.

The custom shader program produced specifies how information from world maps is to be combined both to select the current transition from the FSM map and to produce the resulting action for each individual character. Once the script has been compiled, the simulation starts by updating all of the world image maps that are affected by the crowd simulation. Map updates are also controlled from the script, specifying which crowd will affect which map. Then, using the custom shader for the script that has been automatically created, behavior simulation is executed. Using the current agent state and position, world maps are queried. Based on these queries, and on the current agent state, a transition is selected from the FSM map, and a new state is picked. According to weights in the weight map, information from the world maps is accumulated, and produces a position update for characters. Finally, these new positions for characters are used by the rendering process to identify the detail at which each character is to be rendered and to display it using the most suitable technique.

Our scripting language defines three basic types of objects. First, a set of world maps are defined. World maps describe the properties of the environment that characters check to modify their behavior.

These maps can be colored label maps, where each different color will describe a particular label, or gray scale maps, that may contain different thresholds to specify certain conditions from the environment. Labels and thresholds may be used by a particular finite state machine to trigger specific transitions on the FSM maps. In addition, a set of gray scale maps can be combined to specify the speed and direction an agent may move when in a particular state. In this case, individual maps are provided for x and y components of such speed.

The second type of objects defined by our language, are finite state machines. A FSM will first make reference to all maps that are to be used to trigger different transitions within the FSM and to specify the motion of an individual agent from the crowd. Only the included maps will determine the size and contents of both the FSM map and the weight map for a custom simulation, as well as influence the resulting shader program that will evaluate such FSM. This will produce more compact FSM and weight maps than using all of the provided world maps. After setting up the maps used by a FSM, states for such FSM are specified. Within a state, a set of transitions are included. These transitions should be preceded by one or more conditions, where each condition may refer to a threshold or a label from one world map referenced by such FSM. Transitions will only be triggered if all of the preceding conditions are satisfied.

```

<ggpsim>
  <map name="avoid" type="potential" res="256" >
    <render crowd="crowd1" />
    <threshold max="0.2" name="away" />
    <threshold max="1.0" name="close" />
  </map>
  <map name="soil" type="label" src="soil.kmp" >
    <label color="155,0,0" name="red" />
    <label color="155,255,0" name="yellow" />
    <label color="4,255,0" name="green" />
  </map>

  <fsm name="prey" >
    <usenap name="soil" />
    <usenap name="avoid" />
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      <move dx="-1" dy="0" />
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    </state>
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      <condition nap="soil" label="green" />
      <transition state="left" />
      <move dx="1" dy="0" />
      <escape nap="avoid" weight="1.0" />
    </state>
  </fsm>

  <crowd name="crowd1" type="prey"
    width="128" height="128" >
    <model name="gangster" model="gangster.md2"
      texture="gangster.kmp" size="0.5" />
    <imposter src="gangster_run_64.kmp" back="255,255,255"
      slices="16" stacks="8" res="64"
      frames="8" size="0.5" />
  </crowd>
</ggpsim>

```

```

uniform sampler2DRect agents;
uniform sampler2DRect fsm;
uniform sampler2DRect state;
uniform sampler2DRect maxspeed;
uniform sampler2DRect soil;
uniform sampler2DRect avoid;

void main () {
  vec4 agentLookUp =
    texture2DRect(agents, gl_TexCoord[0].st);
  vec2 agentPos = agentLookUp.rg;
  float agentState = agentLookUp.b;
  float agentSpeed =
    texture2DRect(maxSpeed, gl_TexCoord[0].st).r;

  float soilValue = texture2DRect(soil, agentPos).r;
  float soilQuery = soilValue;

  vec2 avoidValue = texture2DRect(avoid, agentPos).rg;
  float avoidAbs = abs(avoidValue.r) + abs(avoidValue.g);
  float avoidQuery = 0;
  avoidQuery += step(0.200, avoidAbs);
  float fsmCol = soilQuery + 2 + avoidQuery;
  float nextState =
    texture2DRect(fsm, vec2(fsmCol, agentState)).r;
  float soilWeight =
    texture2DRect(state, vec2(0, nextState)).r;
  float avoidWeight =
    texture2DRect(state, vec2(1, nextState)).r;
  float deltaX =
    texture2DRect(state, vec2(2, nextState)).r;
  float deltaY =
    texture2DRect(state, vec2(3, nextState)).r;
  vec2 deltaPos =
    vec2(deltaX, deltaY) + avoidWeight * avoidValue.xy;
  gl_FragColor =
    vec4(agentPos + deltaPos*agentSpeed, nextState, 0);
}

```



Figure 2: Example script for a simple crowd simulation and its translation.

A state also contains a set of commands that will change the position of agents in that state. These position updates may be given in absolute x, y coordinates, or using the directional information contained by one of the world maps referenced by an FSM. Position updates from different maps may be combined by assigning a different weight to each contribution.

The third type of objects are crowds themselves, which are defined specifying both the behavior and graphic representation for characters within such crowds. An example script and its translation to a shader and associated images can be seen in Figure 2.

Counting Crowds

It is impossible to accurately know how a crowd is behaving and how many actors are involved in this behavior, in order to relate a numerical value to the human activity in the crowds we designed a system to capture and analyze crowds sensing and people in the crowd. The human body generates heat and therefore radiation in the infrared spectrum. This radiation can be detected and separated from that generated by other heat emitting objects.

To detect a moving body, one can sense the changes in temperature in the environment. This can be achieved by checking the distortions in the spectrum below 700 nanometers. Using temperature sensors to measure human activity in an open area where lots of people gather is rather complex and there is a need to narrow the sensor's field of view to sense only an specific group of people in one reading. An obstruction sensor

detects when an infrared ray is obstructed by an opaque object. At this wavelength this can be sensed easily with emitters in the range of 930 nanometers, but it is a technology that can't delimit movement or be adjusted to detect only passing humans. Usually counters modify the behavior of the crowd to do their job and use motion sensing instead of heat sensing to register each user, in our application we did not want to interfere with crowd behavior, so we developed our crowd counter to be inconspicuous but effective.

Two such sensors were designed. The first crowd sensor works by discretizing the phenomena of a crowd by sending out a pair of infrared rays that when interrupted give the system feedback. By emitting the infrared frequency modulated at a particular frequency, one can recognize the people passing through by measuring the distortion of the wave received as compared with the original modulating frequency. To avoid counting only one person where a group of people that are close to each other crosses the sensor, a technique combining obstruction and SODAR was used. SODAR uses sound waves, sending very short (in the order of milliseconds) trains of such waves in succession. This causes the interaction of the waves with the thermal and dynamical structure of the environment. Sound energy reaching the detector is proportional, so one can define a function of the fluctuations of temperature on the sound waves if they exceed the range defined in decibels (in our case above 65 db to avoid noise caused by wind) for one person. One can assume that what the sensor detects is a group of people, the number being proportional to the distortion of train waves.

Our second system uses a long wave infrared sensor. It uses a device that returns a non linear voltage that is proportional to the infrared radiation received by the sensor. One can then directly trigger a counter. It is more portable but less exact. Both sensors can be seen in the figure 3. One very important characteristic of these sensors is that they preserve anonymity. They do not use vision techniques and thus they do not have the potential of identifying the people in the crowd. However, they can determine approximately how many people are detected by the system.

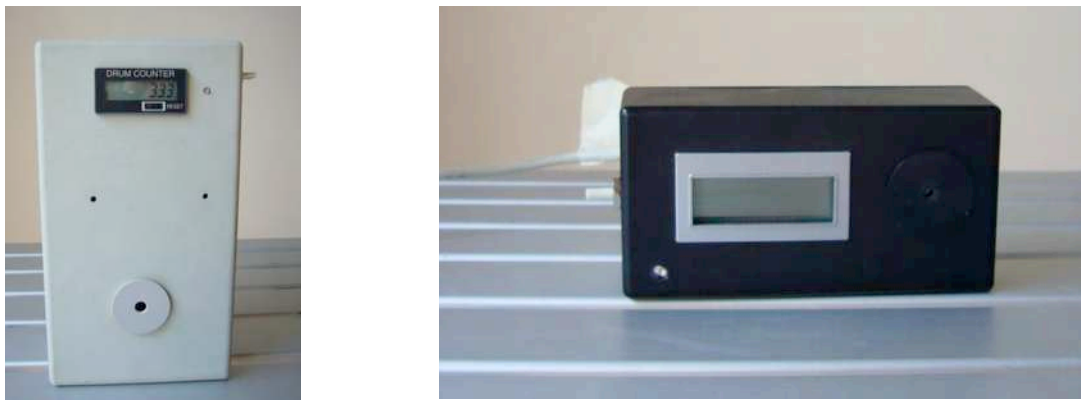


Figure 3: acoustic and long wave crowd sensors.

Artistic Description

Human crowds have been a seldom explored subject in visual arts, at least in a direct way. They are usually associated with political, religious, sporting and musical events, or mass transit systems in cities. But crowds can be seen in at least two ways: from a naturalistic perspective, as the behavior of a certain species, and as a social organization involving culture. From the naturalistic point of view, typical crowd behaviors such as following a leader, agglomeration and dispersion, the random way in which public space is approached, the transgression of proxemic rules, seem to obey obscure, unexplored criteria, that don't emerge at the social

surface except during catastrophic events. More and more, cities are sprouting cameras, vigilant, given the fear crowds cause to political systems.

Who do crowds belong to? What are they really in terms of species? Are new behaviors generated?

Crowds seem to be subject to the continuity of culture that is to the taxonomies of use and traditions of all cultures. In any political system, crowds behave blindly, at a certain impasse between what remains and what must change, that can't be resolved or even reasoned. They can bring down a whole system of government, or remain indifferent to the atrocities of the said system.

“Crowds” alludes to these subjects. It focuses on biological behavior through computer graphic simulation. It is a metaphor of daily life in cities like Mexico City, capturing crowds in the street through sensors, transporting them to an international political landscape. It is a citation of the world population, 75% of them congregating in cities.

As an installation, the piece requires a computer with a DX10 compatible graphics processor, a large flat screen or projection, and a custom sensor that acquires crowd data online, in situ or offline, in the street.

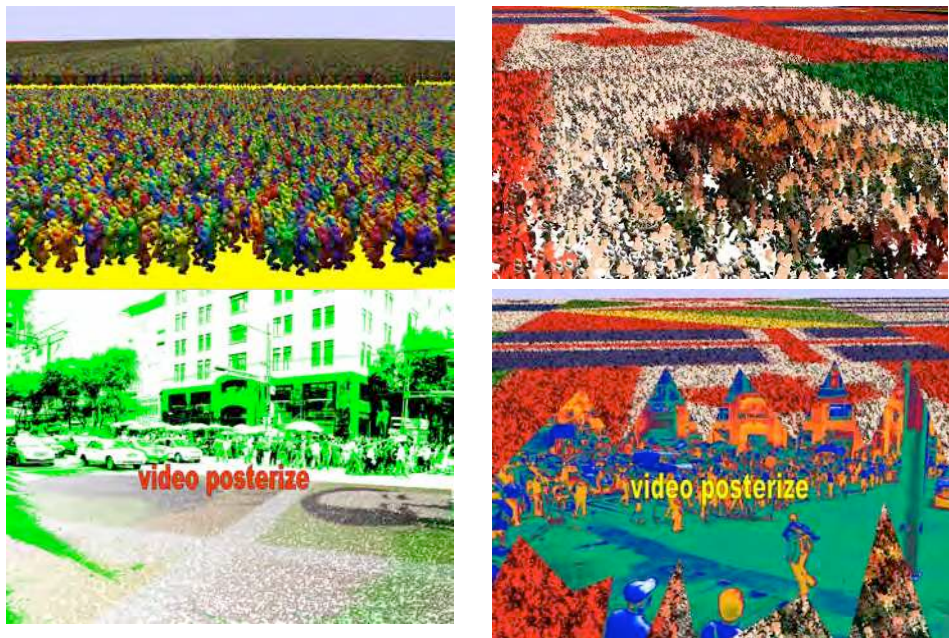


Figure 4: Previsualization of several scenes

The visuals in the piece are of two kinds:

1. Processed video of downtown Mexico city streets: one of the worlds most populated cities

2. 3D simulation of crowd behaviors affected by the sensor. The subject follows the political and social angle that characterizes crowds. Therefore the Zocalo in Mexico City, and Tiananmen plaza in Beijing, is used.

We use these crowds to recreate several different behaviors, such as flocking, congregating for a protest or meeting, following a leader, fleeing from police. Also, large crowds, of up to a million characters, filling the large plazas mentioned above, while moving about in real time, and taking the colors of flags or Warhol's Mao paintings. We chose this as a symbol of China being the most populated country in the world, and that, as we mentioned, simulating the behavior and rendering large crowds such as these is still a challenge for real time simulation.

A previsualization of the kind of scene can be seen in the figure 4.

The installation

Large crowds of characters demand a large amount of computational resources. Since "OverCrowds" consists of several scenes each involving different, potentially large crowds, a set of screens and screen transitions were incorporated into the application using a slideshow analogy to avoid displaying and simulating all crowds all the time. XML tags were used to control these screen transitions. Using this slideshow analogy, screens were handled as slides.

Each screen was capable of displaying and simulating a different number of scenes, where each scene would portray a crowd simulation. While all crowd simulations are initialized with the application, not all of them are simulated all the time. Instead, only those scenes shown are simulated and updated. This maintained a constant frame rate within the application, and sped up screens where only a few scenes were rendered.

Screen also includes custom images that are used to enhance the appearance of the presentation. Continuing with the slideshow analogy, screens change using screen transitions. These screen transitions control flow of the application. There are different ways to trigger these transitions, such as pressing a key on the keyboard, waiting a certain time, clicking on a certain area of the screen. Some transition effects were incorporated to enhance the appearance of such transitions.

From the initial screen, it is possible to navigate towards the different crowd scenes, that, for the moment include the following:

1. groups following different leaders
2. crowds congregating at a meeting point while avoiding certain areas
3. the Zocalo of Mexico City with crowds forming a tapestry of different flags
4. Tiananmen square with crowds forming a tapestry of Warhol's portraits of Mao
5. flocking, with the number of crowds increasing in proportion to the numbers of people counted by the sensor mentioned above

The general screen and several scenes with different behaviors, some of which may be used for the final version of the installation, can be seen in Figure 5.

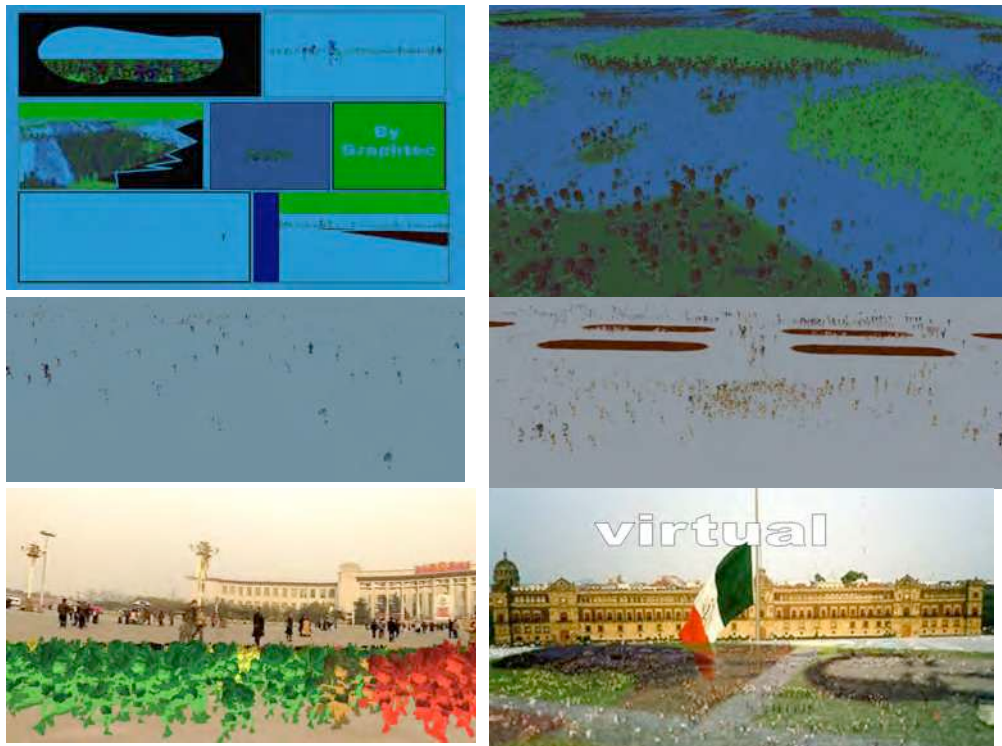


Figure 5: Several scenes from the simulation

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More information on work by this group at
<http://rudomin.cem.itesm.mx/~rudomin>

A video presentation has been uploaded to
http://es.youtube.com/watch?v=_WIEISXNnrM

SAE-GURIMJA: Three shadows

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Description of Artwork

세그림자SAE-GURIMJA is a Korean word meaning “Three Shadows.” It is an interactive art installation, playing on three different concepts of shadows: (1.) Traditional shadow cast by the human body (2.) Broadcast shadow through video camera, cast by sand painting (3.) Digital shadow, projected images of virtual interactive puppets. The shadows are created by three different processes and techniques, but shown on the same screen in the context of shadow and ritual. Sae-gurimja is a stage for shadow play between different generations of techniques and processes. It is a platform for collaborative storytelling between different media, traditional and digital, and different roles, such as storyteller, virtual puppeteer, background painter, and human shadow player.

The process of casting shadow is different for each of the three shadows.

The first shadow (see Figure 1) is directly cast from human body onto the screen. The following images came from a previous project “Experimental Virtual Wayang” (see Figure 6), a contemporary translation of a shadow puppet performance, which used Indonesian shadow puppets as a source to cast the first shadow [1]. In Sae-gurimja, the first shadow will be a silhouette of the human body, instead of a puppet.



Figure 1: First shadow

The second shadow (see Figure 2) is cast by sand painting, then broadcast from camera to computer, and then projected as a background of the puppetry, which is a digitized shadow from a traditional medium.



Figure 2: Second shadow

The third shadow (see Figure 3) is what we call the “Digital shadow,” a virtual interactive puppet, directly projected onto the screen, generated by computer. The digital shadow passes from binary information to virtual forms, whereas the traditional shadow has a reverse process, from form into binary, which is black and white information.

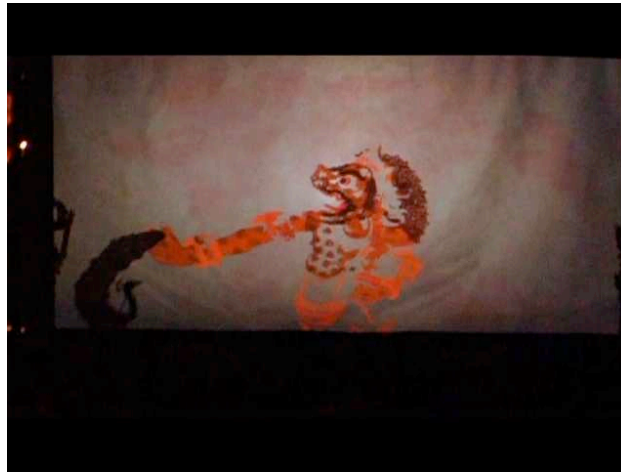


Figure 3: First + Third shadow



Figure 4: First + Second + Third shadow

Creating a collaboration between three shadows (see Figure 4) on the same screen, this project brings the digitally projected image into the context of shadow and ritual.

Sae-gurimja was inspired by the idea of shadow in Javanese shadow puppet theater, “Wayang Kulit.” Wayang Kulit is one of the most ancient forms of puppetry, storytelling, as well as ritual [2]. There is a belief in Wayang Kulit that a certain type of ritual and offering should be involved in the process of crafting puppets, in order to cast clear silhouettes of puppets onto a screen [3]. The shadows of Wayang Kulit are considered spirits of the deceased, in keeping with the traditional Javanese animistic belief that everything had a soul [4]. Wayang Kulit functions as a ritual for calling spirits to ask advice or help in overcoming problems related to disharmony, and to bring balance between positive and negative forces of the community [5].

In this context of ritual, the puppeteer (“dalang”) of Wayang Kulit plays the role of shaman. The shadow puppet is not a doll. It follows the dalang, but the dalang must also follow it [6]. He gives it soul, and it, in return, gives life to him. Such spiraling transformative relationship can be translated into human-computer interaction in a computer-mediated environment [7]. The position of puppeteer is replaced with that of users in Sae-gurimja, providing intuitive interactive devices such as microphone and Wiimote (Nintendo Wii game system remote controller) to puppeteers (users).

Sand painting has been also used for ritual purposes by Tibetan monks, Navajo Indians, and Mexican Indians, on the Day of the Dead [8]. The act of continuous drawing and erasing sand is integral to the process of ritual. In this project, sand painting will be shown as constantly transforming background images where digital and traditional shadow will be mixed and played together.

Sae-gurimja explores collaborative imaginary consciousness between multiple users, crossing over traditional and digital means, in the context of shadow and ritual.

Technical description of Virtual puppet interaction

The virtual puppetry distributes its interaction to two puppeteers’ stations: a Wiimote station for position detection and a microphone station for voice input.

At the Wiimote station, virtual puppets were fitted with infrared units (see Figure 5), which will be monitored by a motion and position detection system. This system then communicates with a three-dimensional computer graphics system which will project virtual puppets onto the screen.

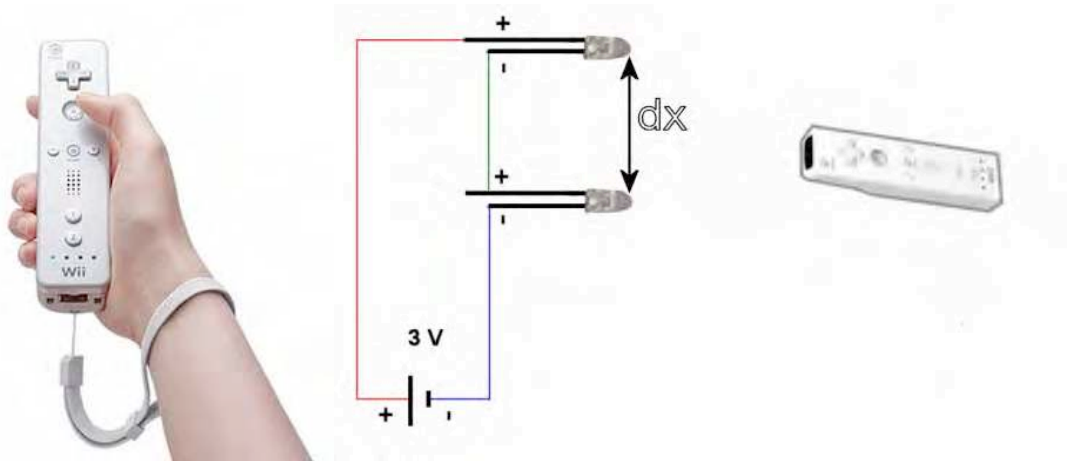


Figure 5: Wiimote + Two infrared lights

The Wiimote controls virtual puppet orientation, puppet position (x,y,z), puppet action (breathing fire, raising an arm, etc.) and character selection. The coordinates of puppet position are estimated by tracking two infrared light sources using the Wiimote infrared camera feature. In particular the “z” component is



obtained by measuring the distance between the two tracked infrared light sources. In this project, we use candlelight for the infrared light source, to create an intriguing connection between fire, shadow and technology.

At the microphone station, the puppeteer will be able to change the appearance of the virtual puppet, such as color, size, motion, and mouth movement, based on his/her own voice speaking into microphone. Any sound input coming into the microphone motivates the mouth, body and facial expression of the virtual puppet on the screen in real time. The virtual puppet constantly speaks and sings back to the puppeteer, like real-time echoes and mirror reflections.



Figure 6: Still images from the “Experimental Virtual Wayang” performance. Indonesian shadow puppeteer Gusti Sudatra is interacting a virtual puppet with microphone and Wiimote controller. Sae-gurimja employs same interactive system.

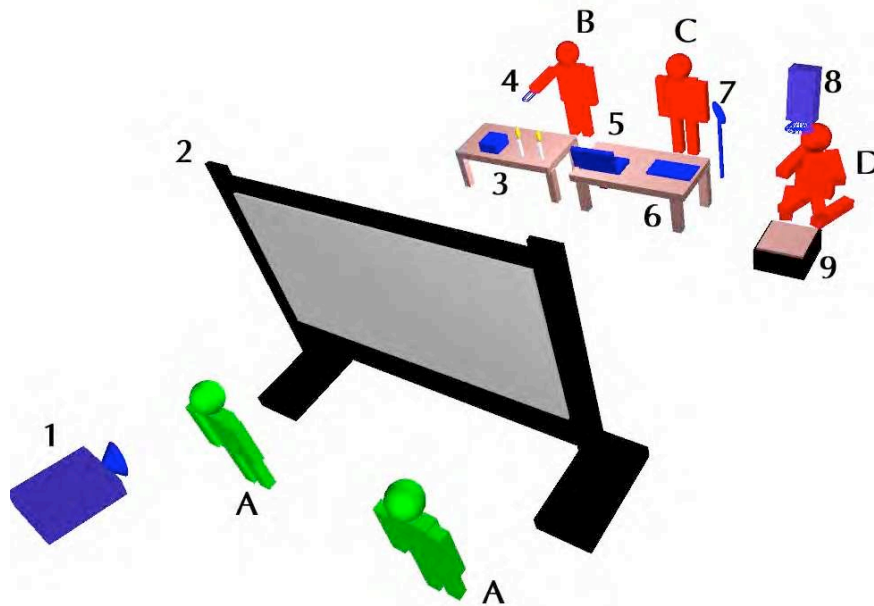


Figure 7: Installation setup

Diagram of Installation setup

Figure 7 shows the installation setup where:

A One or more people interacting through their own shadow projected by the video projector (1) on the projection screen (2)

B One person interacting with the Wiimote (4) combined with two candles or sensor bar (3)

C One person interacting using his own voice captured by a microphone (7)

D One or more people playing with sand at the sand station (9). Sand interaction is captured by a DV CAM (8). The sand station contains a lamp for retro-illumination

Component connections

To the laptop (5): (6) with audio cable, mixer out to laptop audio in; (8) with firewire cable, firewire out to firewire in; (1) with RGB cable, video projector in to RGB out.

To the mixer (6): (7) with audio cable, microphone out to mixer audio in (loudspeaker); with audio cable, loudspeaker input to audio mixer out. Candles may be used instead of the sensor bar.

Tools employed

Software

GlovePie (version 0.29) Programmable Input Emulator

Virtools 4.0

Hardware

Wii remote controller

Laptop computer with Bluetooth, FireWire

Wireless microphone

DV camera

Programming languages

Visual C++

GlovePie script

Presentation support (technical material required for exhibition)

Audio mixer

Microphone

Stereo loudspeaker

Video-projector

Audio cables connecting

audio mixer out to laptop audio input

audio mixer out to loudspeaker

microphone to audio mixer input

Long firewire cable connecting DV CAM to the firewire of the laptop computer.

Long cable (eventually needed) for power on the two infrared led.

Long cables for power on laptop, DV CAM, lamp

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Notes On Interactivity And Sinestesia: The Metatechnical Dream

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The creation of any topo-sensible path is equivalent to the construct of an interface. The dream of many interactive art creators and in general of almost all the electronic means constructors has been since years already the production of new interactive ways, and in this sense have been directed the investigators and artists reflections and productions of our contemporaneity.

In such sense, perceptual interfaces have been developed that register movement, luminosity, sound, temperature, color, scale and all that we may perceive through a video camera, a microphone or a temperature or movement sensor.

In any case, and with all the variants that have already been exploited for receiving signals - the camera and the microphone - in all the possible scales that these artifacts have been used, they have been our main sensorial support for playing producing feedback, and thus be able to shape the dynamic of a great deal of the artistic work that is being currently developed based on the interactivity notion. Interesting variants may be assessed as for example the work *Web of Life* from Jeffrey Shaw¹, in which the perceiver is directly registered by means of a scanner and not by a video camera, although always staying within the optical-luminic register.

These impressions thus captured, enter into a virtual space or software architecture wherein they carry out a true route through its topo-sensible grammar, routing through stations in which morpho-semantic aspects are deposited that return to the space where the interface is located, being audio-visually projected as the interaction actor's facts, that in a co-author casting fashion, is delighted into the immersion of his own and subjected entertainment.

On the other hand, we investigate the sinestesia complexities as from the music and visual arts territory; we formulate questions and reach nearness to the senses territory in the wonderful world of what we are.

It powerfully calls our attention David Rokeby's work *Very Nervous System*, in particular a publication of his own regarding this matter entitled *Dreams of an Instrument Maker*², from which I shall cite the following fragment:

¹ Network installation with Michael Gleich, Lawrence Wallen, Bernd Lintermann and Torsten Belschner. The audio-visual environment "Web of Life" is formed by an immersive conjunction of projected three-dimensional computer graphic and video images, together with a fully 'spatialized' acoustic experience and a specially conceived architectural surrounding. The visitor interactively influences the performance of the audio-visual environment by imparting to it the unique patterns of his individual hand lines, thus giving symbolic and experiential expression to the action of connecting oneself to an emergent network of relations.

² <http://homepage.mac.com/davidrokeby/dreams.html>

Dreams of an Instrument Maker - (published in MUSICWORKS 30: Sound Constructions, Fall 1985)

“He dreamt again: he dreamt that his wife was pregnant, but what she gave birth to was an instrument. Playing this instrument was rather strange. It did not seem to require any technical skills yet it was not an easy instrument to play. Like a snake, it would coil itself around the hands that tried to play it... You had to wrestle the music out of it.

An instrument contains a large number of simultaneous sound possibilities. Music is conventionally, an established sequence of these possibilities strung out through time. Somewhere between music and instrument there exists the possibility for a kind of labyrinth of sound, where there are many possible paths through one composition... “

The will of power and the thirst of knowledge, united to the ethic of an aware life, are orienting the creative strength of many artists towards the conception of algorithms that imply the virtual construction of processes, in some cases of a definitive anthropomorphic patent, by means of the implementation of interface designs that upon exhibiting their entertainment dynamics, profile themselves as specular spaces in which the questioning's last sense towards our alienated immersion ways in the use of the means, almost always remains dazed by the noise of the entertainment itself, although when watching works such as Rockeby's, we may renovate our faith in a certain sense that we are going through the dawn of a new age in which, the trans-disciplined Telematic craftsmanship of some of our most distinguished artists *creators of interactivity*, is a right way towards the rendezvous of a medial ethic in which each time, with a major impact, turns truth the necessary sense of a solidarity and love life beyond any questioning thereof.

In addition thereto, in this Rokeby's³ publication, I find that exactly in the instruments creator's dreaming, begins to shape a sort of an active-unconsciousness, such as the previous stage to the revelation or epiphany, of certain substantiality similar to the tinnitus (*acúfenos*) phantom⁴, which could be part of the raw material of all our sinesthetic musicality.

The tinnitus phantom - that in the West is considered the symptom of an almost certain physiopathology - in the East has for millennia been the way of access to the origin of the body's electroacoustic musicality, as well as the fundament of much older teachings that since time immemorial are imparted to access to the meditative experience.

It's evident that the nature of the tinnitus (*acúfeno*) phantom, in certain cases in which there exist clucking or damage of other nature, in the audition system it turns into a traumatic and desperate experience, reason for which from now on I shall refer to that *acúfeno* as **the one that is not heard**, unless I learn and understand how to re-addressed and concentrate *attention* in order to perceive it.

³ Rockeby, D. *ibid*.

⁴ Estimations are made as to that between 10% and 17% of the world population suffers tinnitus sometime in their lives, as emerged from diverse international studies. As '*acúfeno*' is understood **“the noise perception in the hearing and in the head without there being an external source of sound, without registration of a clucking vibratory activity, phenomenon that occurs when an external noise is produced”** explains Teresa Heitzmann Hernández, ENT specialist from the Navarra University Clinic in Madrid, Spain. Downloaded from <http://www.cun.es/nc/la-clinica/departamentos-y-servicios-medicos/otorrinolaringologia/al-dia/noticias-del-departamento/noticia/back/27/actualidad/en-mas-de-un-80-de-los-pacientes-conseguimos-que-los-acufenos-dejen-de-molestar-y-puedan-volver-a/> on 02/12/08.

Being this brief explanation made on the instruments' dreamer, I want now to refer to the beautiful and curious metaphor that, by authorization of his teacher G.I. Gurdjieff⁵, develops P.D. Ouspensky⁶ in his book *In Search of the Miraculous*⁷, and that in its historic context he speaks to us about the possibility of using the body as electroacoustic resonance box able to be operated in order to achieve the over saturation of the body's tissues, of libidinal material, that contributes in the creation of soul, and all of this as consequence of the conscious and voluntary practice of the *autognosis as aesthetic experience*.

The said metaphor is called by his author *Feeding Diagram after the first Conscious Shock*, and is developed as follow:

⁵ George Ivanovich Gurdjieff (*Georgiy Ivanovich Gyurdzhiev* or *Gurdjiev*); (January 13, 1866? – October 29, 1949), was an Armenian-Greek mystic, a teacher of sacred dances, and a spiritual teacher. He is most notable for introducing what some refer to as "The Work," connoting work on oneself according to Gurdjieff's principles and instructions, or as he first referred to it, the Fourth Way. [1]

At different times in his life he formed and liquidated various schools around the world to utilize his teachings. He claimed that the teachings he brought to the West from his own experiences and early travels expressed the truth found in other ancient religions and wisdom teachings relating to self-awareness in one's daily life and humanity's place in the universe. [2]

His teachings might be summed up by the title of his third series of writings: *Life is Real Only Then, When 'I Am'*, while his complete series of books is entitled "All and Everything".

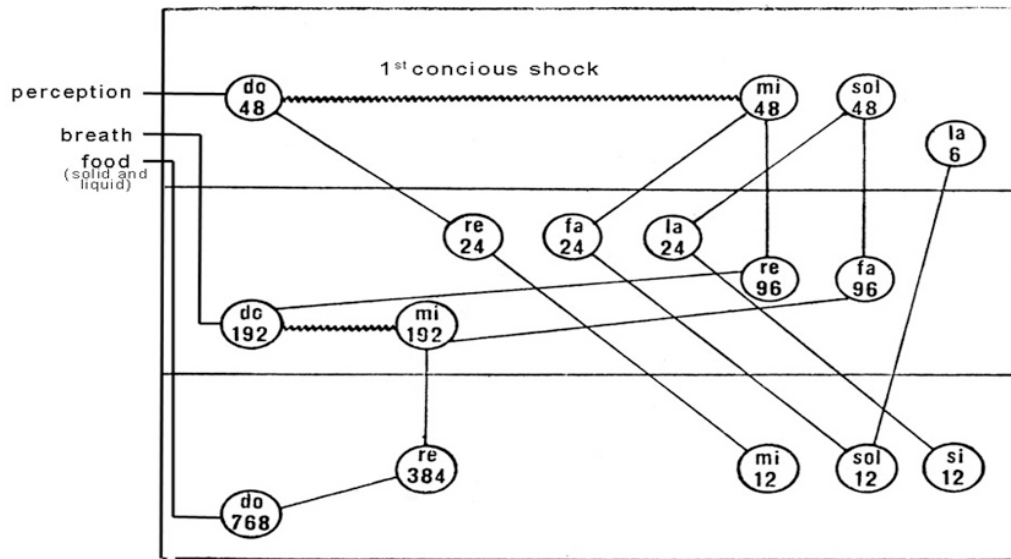
⁶ Peter D. Ouspensky (March 4, 1878, Moscow - October 2, 1947, Lyne Place, Surrey, England), (Pyotr Demianovich Ouspenskii, also Uspenskii or Uspensky) was a Russian philosopher who invoked geometry in his discussions of psychology and higher dimensions of existence.

During his years in Moscow Ouspensky wrote for several newspapers and was particularly interested in the then-fashionable idea of *the fourth dimension*.

Ouspensky is best known, however, for his expositions of the early work of the Greek-Armenian mystic and spiritual teacher G.I. Gurdjieff.

⁷ *In Search of the Miraculous: Fragments of an Unknown Teaching* (1947) by P. D. Ouspensky recounts the teachings of an individual to whom he refers only as "G.", known to be G. I. Gurdjieff, and the author's relationship with "G.", leading to his break with him. He meets "G." in St. Petersburg before the Russian Revolution of 1917 and follows him through the Caucasus mountains to Constantinople (present day Istanbul), and then to western Europe.

Originally published at the time of G. I. Gurdjieff's death and authorized by Gurdjieff, it is considered one of the best expositions of the structure of Gurdjieff's ideas on consciousness, self-remembering, the three-brained nature of human beings, and his cosmological structure of the universe as nested worlds.



The varied implications that this chart presupposes may be consulted in Ouspensky's work, but for this reading's ends, a short explanation thereof becomes indispensable.

As may be observed in the chart, G.I. Gurdjieff divides the human organism in three (3) presupposed parts that could be associated the first to the head, the second to the torso, and the third to the abdomen and hips.

Likewise, he divides foods in three (3) classes: Solids and Liquid (eat); Gaseous (atmosphere - breathe); and the sensorial impressions (perceive), to which he attributes feeding character, and as we will see they constitute themselves in fundamental value for the construction of soul by means of the aesthetic experience and the active contemplation.

It's also necessary to highlight that the nomenclature used in this chart for designing the different types of foods is based in numberings and musical notes belonging to the traditional tonal scale. The numbering corresponds to molecular densities of the gaseous element, wherefrom we may infer that at higher numerations, we will be in the presence of heavier substances, and at lower numerations in presence of finer or lighter (of high vibration) substances.

Returning to the chart, when I swallow a chicken leg accompanied of some beverage of my preference, this matter enters into my organism as a **DO-768**, and through the digestive system's mechanic action, successively transform itself (it accelerates) onto a **RE-384** and a **MI-192**.

Up to here, the digestive system does the transformation work itself, producing **MI-192** corresponding to the solid and liquid food running at this height through the bloodstream; this meaning: I still don't feed myself with the chicken leg due to that my cells and energetic centers have not yet received nothing.

At this height, the process presents a mechanical interruption related to the absence of a semitone in the tonal scale that, as may be seen in keyboards, corresponds to the missing of one of the black keys between the notes MI and FA, and between the notes SI and DO. What this means is that between these notes exists a

vibration - vectorial fall that may only be compensated by means of applying an additional energetic shock that must necessarily come from an external entropic system that in the case of the digestion is provided by the involvement of the respiratory system.

Thanks to the breath entrance that appears in the chart as a **DO-192**, the octave that began with our chicken leg continues developing mechanically up to becoming **SI-12**. This last substance coming from the chicken leg's octave development, is the matter we are looking forward to produce and amass, and is no other thing than the sexual-libidinal matter, in quantities enough in order to supply our reproductive impulses and some of the most varied fantasies that we are able to articulate during the vestibular waiting separating the events of our drowsy everydayness, and that in some fortunate cases, impulses the creation work.

Here I must make another arguing parenthesis in order to justify the needs that this chart sets out as to over saturate the organism's tissues with this fine density substance **12** in different tonalities, as raw material to be sublimated and converted into soul.

It is of the acquaintance of any devoted reader that in all religious cultures or spiritual paths of the East and West from the beginning of times, one of the common factors that we may find is the almost constant disposition to celibacy, chastity and the orgasm retention. It is not the case here deepening into the motives and details with which this way of the spiritual searcher's behaving is presented in connection with sexuality, nor much less pretend to work out a behavior recipe that may be applied equally to all seekers, however, we may accept that so much in Western religions and alchemy, as well as in the Hindu and Taoist yoga, sexuality is a matter of main importance for the development of the potentialities of the consciousness and soul.

Taking this as an accepted fact at least by an important sector of the tradition, we continue with the chart that occupies us in the search of validating the value of the conscious aesthetic experience and directed to the producing of soul.

Let's continue.

We were in the respiration entrance as a **DO-192** that helped the chicken leg octave turning into **SI-12**.

Well then, this **DO-192** goes developing toward **RE-96** and **MI-48**, and as it happened with the chicken leg when reaching the note **MI**, it should stop in its development for lacking the energetic impulse necessary to such end.

At this point, arrives our savior hero that is not other than the **DO-48** that for the mechanical effects of our existence is simply a sensorial perception (new data).

In the majority of the cases, this input of **DO-48** into the human organism system doesn't contribute to the respiration octave's necessary energetic shock for keeping developing, and this is due the unconsciousness and mechanizing state (dialogic consciousness) that we live in our lives.

Now then, if to the contrary the sensorial perception moment comes accompanied with a *paying attention*, with a being present feeling what goes on, the **DO-48** of the perception contributes to the **MI-48** with the respiration energy that is missing necessary to develop onto **LA-6**, and itself as octave start, develops mechanically up to **MI-12**.

As may be observed in the chart, the sole active will participation in the everyday perceptual act contributes to triple the **12** density substance that according to Mr. Gurdjieff is not that necessary for producing soul.

Just as Aristotle attested when he expressed that the individual's superior values are developed as from the inferior, the psyche's inner dialogic process turns in the case of the diagram having our attention, in the underlying territory for developing the capacity of concentrating *attention* that will be indispensable to combine with the feeling so that it may operate a change of the consciousness state we have of ourselves.

In accordance with what was set out herein, we are talking of a change of consciousness that comes from a *dialogic reconfiguration* that presupposes a creational renovation of electrochemical nature in the organism.

Up to now, the metaphor value may perhaps, in the less skeptical of us, allow the evocation of a possibility, namely, the one of using the organism and its *signals system* just as a sophisticated digital processor in which the (dialogic) *attention* input on the mind's associative dynamics happening in its inner architecture, allows the dream materialization of any interactive artist or investigator-designer of interactive processes, that is no other than the creation of metabolic intelligence (soul).

This even will surely conduct us to dream, not without hazard, upon a processor that in addition to being able to observe itself, shall be able to transform its own *ram* with such a sensible interface that produces a feedback that will not only generate entertainment, but true healing recreation as from the interactor's own consciousness contents and somatopsychic structure.

Just as a miracles-maker machine.

Honeypumper: Moment Of Absence

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Concept

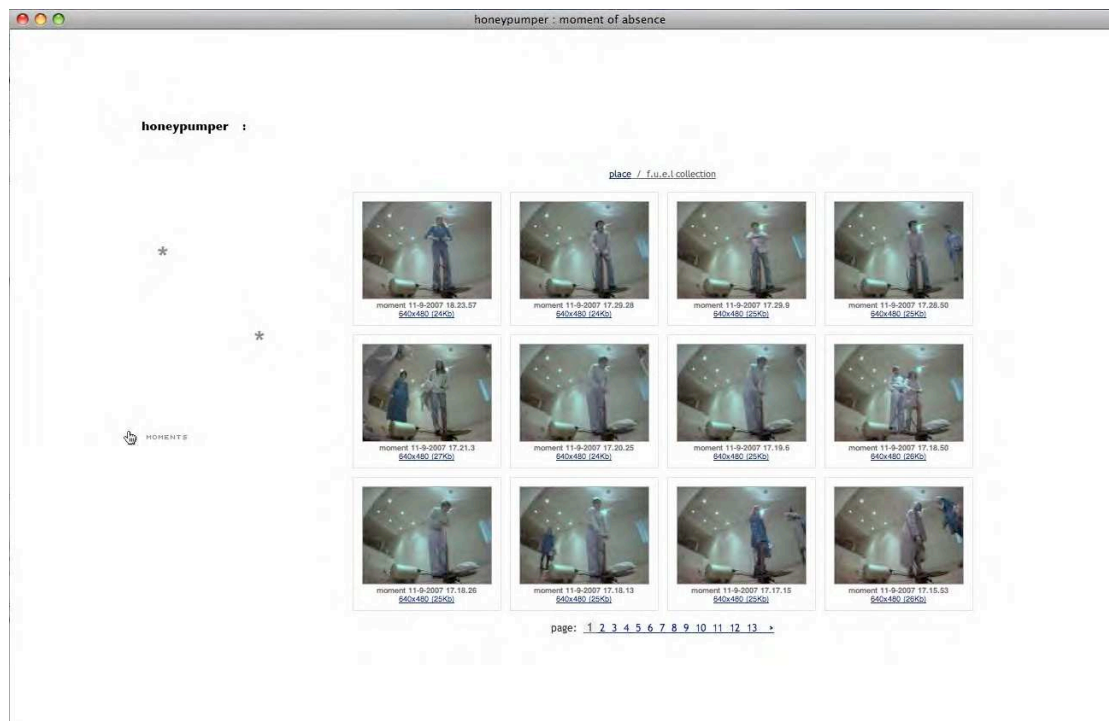
Honeypumper: Moment of Absence collects moments of perceived absence. Participants in a remote location approach a monitor and pump resting on the floor. They recognize themselves on the screen, and naturally grab the handle. As pressure builds, their representation begins to fade, leaving only an image of a disembodied space. At that moment, their image is captured and stored, forever...

Referencing Joseph Beuys' seminal *Honeypump in the Workplace*, this work associates his concept of "social sculpture" with the dialogic possibilities embodied in the development of global communication. It expresses a sense of ambiguity about our relationships to each other and to technology. Beuys considered the honey that flowed through his work a symbol of the creative energy released by the social interactions of a participatory society. The data that flows through the bitsphere can be considered in a similar manner; a potential fulfillment of his idealized vision.

Of course, as Mies said, "god lives in the details." As we construct our digitally mediated world, the implementation often seems to discount the democratic possibilities. Ironically, as we rush to embrace the "new", the individual is often forgotten; surveilled, cataloged, marketed and processed, often with little awareness.

Description

The work consists of a computer, lcd monitor, microcontroller, air pump, camera and an associated website: <http://www.honeypumper.org>. Participants operate the pump, which controls a video image that is a mirror image of them interacting with the work. As they pump their image is dissolved, leaving only the image of the surrounding space, minus their presence. At the moment they "disappear" an image is captured and stored on the honeypumper.org website. The public can view this collection of moments, categorized by exhibition venue, date, and time. The primary display of the artwork is accomplished utilizing an application designed with Max/MSP/Jitter. This software interacts with an embedded Arduino microcontroller and custom electronic circuit programmed using Processing (Java). The Internet component is handled using a typical combination of Apache and php.



screenshot from *honeypumper.org* website.

Presentation Support

The artist will deliver and provide all equipment required for installation of the work, with the exception of power and a network connection. The work requires a 110/120-volt power outlet proximate to the site of installation. Ideally, the power outlet would be located in the floor. If a floor outlet is not available, the piece can be configured to utilize a wall or baseboard outlet. In addition to power, the work requires a stable network connection. In order to capture moments and save these to the web server, a file sharing connection to the remote server is established via the Internet. The installation computer is an Apple Mini, which can connect wirelessly. A wireless network connection is ideal, but if not available or sufficiently stable, an Ethernet connection can be utilized. The work will be scheduled to automatically start and stop based on the exhibition schedule of the venue. In order for this to function properly, the power should not be turned off. The artist can also remotely administer the work as long as the network connection does not filter specific network ports. Essentially, given stable power and a network connection, it requires no interaction on the part of the venue staff. In the event there is a problem, the work will reconfigure itself after a simple restart. The work will be left with a shipping container and pre-paid return-shipping label to facilitate its return to the artist.

Strategic Technologies for Art, Globe and Environment

Dennis Summers

CCO, stage2001.com

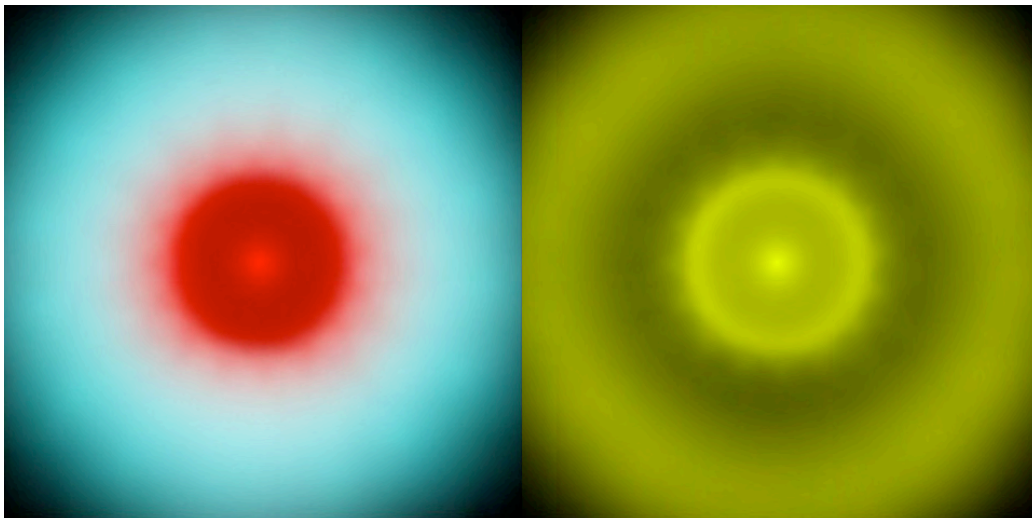
Phase Shift Videos (www.phase-shift.org)

The videos in this series were inspired by the early phase shift music of Steve Reich. The first one that was created analogously sets two colors, each of which is cycling through all the colors in the spectrum, against each other as they slowly go out of phase. They come back into phase after roughly 15 minutes at which point the piece will seamlessly loop. Although in other pieces from this series, the shapes and arrangements of shapes, and some of the color patterns become more complex over time, at the basic level the generative system remains the same.

These pieces can be experienced on different levels. They are visually quite beautiful, and set up an ever changing pattern of interesting color relationships. They create unusual optical effects –for example, the shapes sometimes appear to change size, or even move, when in reality nothing except the colors is ever altered. Additionally, like abstract art in general, their interpretation is open to the viewer's discretion. And finally, for many they create an absorbing meditative experience.

The software used to create these works is Autodesk combustion. Using this software it is relatively easy to animate the necessary spectrum shifts, leaving time to focus on creative aspects. Some times, like a minimalist painter I will work in a series developing an idea through multiple iterations. Other times I will act more like an action painter, moving and changing shapes until I get something interesting. As it can take anywhere from several hours to several days to render all of the necessary frames, in all cases I will have to make changes and tweaks numerous times until I get a video that "works."

In addition, the overlapping shapes in each video are combined using different kinds of blend modes, of which combustion has many. This piece on exhibit here, "Filament," is one of the more complex combinations of blend modes, but using relatively simple shapes. Other works will vary.



dream.Medusa: A Multiuser Interactive Multimedia Performance

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Abstract

dream.Medusa is a multiuser multimedia performance piece combining responsive video and audience feedback. Live vocalization and participant controlled devices provide interaction into a simulated lucid dream environment created with Max/MSP and Jitter. We discuss the concept of the piece, the interaction technologies, the performance experience and the notion of co-creation of performance with interactive participants.

1. Introduction

The *dream.Medusa* performance was conceptualized as part of an installation exploring the stages of sleep and dreaming, created for the all night art festival *Nuit Blanche* in Toronto, Canada [1]. *dream.Medusa* uses live performance, interactive video and participant interaction to lead the audience through a simulated lucid dream. In a lucid dream, the dreamer becomes conscious that s/he can interact with and control events in the dream environment [6]. In our performance, four participants holding specially created interactive objects become capable of interacting with responsive videos and a performing musician to create a visualization in a collaborative manner.

The fifteen-minute piece begins with a singer guiding the development of the performance by using her voice to control a responsive video. As it progresses, the participants realize that they as well can transform the video by manipulating their abstractly designed controllers. The technology simulates the experience of lucid dreaming, in that the participants drift in and out of control of the dream-like experience, initially unsure of their status, but gradually mastering the scope of their influence. The result is an audio-visual performance that non-participatory audience members can observe in the manner of a traditional concert-style performance. The imagery and music is created with the goal of transporting both participatory and non-participatory observers into a dream-like, calm, and peaceful state, using videos of rhythmically moving jellyfish and a relaxing soundscape in order to encourage a restful and serene mood.

This paper describes the *dream.Medusa* performance, and the technologies used in its creation. We will describe the voice analysis and visualization mechanisms, as well as the interaction between the participants and the system via our specially created interactor objects. We will then present a short discussion of the challenges of creating and performing a piece which is dependent upon the interaction of audience participants, and discuss future directions for development and exploration of interactive performance.

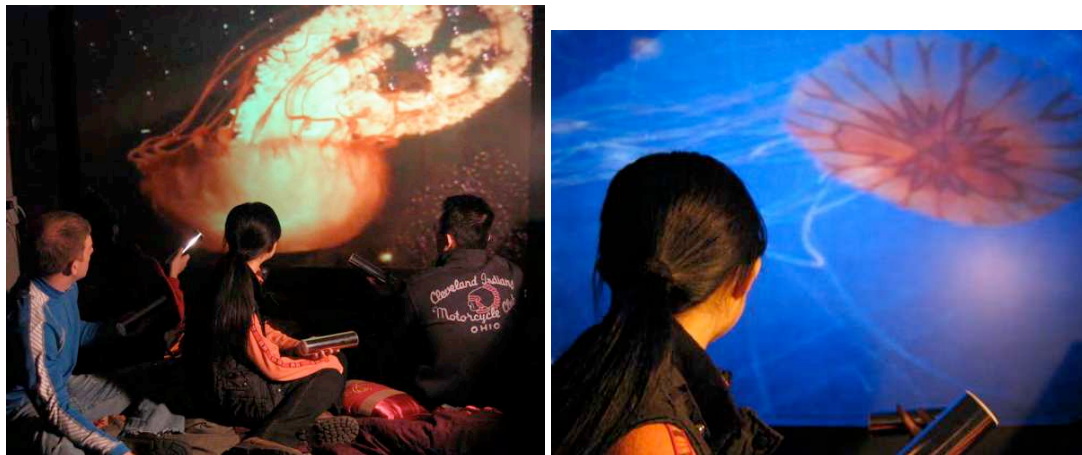


Figure 1. The space is delimited by a blanket and pillows upon which the participants sit in front of a large projection screen

Figure 2. The screen fills each participant's field of view, and each participant holds a controller object

2. The Staging

The performance space consists of a large projection screen, upon which a video of drifting and floating jellyfish is displayed. The four active participants and the singer sit in front of this screen on a brightly coloured assortment of decorative pillows and blankets, intended to represent the bed in which the “lucid dreamers” reside (see Figure 1.) This staging not only creates a visual image for the observing audience, but also provides a tactile stimulus to the participants, intended to increase their immersion in the experience, and assist them in releasing inhibition. Insisting that the participants remain in one space also serves a practical purpose, as the controller objects operate via Bluetooth communication, and restricting the participants' movements helps maintain the Bluetooth connection. Placing the participants so close to the screen ensures that the large screen fills the field of view of the participants (see Figure 2.) This, as well, is intended to increase the immersion of the participants in the performance experience. The non-participatory audience members can easily view the singer and the participants as they perform their interactions while sitting on the bedding placed directly in front of the projection screen.

3. Voice-Controlled Visualization

The performance is initially controlled by the live singer, who, by manipulating her vocal tone can control a music visualization module which changes the colours of the jellyfish floating on the video screen, manipulating the video imagery using her voice as a control mechanism.

The vocal visualization software is adapted from the software used to create our previous multimedia performance, *Deep Surrender* [2]. The feature extraction system is developed in Max/MSP [3], and uses Puckette, Apel and Zicarelli's fiddle~ object [5] to extract the harmonic spectra of the singing voice.

Different vowel sounds sung by the singer result in differences in the extracted harmonic spectra. The visualization system maps each vowel sound to different colours. Open vowels (such as /a:/ or /o:/) result in blue or green tones, and closed vowels (/i:/) produce vibrant red and orange colours. This effect is achieved by mapping the first, second, and third partials found in the harmonic spectrum of the vocal input to the red, green, and blue components of a Jitter [4] video stream. Pitch also affects the outputted colour – high pitches result in bright oranges and reds, while mid-range singing results in blue or green tones in the

visualization. Using this mapping, the singer can modify the color of the video composition by modifying her vowel choice or the pitch of her singing.

Performing with this type of responsive system requires the artist to interact with an analogue control system – she can only broadly control the values present in the harmonic spectrum of her voice by manipulating vowel or pitch, and must evaluate during the performance how her subtle vocal manipulations control the visual output in order to more precisely refine the visualization and present pleasing results. This system of feedback responsive interaction makes the artist necessarily attuned to the real-time progression of the performance, and ensures that each performance of the piece is unique.

4. Wiimote Interaction

After several minutes pass, in which the participants are merely observers of the singer's control over the visualization environment, the "lucid dreaming" component of the piece begins.

The onstage participants each possess an object with which they are told that they can effect change in the visualization. The objects are purposefully mysterious mirrored cylinders (see Figure 3) with no defined orientation or functional indicators. The distorted reflection yielded by the object is a direct reference to subjective accounts of lucid dreaming [7] in which dreamers commonly report that they become aware that they are dreaming by noticing an anomaly in their reflection when looking into a mirror during a dream.

Each tube's decorative casing conceals a standard Nintendo Wii controller with a three-axis accelerometer and force-feedback. As the participant moves the object, readings from the accelerometers are transmitted to the Max/MSP environment via a Bluetooth connection facilitated by Akamatsu's aka.wiimote object [8].

The participants are told that their object represents an indicator of the lucid dreaming state. At certain points in the performance, their object begins to pulse with a simulated heartbeat, which is a cue notifying the participants that they are able to interact with the video environment. The responsiveness of the objects is triggered on and off during the performance, much as a lucid dreamer's control of the dream environment intensifies and recedes during the course of a lucid dream.

When the controllers are enabled, the participants' manipulations of the objects are mapped to aspects of the video manipulation routines. Each participant controls a specific, mutually orthogonal, aspect of the responsive visualization (edge detection, image colouration, colour saturation or video mixing) and when they move their object, the video is manipulated in response (see Figure 4.) The participants are not instructed as to how to move the objects, rather they are encouraged to experiment, observe how their actions modify the video, and try to learn how to use the object in the co-creation of an aesthetically pleasing visualization. The mappings are not static, so over the course of the performance each participant controls a sequence of different video parameters. This makes it necessary for the participants to maintain attentiveness if they wish to maintain an awareness of how their actions are affecting the visualization.

Our participants are deliberately not shown the mechanics of the devices, in order that they feel free to experiment with the objects rather than operate them in a fashion constrained by their knowledge of Wii technology.



Figure 3. The interactive objects



Figure 4. The edge detection effect is applied by a participant manipulating an interactive object

5. Performing with Participants

Creating a performance that is responsive to the actions of participating audience members is interesting both from design and performance perspectives. When designing the scope and nature of the participants' interactions, care had to be taken to make the objects that mediated the interaction and the interaction strategy accessible but intriguing. It could not be too complex, since the goal was that participants would be experiencing the system for the first time while participating in the performance, and that as the performance developed, they would obtain enough understanding of how their actions manipulated the video control system in order to feel that they could consciously control the interface and manipulate the video effects in order to create visual images they found pleasing. After some experimentation, we found that a simple mapping between the orientation of the control object and the video effect parameters produced a control parameter that the users could learn to manipulate in order to deterministically trigger an aspect of video manipulation.

The participants perform simultaneously, however, making the appearance of the manipulated video contingent on numerous factors: the input from the four participants, as well as the input controlled by the live singer. When devising the design of the system, we wondered if the participants would intentionally collaborate in order to develop visual effects, or if they would focus on their own control mechanism and operate independently. Informal discussions with the participants revealed that they were, in fact, choosing to watch each other's actions when trying to determine how their actions were affecting the system, and as they became familiar with their control mechanisms, they would try to combine their visual effects with those of their neighbours in order to see what resulting visual manipulations could be produced. Similarly, the singer controlling the colour balance of the jellyfish image tried to collaborate with the participants in order to create the most interesting and dynamic visual results based on the input parameters they were providing.

6. Future Work

Interactive performance in which novice users take a participatory role offers the opportunity to examine how technology can be used to facilitate expressivity, and we would like to deepen our understanding of how

our participants perceived the collaboratory performance process in order to better understand how we can customize environments for participatory creative expression.

We have not yet formally investigated participants' responses to the system. Informal discussion with participants indicates that they find the experience to be rewarding. They are able to develop some control over the performance within the performance's timeframe, and they have told us that they find the visualization and musical components to be evocative and enjoyable. However, we would like to construct a structured study in order to obtain more focused feedback about their participatory experience.

We aim to use this piece as a test bed to explore the nature of participatory performance and investigate how the introduction of audience interactivity affects viewers' and participants experience and emotional investment in an interactive media piece. It is our hope that we gain insight from a user's experience of a multi-user interactive performance that will prove useful in the development of more expressive collaborative creative interfaces.

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Attacking Computer Art: Politics Surrounding The Emergence Of Computerized Art

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In the first ever full-length publication dedicated to static pictorial computer art, Lloyd Sumner implores his reader not to “prejudice” his art because of the methods of its construction.¹ The year was 1968 and, from all accounts, the artist’s plea went completely unheard. In the coming decade, computer art would come to arouse the kind of extreme resentment that characterizes many of the idolatry controversies scattered through the history of art. Beyond the sabotaging of computers, physical attacks were made on artists for their involvement with such devices,² and the careers of art curators were significantly damaged by their participation in computer art exhibitions.³

The hostility to computer art is surprising when one considers that the computer is the principal technological emblem of our time. As one of humanity’s greatest technological achievements, the computer has affected all areas of human endeavor. Touching every part of modern life, it has dramatically transformed the nature of the world and revolutionized both scientific and creative pursuits. Beyond its creative application, the computer has permeated all aspects of the visual artworld, especially the areas of management from administration to conveyance. Ironically, the birth of an entire new creative process has been met with suspicion and condemnation.⁴ While in some creative fields such as music, the computer is celebrated as a great and indispensable instrument, within the fine art tradition it has continually met with mistrust and aversion.

Why, then, was computer art so maligned and what were the factors that contributed to its marginality within the artworld and the wider cultural community? In this article, I argue that there are three destabilising forces that impact computer art, which include the inability of exponents and proponents to clearly define, theorize and historicize computer art, the general humanistic and anti-technology sentiments of the mainstream artworld, and the wider public’s distrust and fearfulness of the early computer and its perceived capabilities.

From its very beginnings, computer art has received a hostile response from most quarters, including from its exponents. In fact, self-criticism, disparagement, and unfavourable assessment amongst those engaged in computer art emerge as a dominant feature within the entire discourse. Even the most fervent enthusiasts have—surprisingly—been left “curiously cold” by computer art.⁵ A strange kind of defeatism or fatalism permeates much of the field in the first and following decade. For many it was the term “computer art” that presented an enduring problem. On a philosophical level the term appeared to convey an uneasy “frisson” generated by two seemingly incompatible and oppositional worlds. This discomfort concerning the incongruous combinations that appear to form the very nature of computer art has in fact permeated nearly all writing on the subject. For many of its detractors, computer art was simply a contradiction in terms; for its most ardent exponents, the classifier was simply unsuitable.⁶ Ever since the birth of this neologism, in 1963, its oxymoronic overtones have troubled those interested in creating art with computers.

The uneasiness with the term “computer art” emerged from its dual nature. For instance, the history of computer art and the history of graphics are indiscernible, especially in the first decade, as illustrated in

Franke's dual titled *Computer Graphics—Computer Art* (1971), the first historical account of computer art.⁷ The boundaries between the two remained permeable and indistinct. The expanding nature and convergence of computer technology has meant that computer art is essentially a diffuse practice. Hence a plurality of theories emerged about what computer art really was, and the need to define computer art remained a central preoccupation in computer art discourse. Practically all writings on computer art begin with an attempted description. Defining its nature, its crucial properties and its necessary conditions remained a central aspect of computer art discourse. There is unceasing contestation over what computer art "is" and "means." Because the computer was a variegated technology, any concept associated with its explication had difficulty sustaining competing articulations. As such, computer art remained an elusive concept that frustrated and defied the powers of definition.

Yet, even without a firm definition, computer art possessed its own discourse and modes of practice for a period of over 25 years. Indeed, the amount of writing that was produced about computer art in the 1960s and early 1970s rivalled, and often exceeded, the amount of writing about mainstream movements of the time, such as conceptual art. Throughout the 1960s and early 1970s computer art often produced wider cultural debate and dialogue. Discourse on computer art also eclipsed discourse on video art, its main technological rival. The reason for computer art's significant output was its interdisciplinary nature. It has been theorized and debated across a number of disciplines such as art, science, computer science, mathematics and engineering. Consequently, computer art became a subject of various specialist texts including periodicals. Apart from featuring in specialist publications, computer art has also captured the imagination of the wider public. It has never been short of an audience. Its interdisciplinary nature has meant that it could appeal to multiple audiences at once. Evidently, computer art has generated an enormous amount of interest from people in a variety of disciplines (with its practitioners located across many different fields). One outcome is that computer art has appeared in popular newspapers and magazines, a feat not achieved by the often esoteric art forms of avant-garde fine art.

While exponents often impeded the movement by their continual call for a definition and criteria for judging computer art, it is the more contemporary writers that have judged the computer often a "disappointing instrument of representation".⁸ Many have concluded that the early works deserve little attention.⁹ Even Frank Popper, a prominent historian of electronic art, considered very few examples of computer art before the mid-1980s worthy of mention.¹⁰ The most common critical position, however, is one that merely dismisses computer art as inconsequential. The dismissive critics see computer art as merely a "playful side effect" of utilitarian research.¹¹ Tediously repetitious, the critics' commentaries make clear their belief that it has no claims to the status of art, especially on aesthetic grounds. Even when computer art gains fashionable notoriety, the critics have spurned it as a "popular sideshow"¹². For many within the art establishment, computer art appealed only to a "scientific-technical subculture" who wrongly consider it art.¹³ Other critics saw computer art as just another example of the vulgarisation of science, where besotted artists, flirting with the latest scientific and technological media, produced what was tantamount to science as kitsch.¹⁴ Because it emerged from the abstract sciences, the computer art form was viewed by many as an anachronistic project—akin to the early modernist fascination with pure science. While many galleries showed computer art, these exhibitions were often "condescendingly reviewed", as though the medium was "without serious intent or noble aspiration."¹⁵ In fact, there is a litany of stories telling how computer art has been accepted on its merits only to be rejected once the curators discovered it was produced with the use of the computer.¹⁶ Most computer artists were castigated and insulted by the mainstream art galleries.¹⁷ Such was the stigma attached to computers that artists have used the expression "kiss of death" to describe the act of using computers in art.¹⁸

To the traditional field of art history, computer art has always appeared an un-navigable wilderness. One of the reasons for this neglect of computer art is that it remains remote from contemporary art discourse and the traditions of art history. Computer art does not fit the defined parameters of what, according to tradition and current convention, should properly constitute the object of art history. For many theorists, computer art is so varied in its technological mode that it is undefinable and thus incongruous with the art historical tradition. Furthermore, the wider art and technology debate has often been deemed notional or inconsequential to traditional art historiography.¹⁹

Admittedly, computer art has a fragmented and often capricious history, which necessitates perseverance when doing art historical research. Previous historical accounts of computer art possess idiomatic elements that separate it from traditional art history. They tend to be aggrandizing in nature, seeking to justify and promote computer art.²⁰ Often simplistic, celebratory and utopian, these accounts neglect the basic precepts of art historical research, such as dimension and dates of the artworks. The little archive material available is fragmented and often difficult to access (though recent projects, such as CACHe and the Victoria and Albert Museum are remedying this).²¹ One of the main problems, however, is that early accounts of computer art give priority to technical interests over historical context. Mirroring the influence of science and engineering journals, computer art discourse is filled with technical explanation. Consequently, computer art requires a “specialised technical knowledge” of its viewer.²² This is probably why histories of computer art focus on technological change to structure their narratives. Technological phases became the dominant structure of these histories. In this deterministic model, the emergence of new technologies and techniques become “historical landmarks”.²³ This was logical for many, since the history of computers must be a story of the evolution of technology.²⁴ Herbert Franke, a key figure in computer art discourse and the first to write an historical account of computer art,²⁵ felt that it was “dependent on the computers”, and that nothing could be achieved beyond the state of progress within computer science itself.²⁶ While computer art was inextricably linked to the evolution of computer technology, the technical model of explanation is only one dimension in a possible spectrum of historical understandings. By using technology as the underlying logic, these histories fail to acknowledge the importance of cultural and ideological contexts in the emergence of computer art. Like technological determinism, this process removes the computer from its social and political reality and treats it as a self-forming technology in isolation.

Apart from the emphasis on the technical, computer art is difficult to assimilate into traditional art historiography because its history is shared. To research computer art is to probe several histories at once: the history of the computer as visual medium; the history of computer graphics and its emergence as a global industry; and the history of computers in the creative and fine arts. Also, because computer art was an international phenomenon, it could not derive any cultural legitimacy from a nationalist art history. Apart from having no national heritage, there was no centralised location or organising body that could devise a coherent corpus of belief (in contrast to the myriad of other twentieth century art movements that achieved this). Subsequently, in the early stages, there was no formal attempt by the practitioners, especially in the United States, to organise themselves socially and politically around a key idea.²⁷

Underlying the surface criticism from the artworld, there were deeper destabilizing forces that left the field of computer art in an almost permanent state of crisis. These originating societal attitudes in conjunction with artworld attitudes inevitably shaped the troubled history of computer art. Indeed, computer art suffered from its dubious provenance. The first crucibles of computer art development were the military and corporate research laboratories. In fact, a military laboratory produced the first recognized and indeed award-winning piece of computer art in the United States (Fig. 1 & 2). The uncomfortable knowledge of computer

art's origins has prompted many commentators and proponents to situate the emergence of computer art a number of years after 1963, effectively bypassing its military birthplace.²⁸ Indeed, computer art encapsulates much of the "technocratic vision" and the scientific pragmatism of the immediate post war period from which it sprang. Computer art's relationship to science ideologies would remain close and enduring, which would often prove an impediment in finding legitimacy in the artworld.

The initial reaction to the first computer art exhibition at the Howard Wise gallery was hostile from artists and critics alike.²⁹ Although the exhibition was a significant landmark and generated a certain amount of technical interest, the criticism ranged from "cool indifference to open derision."³⁰ The reviewer in *Time* magazine noted that the pictures on display not only resembled "the notch patterns found on IBM cards" but also had "about the same amount of aesthetic appeal."³¹ The *New York Herald Tribune* denounced the works as "cold and soulless", a criticism that would continue to haunt the artform.³² While the Howard Wise Gallery was the premier commercial venue for presenting art and technology, receiving much press and attention, none of the work sold.³³ This response was not confined to the United States. Because the humanist critique of science and technology held a global influence, computer art received a uniform response, which was both apathetic and dismissive.³⁴

When computer art, with its scientific ideals, moved from the relative safety of the technocratic domain to the intensive critical environment of the art world, it created the inevitable frisson appeared. The general antagonism between the scientific and artistic communities, what Goodman called the "uneasy liaison",³⁵ pervaded the early commentary on the emerging art form. These hostilities were played out in the science-based publications, which tended to depict technologist as a zealous scientist forging new artistic paths, while the artist, characterized as defiant and lacking fortitude, languished in the doldrums of technological ignorance.³⁶ While Herbert Franke recognized that the computer, as art maker, had raised and exposed many aesthetic problems,³⁷ only members of the scientific community had the language, awareness and skill to approach the new form.³⁸ In response, the artist and critic felt the scientist was trespassing on their ground; they saw the scientist's work as dull and lifeless, evidence of aesthetic ineptitude. The antagonism between artists, critics and scientists was part of a larger controversy permeating cultural discourse, as C. P. Snow's notorious "two cultures" lecture made clear. This controversy was reaching its apogee at the time of the emergence of computer art, which, as an amalgamation of art and science paradigms, embodied this cultural tension. Resting precariously between two competing cultural discourses, the artform surfaced at a time when the computer itself had begun to lose some of its luster as the great technological panacea.

While there were stylistic reasons for computer art's early marginalization, such as a move within the vanguard art movements away from the static pictorial tradition in the 1960s and 1970s,³⁹ important social factors also contributed significantly to the foundation of computer art's early criticism. What surfaces as a strong anti-computer response can be traced to two overarching ideological attitudes. While the twin assault on computer art by particular strains of humanism and anti-humanism had similar motivations—the fear of computer technology—they did not share each other's discursive intent. Firstly, the artworld's negation of computer art stems from humanist discourses that carry a heavy anthropocentric bias and a general resistance to advanced technology. Combining the strong anthropomorphic ideals of Renaissance humanism with the eighteenth-century traditions of romantic protestation against mechanization, this humanist reaction sought to admonish computer art—and its mechanical creator—for its dehumanizing and rationalizing tendencies. Secondly, within an anti-humanist stance, which emerges later in the 1960s, cultural critics promote a measured skepticism towards computer technology and its perceived modes of control. Whereas humanism in the fine art tradition was both liberal and conservative, attacking certain technologies for its dehumanizing

dimension, the popular anti-humanist critique of technology attacked the rising technocracy rather than the technology itself.

For the humanist, the artificial methodologies of computer-generated art alienated the human from the art experience. Countering the “cult of science” and the “technocratic spirit” that fostered the birth of the computer was a wave of existential humanism amongst intellectuals and artists.⁴⁰ In the immediate post war period, the memories of atomic clouds rising over Hiroshima and Nagasaki resonated deeply within social, artistic, and intellectual circles, spreading pessimism and collective despondency towards technology. Social critics reacted violently, not only against the atrocities of two world wars, but also against the perceived loss of human qualities to the all-pervasive technological logic of the industrial state. Computer art seemed a deliberate denial of human feelings of wonder and mystery through the cold calculation of utility and instrumental rationality. For the humanist, it was concurrent with the rationalization of the world, a process by which all human activities are progressively exposed to increasing calculation and control by impersonal technological forces. Although this liberal sentiment would continue to haunt the reception of computer art, the most compelling criticism came from other quarters. In 1964, the same year that computer art first entered the cultural sphere, influential cultural theorists, Jacques Ellul, Herbert Marcuse and Marshall McLuhan produced influential publications that in different ways were critical of technology.⁴¹ The Cold War period saw the popularization of dystopian theories, which posited technology as inherently predisposed towards domination. Influenced by these critics, the art theorists of the coming decade naturally viewed computer art as part of the technocratic and scientific regimes used in prosecuting the Cold War.

The overarching criticism of computer art originated from a technophobic mistrust of the computer itself. Through an uneasy mass media, the “awe-and-wonder stance” that had characterized the positive public response to the introduction of the UNIVAC computer in the 1950s gave way to a more general “anti-computer spirit” in the following decade.⁴² What had been a symbol of great hope in the cultural imagination was becoming an object of profound fear. This was motivated not only by the anxiety that the computer would take the place of the worker, which had been dramatized in the 1957 Hollywood movie *Desk Set*, but also by the alarm that the computer could become the seamless instrument of governmental control (Fig.3). Through the 1950s, the computer became the principal technological metaphor of the period, reflecting the “versatility of the human mind as no pervious mechanism.”⁴³ A cognitive revolution began to emerge around the theoretical work of Alan Turing, which precipitated a new conception of the human being as a machine. The decade would see the first artificial intelligence conference and the extensive use of the “human-as-machine” and “computer-as-brain” metaphor in advertising (Fig.4). This process meant a steady anthropomorphizing of the computer.⁴⁴ As the computer became a surrogate for human intelligence and the faculty of memory was metaphorically conceded to the machine,⁴⁵ the computer appeared to be a “new species of technology”. It appeared to flirt with the “mysteries of the mind itself”.⁴⁶

Developing in the 1960s was a “secondary undercurrent of uneasiness” that the computer was an “autonomous thinking machine.”⁴⁷ The “spectre of machine intelligence”—that some day machines would enslave its creators—haunted the public consciousness.⁴⁸ Stanley Kubrick’s 1968 film adaptation of Arthur C. Clarke’s *2001: A Space Odyssey* is a prime example. At the close of the decade the computer had become a “symbol for all that is good and all that is evil in modern society.”⁴⁹

The computer as “pervasive mechanism” replaced the “autonomous super-brain” myth of the 1950s. It was now both the corrupter of human minds and the mechanism of central government organization. It symbolized “impersonality, conformity to pre-established patterns, reduction to a number, and impossibility

of changing the status quo.”⁵⁰ The computer now became an agent of “stagnation and colossal inertia” inherent in modern organization. From this perspective, it is not principally a useful tool or an important labor-saving device, but a machine that imposes its own logic on society. The popular image of the computer was an immaculately clean room filled with streamlined computational machines and its various periphery devices. Standing dutifully by was a collection of dark-suited human programmers and operators, often called the “priesthood” (Fig.5). In the popular imagination, the “priesthood” was seen to deify the computer as some kind of superhuman instrument, which led many social critics to view the “priesthood” as slaves to the new system-based order. The computer was too literal, it had no emotions, no personality and therefore it had “no experience or cultural frame of reference.”⁵¹

Although troubled by the desires for machine intelligence, artists and critics were most concerned about the promises technologists were making regarding artificial or mechanized creativity. Many artists regarded the “machine as their enemy.”⁵² In 1958, Denis Gabor, the Nobel Prize winner in Physics, voiced this concern: “I sincerely hope that machines will never replace the creative artist, but in good conscience, I cannot say that they never could.”⁵³ Gradually the social anxiety of the machine taking over the human creative role manifested in the late 1950s and early 1960s through science-fiction.⁵⁴

Even before the industrial revolution, people within society reacted with trepidation whenever a machine embodied those characteristics that were believed to be exclusively human.⁵⁵ Creativity was a cherished attribute. The artist had been traditionally associated with “creation” through Christian theology. As Tom Gretton wrote “The artist’s greatest and most necessary illusion is the illusion he is creating. Rob him of that belief and you have shorn him of his power”.⁵⁶ The ideological power of art “derives from its mystification of the process of making, the granting of special status to art making.”⁵⁷ With a Kantian understanding of “genius”, Modernism in the twentieth century recast this mythology by building on the belief that art is the “only properly autonomous and self-determining mode of production.”⁵⁸ The computer appeared to undermine the ontology of art and efface the identity of the artist by reducing him or her to a mere servant of the machine.

The scientist’s and technologist’s dream of a fully mechanized art was an affront to this humanist tradition. The computer undermined the act of creation, the exclusive domain of humans. Inherent in the computer art dream was the redundancy of the artist. This was implicitly put forward in the title of the first essays on computer art; for example, “The Electronic Computer as Artist” (1964) and “Portrait of a Machine as a Young Artist” (1965).⁵⁹ Not only the cherished faculty of creativity was under attack, but the sacred act of making art. The Howard Wise exhibition showed that the artist had become redundant in the physical production of the work. For the technologist, it was inevitable that increasingly efficient generations of automation, widely employed in other fields, also would be used in art production. In any case, from the technologist’s perspective, they were designing machines to extend, multiply, and heighten human mental and physical abilities.

This emotional response to computers was not just a knee-jerk reaction by angst-ridden humanists. Zealous technologists did little to allay fears that the machine would render the artist redundant. Mirroring 1950s discourses on artificial intelligence, many technologists explicitly promoted computer art within the “man versus machine” paradigm, which effectively positioned the computer as an oppositional force. Beyond touting the first renowned computer art piece as a successful simulacrum of a modern master, such as the famous A. Michael Noll’s *Computer Composition with Lines*, 1965, which positions the computer against Piet Mondrian (Fig.6), the rhetoric emerging from technologists tended towards the final demystifying of art.

For technologists, mechanized creativity was simply a natural progression in the computer's bid to automate all human functions. On a more fundamental level, scientists envisaged a machine to wipe away what they saw as the fallacious mysteries of art. In contrast, most art critics felt that art made by an autonomous machine undermined the integrity, function and meaning of art and its history. The computer threatened to invade the "territories of art"—to reuse Charles Baudelaire's reaction to photography.⁶⁰ Like Baudelaire, critics and artists were fearful that the computer could ultimately usurp and corrupt human creativity. Just as critics saw the computer as "an interloper, as something alien to the creative process",⁶¹ mainstream artists felt they were surrendering the privilege of creating art to a mere automaton.

As the 1970s progressed, computer art (especially in West Germany) tended towards the abstract sciences and the desire for the "mathematization of art",⁶² which increasingly put computer art at odds with the sacrosanct assumptions of traditional fine art. Influenced by mathematical-logical formalism and the empiricist epistemology of natural sciences, the technologists and mathematicians envisaged the power of the computer as an experimental tool, an instrument to transform complex mathematical information into visual phenomena. Beyond making the abstract visible, there is a prolonged attempt to submit art to the powers of mathematics—to, in effect, demystify art. For many exponents of computer art, mathematical formalization could finally purge art of the taint of rhetoric and mystery. The Kantian doctrines of artistic creativity and autonomy, which are the cornerstones of Romanticism, appeared to come under relentless attack. Fine art was no longer the domain of the "artistic genius" or, as Kant suggests, "a talent for producing that for which no definite rule can be given".⁶³ Instead, scientists, armed with the ultra reductive machine, attempt to debunk the notion of the "genius" effectively claiming that talent is not innate, but can be programmed into a machine. Scientists and technologists found in the computer the possibility of a fully mechanized art and the final "delegation of the aesthetic-creative processes to machines."⁶⁴ Thus, confirming the uneasiness of *The New York Times* critic who covered the first computer art exhibition, art was resigned to becoming "entrusted to the *art ex machina*."⁶⁵

While computer art expanded in the 1970s with the help of a committed group of women computer artists⁶⁶, the movement came under sustained criticism. The computer art project continued to rest precariously between the two major cultural discourses. While, in many ways, computer art was an attempt to bridge two divergent and opposing worlds, it was destined, through its scientific and technocratic heritage, to remain marginalized from the mainstream artworld. Likewise, the scientific community would malign computer art because its artistic intentions were inconsequential and insignificant to the key project of science. Computer art appeared a child born to loveless parents.

It would not be until after the early 1990s, when user-friendly computer technology became pervasive, that computer art would find safer ground. But prior to this, computer art would first come under—the then modish—postmodern modes of interpretation and deconstruction. Following trends in art critical discourse in the early 1980s, critics and theorists significantly reoriented computer art discourse towards the social-critical. For the first time the thinking of Walter Benjamin, Michel Foucault, Jacques Derrida, Roland Barthes, Jean Baudrillard and Jean-François Lyotard are discussed in relation to computer art.⁶⁷ The intention of the new postmodern computer art commentators was to fill the critical and theoretical "void" that had plagued computer art since its inception. Some new computer artists and theorists saw the lack of criticality as the most pressing problem of computer art.⁶⁸ The first objective of this new critical stance was the negation of the term "computer art" (replaced with terms such as "new media", "digital art" or "electronic art") and the need to identify, and if necessary, re-cast the history of computer art. For the postmodernists the important aspect of the computer was that it disrupted the agenda of modernism. So, in a

complete turnaround from previous criticism by humanists and anti-humanists, the computer is increasingly perceived as a technology of rupture rather than an embodiment of the Enlightenment and more recent technocratic vision of the Cold War.

While computer art has received deserved attention recently, it is still plagued by assumptions and stereotypical characterizations. The sense of the loss and forsakenness that once hung over computer art is beginning to dissipate. In fact, major collections are being formed in Europe and now North America.⁶⁹ Nevertheless, the art form remains a peripheral subject in art history and art theory. Those who mention computer art within the traditional art fraternity of today will most often receive one of two uniform responses. Either there will be the traditional aversion to the idea of computer art as a serious subject of research or there will be a statement to the effect that computer art is *passé*, a curious anomaly outmoded by newer phenomena such as “digital art”. Nonetheless, computer art has endured and outlasted many of its contemporary forms. If one explores computer art and its history, one finds far greater significance. Beyond being crucial in the evolution of art towards a sustained new media discourse, computer art through its pioneering artists, critics and exponents laid the foundations of today’s thriving art and digital media programs in colleges and universities across the globe. The early computer artists were the first to institute the innovative degrees and diplomas that provided the model and formula of our digital art pedagogy. Beyond education, many have risen to become prominent figures in computer science and computer graphics. As the history of computer art shows, the pioneers were courageous in their attempt to carve out an art form with what was an exceedingly difficult technology. It is remarkable that many were able to sustain their practice with the constant criticism and overall discontent that characterizes the computer art discourse.

Illustrations

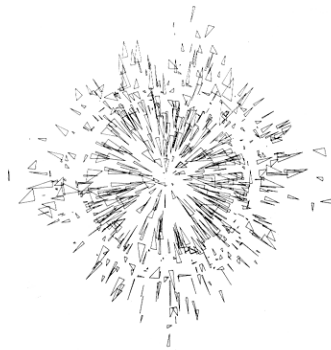


FIGURE 1. *Splatter Diagram* (often titled *Splatter Pattern*), 1963. Computer-generated. Ballistic Research Laboratories, Aberdeen, Maryland. *Computers and Automation*, (1963)

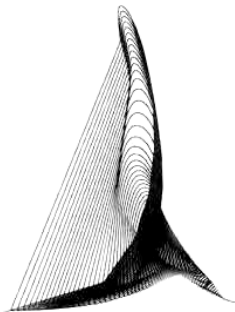


FIGURE 2. *Trajectories of a Ricocheting Projectile*, 1964. Computer-generated. Ballistic Research Laboratories, Aberdeen, Maryland. *Computers and Automation*, (1964)



FIGURE 3. Film still. Spencer Tracy and Katherine Hepburn in *Desk Set*. Directed by Walter Lang. 20th Century Studio, 1957.

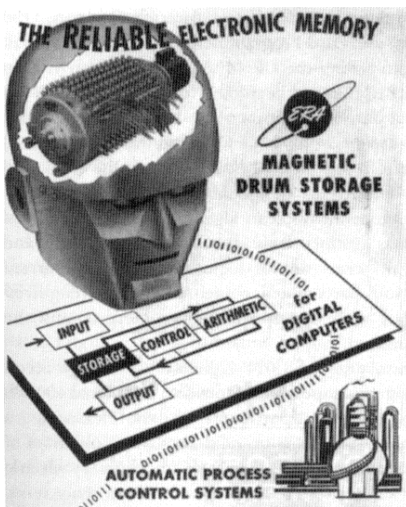


FIGURE 4. (Detail) Advertising for Magnetic Drum Storage Systems, Engineering Research Associates (Division of Remington Rand). 1954.

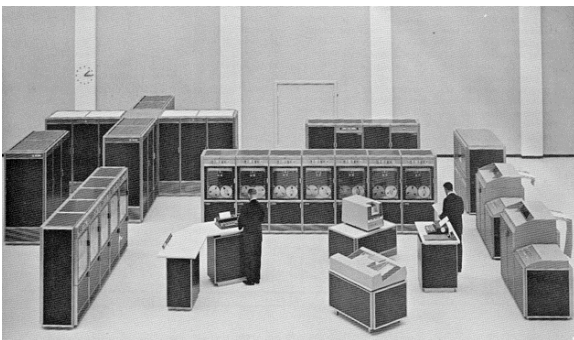


FIGURE 5. Advertising image for a large mainframe computer, reproduced in *Computers and Automation*, (1964).

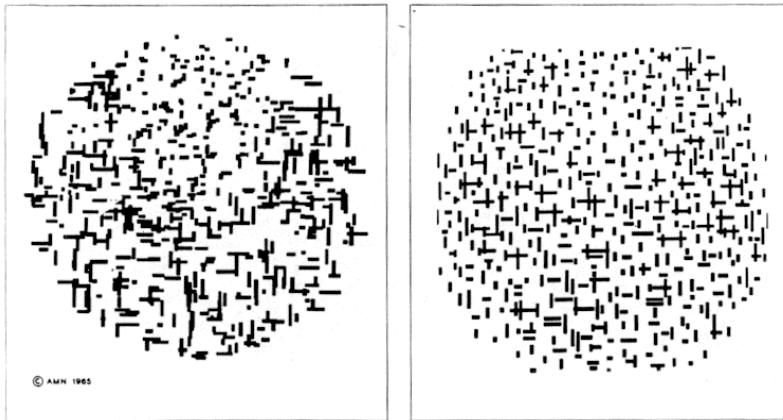


FIGURE 6. (left) A. Michael Noll. *Computer Composition with Lines*, 1965. (right) Black and white reproduction of Piet Mondrian's *Composition with Lines*, 1914.

Endnotes

¹ Sumner, L. *Computer Art and Human Response*. Charlottesville, Virginia: Paul B. Victorius, 1968. p.21.

² Manfred Mohr quotes: "On one occasion in 1972 in Paris a student accused me of using a devilish capitalistic instrument to make corrupt art...even an egg was thrown at me..." M. Mohr, Personal communication with author, 1st August 2003.

³ Critic and curator, Jack Burnham, has written about the possibility of sabotage in his troubled 1970s exhibition *Software*. J. Burnham, "Art and Technology: The Panacea That Failed", in *The Myths of Information: Technology and Postindustrial Culture*, ed. K. Woodward (London: Routledge & Kegan Paul, 1980), 205.

⁴ As Franke has outlined, it was the first time artistic production become "amenable to mechanization". H. W. Franke, *Computer Graphics—Computer Art*, trans. G. Metzger (New York: Phaidon, 1971), 9.

⁵ Mealing S., ed., *Computers and Art* (Exeter: Intellect, 1997), 7.

⁶ Both exponent and critic have been at great pains to safely separate art and the computer. Mealing suggests, when the terms are interchanged—to make "computers and art", they denote a more "expansive subject" that includes all the diverse practices and potentials inherent in employing the computer in the visual arts. Ibid., 7-8.

⁷ Franke, *Computer Graphics—Computer Art*. trans. G. Metzger (New York: Phaidon, 1971)

⁸ Nadin, M. "The Aesthetic Challenge of the Impossible", in *Images Digital*, Munich: Barke, 1986. p.19.

⁹ For example, see Kempkens, A, and B. Kempkens, eds. *Images Digital*. Munich: Barke, 1986. p.87.

¹⁰ Rush, M. *New Media in Late 20th Century Art*. London: Thames & Hudson, 1999. p.172.

¹¹ S. Päch, "Computer Art in Changing Times", in *Images Digital*, ed. A. Kempkens and B. Kempkens (Munich: Barke, 1986), 87.

¹² See, Canaday, J. "Less Art, More Computer, Please", *The New York Times*, 30th Aug 1970.

¹³ Franke, H. W. "Refractions of Science into Art", in *The Beauty of Fractals* (Berlin: Springer-Verlag, 1986), 185.

¹⁴ Daniels, "Art and Media", 560.

¹⁵ Davis, P.J. and R. Hersh, *Descartes' Dream: The World According to Mathematics* (Sussex: The Harvester Press, 1986), 48.

¹⁶ Spurned artists include Lillian Schwartz who, in 1969, submitted a computer generated print to a competition in New Jersey only for it to be rejected. The following year, she entered the same print. However, this time, she listed it as a silkscreen. It was not only accepted but also bought by the Museum for its permanent collection. See C. Goodman, "Art and Technology: Bridging the Gap in the Computer Age", in *Siggraph 1982* (Boston, Massachusetts: Siggraph, 1982). Likewise, Jean Pierre Hébert has been excluded

from galleries as soon as it was made known that a computer had been involved, even after they had reacted positively to the actual art. J.-P. Hébert, Personal Communication: Electronic Mail, April 23rd 2004. Paul Brown has made similar claims in which he had found success with the computer only to be discouraged and rejected when he mentioned that the work was made with the computer. P. Brown, "An Emergent Paradigm", *Periphery* 29 (1996).

¹⁷ Hébert, Personal Communications, 2004.

¹⁸ Brown, "An Emergent Paradigm", 1996.

¹⁹ Edward Shanken is one of a few historians who have revisited the art-and-technology exhibitions of the late 1960s early 1970s. E. A. Shanken, "Gemini Rising, Moon in Apollo: Attitudes on the Relationship between Art and Technology in the U.S., 1966-71", *Leonardo Electronic Almanac* 6, no. 12 (1999).

²⁰ D. Maxwell, "The Emperor's New Art?" in *Computers in Art and Design*, ed. I. V. Kerlow (Las Vegas: Siggraph, 1991).

²¹ For example, Douglas Dodds, Head of Central Services & Senior Curator, Computer Art, Word and Image Department, Victoria and Albert Museum.

²² D. Carrier, "Theoretical Perspectives on the Arts, Sciences and Technology", *Leonardo* 20, no. 1 (1987): 79.

²³ The Digital Art Museum (DAM) defines digital art in three phases, which included "1956-1986 The Pioneers", "1986-1996 The Paintbox Era", and "1996-2006 The Multimedia Era". King, "Computer and Modern Art: Digital Art Museum". For further examples see also Lovejoy, *Postmodernist Currents: Art and Artists in the Age of Electronic Media*, 172. N. Lambert, "A Critical Examination of 'Computer Art': Its History and Application" (Electronic Word File, Oxford, 2003).

²⁴ M. Resch, "Computers, Art and Context", *Leonardo* Supplemental Issue (1989).

²⁵ Franke was well placed to comment on science-based art, as he had studied topics that included physics, chemistry, psychology and philosophy at the University of Vienna. In the mid-1950s he became a freelance technical journalist and a pioneer of electronic imagery generated with analogue computers. His survey of computer art *Computer Graphics-Computer Art* (a translation of his *Computergraphik-Compterkunst* published in Munich in 1971) was at the time the most comprehensive international survey of computer-generated visual art. With an extensive bibliography, the text included the technical processes of the digital machine and its periphery instruments, as well as how technologists and artists implemented their computer techniques. This seminal text provided the Western European perspective of the rise of computer art. Consequently, Franke became the central commentator and theoriser of the international art form.

²⁶ Franke, *Computer Graphics—Computer Art*, 7.

²⁷ One could argue that London's Computer Art Society established in the late 1960s provided a focus for computer artists.

²⁸ For a full analysis of historical omissions and inclusions, see Taylor, G. D. PhD Thesis, *The Machine that Made Science Art: The Troubled History of Computer Art 1963-1989*. The University of Western Australia, 2004.

²⁹ Not all the reviews were written with disdain. Noll believed that Stuart Preston's *New York Times* article was positive. Noll, A. M. "The Beginnings of Computer Art in the United States: A Memoir." *Leonardo* 27, no. 1 (1991): 39-44.

³⁰ Goodman, C. *Digital Visions: Computers and Art*. New York: Times Mirror Books, 1987. p.25.

³¹ From "Computer-Generated Pictures" in the *Times*, 23 April 1965. Goodman, 1987. p.184.

³² From "Computer-Generated Pictures" in *The New York Herald Tribune*, 10 April 1965. Goodman, 1987. p.184.

³³ Noll. 1991.

³⁴ In West Germany, the artistic community responded with distrust, even "unrest". The critical response to the first computer art exhibition in 1965 in Stuttgart, West Germany was effectively the same as that in the

United States. Even in Japan, the artistic community was apprehensive. Haruki Tsuchiya observed that artists who were not computer professionals were extremely suspicious of computer art.

³⁵ Goodman's account of the "uneasy liaison" between art and technology is the only real critical approach to this divide. Goodman, 1987. p.18. Any prior history downplays the hostilities between the disciplines, and instead prefers the outward display and celebration of the similarities.

³⁶ Rockman, A, and L. Mezei. "The Electronic Computer as an Artist." *Canadian Art* 11 (1964): 365-67.

³⁷ Franke, H. W. "Computer Graphics—Computer Art". trans, G Metzger. New York: Phaidon, 1971. p.7

³⁸ Franke, 1971. p.106.

³⁹ For a full analysis of computer art's relationship to conceptual art, see Taylor. 2004.

⁴⁰ Sartre, J-P. *Essays in Existentialism*. Secaucus, New Jersey: The Citadel Press, 1965.

⁴¹ Ellul, J. *The Technological Society*. Translated by J. Wilkinson. New York: Vintage, 1964. Marcuse, H. *One-Dimensional Man*. Boston: Beacon Press, 1964. McLuhan, M. *Understanding Media*. New York: McGraw Hill, 1964.

⁴² Taviss, I., ed. *The Computer Impact*. New Jersey: Prentice-Hall, 1970.p.4.

⁴³ Bolter, J. D. *Turing's Man: Western Culture in the Computer Age*. Chapel Hill: The University of North Carolina Press, 1984. p.40.

⁴⁴ Berkeley, E. C. *Giant Brains or Machines That Think*. New York: John Wiley & Sons, 1949.

⁴⁵ Roszak, T. *The Cult of Information: The Folklore of Computers and the True Art of Thinking*. New York: Pantheon Books, 1986. p.36.

⁴⁶ Roszak, 1986. p.8.

⁴⁷ Lee, R. S. "The Computer's Public Image." In *The Computer Impact*, edited by I. Taviss. New Jersey: Prentice-Hall, 1970. p.271.

⁴⁸ Kurzweil, R. *The Age of Intelligence Machines*, Cambridge: MIT Press, 1990. p.39.

⁴⁹ Taviss, 1970. p.3.

⁵⁰ Withington, F. G. *The Real Computer: Its Influence, Uses, and Effects*. Reading, Massachusetts: Addison-Wesley Publishing Company, 1969. p.222.

⁵¹ Withington, 1969. p.34.

⁵² Rockman. 1964. p.367.

⁵³ Gabor, D. *Innovations: Scientific, Technological, and Social*. Oxford University Press. London, 1970. Gabor, D. *Inventing the Future*. Harmondsworth, Middlesex: Pelican, 1963.p.18.

⁵⁴ One of the most persistent and perhaps the most important themes in science fiction is, "man's need to be creative." M. Ascher, "The Computer as Seen through Science Fiction", in *The Computer Impact*, p. 278.

⁵⁵ Michie, D. and R. Johnston, *The Creative Computer: Machine Intelligence and Human Knowledge*, Harmondsworth, Viking, 1984. 188.

⁵⁶ Carpenter, R. "The Basis Artistic Creation in the Fine Arts", in *The Bases of Artistic Creation* New York: Octagon Books, 1969.

⁵⁷ Borzello F. and A. L. Rees, eds., *The New Art History*, London: Camden Press, 1986. p.68.

⁵⁸ Borzello, 1986.

⁵⁹ Rockman. 1964., J. R. Pierce, "The Portrait of Machine as a Young Artist", *Playboy*, June 1965.

⁶⁰ Baudelaire, C. "The Salon of 1859: The Modern Public and Photography", in *Modern Art and Modernism: A Critical Anthology*, ed. F. Francina and C. Harrison, London: Harper and Row, 1982. p.23.

⁶¹ Kurzweil, R. *The Age of Intelligent Machines*, Cambridge, MA: MIT Press, 1990. p.39.

⁶² Franke, *Computer Graphics—Computer Art*.

⁶³ Kant, I. *Critique of Judgement*, trans. J. C Meredith, Oxford: Clarendon Press, 1952. p.168.

⁶⁴ Franke, *Computer Graphics—Computer Art*, p.57.

⁶⁵ Preston, S. "Art Ex Machina", *The New York Times*, April 1965, p.53.

⁶⁶ Taylor, G. D. "Humanizing the Machine: Women Artists and the Shifting Praxis and Criticism in Computer Art", *International Digital Media and Arts Association Journal*, Fall Issue, 2007.

⁶⁷ For full discussion of the impact of postmodernism, see Taylor G. D. "Computer Art in Crisis: Postmodernism and the Expanded Field", PhD Thesis, *The Machine that Made Science Art: The Troubled History of Computer Art 1963-1989*. The University of Western Australia, 2004.

⁶⁸ The significance of the CAA (College Art Association) annual meeting of 1989 is that the papers presented became the material for the *Art Journal* (1990) fall issue. Also, the essays presented at the "Computer Art in Context" conference (Siggraph art show catalogue) formed the supplemental issue of *Leonardo* in 1989. T. Gips, "Computer and Art: Issues of Content", *Art Journal*, Fall (1990). This collection of articles forms the basis of the move toward postmodern modes of interpretation.

⁶⁹ Anne and Michael Spalter have developed one of the largest and finest collections of early computer art in the United States.

Materiality And Genesis Of Forms: From Idiocy To Idiom. Cases Of NTIC And Digital Art

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As an author and critic, one of the things I do consists of developing ways to consider new practices and new tools of communication and creation which are the New Information and Communication Technologies.

My proposition consists of taking on the material (technical) and spiritual (symbolic) relationship between media and language.

Introduction

By considering the physical makeup of the New Technologies of Information and Communication, we shall attempt to tackle their material characteristics.

The aspects and forms of this materiality will be analyzed successively according to two designs:

- as organic and physical (material) entities
- as indicators of language that it may form (informational)

This questioning applies itself to Norbert Wiener's logic, according to which each element has behavior which must be considered as information.

Thus similarity, or tautology exists, between the organism and communication, the material and informational. Each object possesses its own language, based on its own behavior.

This non-distinction, or non-separation, between matter and information nullifies the dimension of symbolical forms. Language is natural, reality is its own representation.

The similarity Wiener finds between the functioning of the human brain and the computer largely explains the development of his research and conclusions.

Though this is the domain of behavior, studied and applied by science, rather than models of representative cultural constructions.

Therefore a more anthropological approach will be added here, treating the question of information. Wherein we will explore how the human, via an introduction of viewpoint and interpretation, tends to separate or transform the rapport between reality and representational form. Between the real and its double.

This is where what we refer to as the difference between idiom and idiocy unfolds, and the question of meaning is put forward.

In the first case, the world would present itself only in its organic, living form (its metaphysical absurdity), in the second, mankind, graced with sensory and logical capacities, would translate and comment upon them, exchanging with others and not with the world itself.

Throughout this reflection, we will explore the paths between the organic form and the symbolic one, whether there is a link between the two, and if so, which sort of connection it is?

We shall specifically analyze the case of the NTIC's artistic works using these technologies, and attempt to

shed light on the emergence of language and representational forms, the installation of writing systems in terms of discursive intention, and organization of signs.

Thus, representation will be undertaken according to a "postulate" of self-referentiality, that is to say, the generating of formal signs whose matrix would be technology itself.

Finally, we shall examine the place programming occupies in the writing process : is it an essential paradigm, or on the other hand, structural and technical engineering?

Methodology

"The first problem arising is naturally that of the elements of art, or the work's material, necessarily specific for each form of art. We must first distinguish the basic elements from the other elements, in other words, those without which a work of art cannot be born in one domain of art or another."

W.Kandinsky, Point and line on a plan

It is indeed through the nature of materials that the "language of new medias" shall first be questioned, using the terms of the artist and theorist Lev Manovich.

As Kandinsky proposes, we must distinguish from which raw material each form of art is made, and what the role of this raw material is in the ensuing morphogenesis, meaning the one emanating from the singular work of the artist.

Kandinsky considers his book "Point and Line on a plan" as the organic development of "About spirituality in art". This reflection attempts to unravel the dialectic system between the material and spiritual, the organic and symbolic, using elements of the new technologies of information and communication. Firstly, as Kandinsky did, it shall be considered that materiality is the condition of a specificity for each form of art, the "work of art's material" being, "of a different nature" for each of them.

Or, we might state as Marshall Mac Luhan does, in accordance with the media: "the medium is the message".

Idiocy: forms of the organisms, organisms and messages

Does materiality speak?

If we consider the materiality, or the medium of art, we step away from a notion of technical and cultural object, and can then approach its physical constitution : the "basic elements" evoked by Kandinsky.

We shall then name its reality this way.

The reality of the world, the real, its forms, its nature, differ from those of art, be it mimetic, concrete or abstract. Materiality has its own forms and behaviours. Its proper essence.

Reality does exist in itself, in its simplicity, its singularity. Its constitution has a specific organic order, keeping it alive.

"Existence as singular fact, without reflection or double : idiocy, therefore, taken in the first sense of the word, idiotès signifying, particular, unic", which C.Rosset refers to in his essay "The real, idiocy treatise".

Reality says only what it is, in its functioning, in what its vital energy produces.

The discourse of reality is defined by what it is : its identity expresses itself in its tautology.

The same way materiality does through its behaviour.

It gives itself as information, as an element of the world. And each element gives itself thus, in its essence. In its nature. Naked.

Transparency, or the informational paradigm

A relationship other than one pertaining to philosophy and "idiocy", reality and material can be noted. That of the information and communication of theories and sciences : "Everything is information" or "we cannot not communicate". Basic concepts of such a trend of ideas can be found in even the most autistic forms of behaviour. Any corps is able to send messages, meaning there is transparency between medium and message : another way of saying tautology.

Another essential term to keep in mind is the notion of transparency ; these ideas originate from the mathematic and cybernetic researcher Norbert Wiener.

Philippe Breton, French researcher in Commnucation Sciences summerizes Wiener's arguments in this way : "All objects in the universe exist in an informational form, which is essential to them. The entire universe is constituted from the differences between its compositional objects, those differences being equivalent to their behaviour."

An organism's behaviour is considered a language, the emission of signals or signs, containing meaning, a merger, between the referent and the signified.

The organism is complex and moving, so the message is changing, submitted to variations. For Wiener, if the organism is still alive, it is the opposite of chaos, and so "the organism is considered a message". As long as it is alive, it communicates : interacting with its environment.

The question of meaning

Organisms and materialities are considered bearers of messages and information about the world and its reality : however in tautological and idiot dimensions, that is to say, without commentary. And without translation.

Each element has a behaviour which is its own language of information. The medium is the message.

And it is thus. Without any other finality.

The organism's system, specific to each, autarchic, foreign to one another, seems to establish two types of relationship with the world : a distinction between each organism or materiality, allowing us to identify them, though consequently producing autism between the diverse forms of fonctionning, which are unable to understand one another.

The order of things, the systems and regulations keeping them alive, fails to explain any sort of intention or goal : meaning is only bio-logical.

Materiality only marks the state of the world. With no other meaning.

The idiom: from tautology to symbolic forms, from physical to poetic

What is NTIC's material?

Digital materiality, immateriality, virtuality?

The materiality of NTIC seems to escape consistency, making it difficult to define. Absence, fluidity, evanescence? This lack of fixedness may make it indefinable.

But what is it made from, what are its "basic elements", the ones making it appear ?

What does the matrix generate?

Here, the field of NTIC is defined by the computer and its extensions, from the screen to the internet, considering the capacities of computer science, from software's automatic programmes to artificial intelligence, or the creation of virtual realities.

The observation of these applications obviously has for focus the artistic and cultural domains.

The computer is a piece of equipment allowing information to be processed automatically, through a digital data system. The Computer Engineer's work is creating logical solutions making these processes possible. The tools of data processing, via the computer's structure, consist of hardware and software. The hardware can be assimilated to the superstructure and software to the infrastructure. Software is intended to process data irrelevant its nature or its source : text, image, sound, etc...

How does a computer program process data ? How do computer codes and languages interact with other sorts of codes and languages ? How is the result perceptible on a computer screen ?

How is this information given out and transmitted, how do they materialize ?

Independant of the data handled or the processes carried out on this data, the computer program is a combination of binary numbers, called bits, represented by 0 and 1.

To create a program, it is necessary to combine a certain quantity of 0 and 1, and also to associate these numbers to external data, what we call coding the data. This allows us to process it.

We will not examine the complex procedures of program writing, for which each object processed requires a considerable amount of combinations and instructions for its functioning.

The coding and the program do not appear on screen, though they determine the existence of what appears.

What is visible or audible?

Its digital or digitalized material, in the form of data, with which the code, then the program are associated.

The structural elements of the idiomatic

We therefore realize what the NTIC's materiality is composed of, made from computer components, or at least those at work, or working, for its functioning and its use.

Digital components, the basis of the data processing system, seem to manage the entirety of the computer's machinery, from coding to information processing, the mechanisms of simulation and the appearance of the digital data. The starting point for everything in the digital system and its infinite combinations, are 0 and 1, the same way the letters of the alphabet are for writing and language, the structuration of these "basic elements" will generate a number of possibilities for a specific idiom. The 0 and the 1 for Computer sciences

are the binarity from which all is carried out. Everything, or all the probabilities given off by the exponentiality of the combinations the programmer will have provided.

The digital system is both the vehicle of the materialization of the information, and the writing system allowing it to process this information, in other words, manipulate it.

Double language

Data processing, via its digital component, creates a scission between the medium and the surface. The program transmitting the processed information and these data do not share the same field of language.

The data processing program treating texte or image discretely remains a numerical system, for example.

We are therefore dealing with a double, concomitant language, from which logic and meaning are different and autonomous. The informational paradigm of each of them has its own system. Their adjustment to the data processing system is only a technological one, not a semantic one. And there is a lack of direct transparency for the computer user.

Morphogenesis

How does information appear ?

We have seen that the digitalization of external data, of information, its coding followed by its programming were specific to the functioning of data processing.

This implies a double language operating internally in the computer.

This situation is completely different from analogical technologies that do not create forms by themselves, but which record and reveal them, or reproduce them : photography, cinema, recorders, for example.

Concerning the new technonologies, the internalization of the process of creating signs, or formal traces, is one of their specificities. This potentiality places signs, or forms, into their own referential system. And it is the interconnexion of the manipulation of the bits and its results which then generate the forms stemming from the digital.

Several examples

- The dynamic ideography of Pierre Lévy

With dynamic ideography, the philosopher and researcher Pierre Lévy has invented a writing system peculiar to the capacities of contemporary Computer sciences, linking the possibilities the new technologies offer to a new era for thought representation.

Its consequences would be a revolution for human communication.

What sort of writing could have been invented if dynamic and interactive mediums were available to us instead of fixed ones? It would be a writing that doesn't take sound into account, the way the alphabet does, but uses rather mental models. "Dynamic ideography is a form of writing that is iconic and interactive on computer screens. Writing systems have always been developed into a static and fixed inscription, but the computer is a technological support and medium of communication allowing us to combine abstraction, moving image, and interactivity. Movement and the metamorphosis of dynamic signs would be completely

new : an ideographic system full of symbolic, mental representations. The computer would be able to translate and transmit complexity and thought movement."

Pierre Lévy's book "The dynamic ideography" founded this theory of the system of signs. His analyses have inspired many artist's practices.

- Eduardo Kac's Holopoetry

The artist Eduardo Kac has done a substantial amount of work strongly questioning the relationship between new technologies and the human being. Their anthropological impact and effect make up Kac's artistic experiments.

One of them is Holopoetry, created by Kac in the 1980's. Using technics from holography, he establishes perceptive and cognitive experiments based on the reading of immaterial and mobile messages lightly structured in space. "In Holo/Olho (Holo/Eye), the work of art founding holopoetry, different expressive possibilities are organized into synergy" says Kac. And it is the multidimension of holography that affects our sensations and perceptions. "The dissolution of the solidity of poetic space also affects significant units of the poem, the word and the letter. One of the elements of holopoetry is what I refer to as the fluid sign. This is a verbal sign that changes its visual configuration by escaping from the permanence of meaning. A fluid sign is perpetually relative."

Presently Kac designs holopoems engendered by computers. Through its composition methods and reading process Holopetry introduces problems relative to the complexity of human perception.

- About artificial creatures, the historical thread of Philippe Breton

In his book "Into the image of mankind, from Golem to Artificial Creatures", Philippe Breton, the communication science researcher and specialist of technical anthropology, develops the idea that there is an imaginative and symbolic continuity in the history of representing artificial creatures.

Out of anthropomorphic formalism, there is also a technical continuity, making up the base of the materiality of these artificial beings. The term continuity doesn't imply that there is only one materiality for all of these creatures throughout time, but that the technical evolution is able to generate new forms, updatating imaginary projections. Fictitious characters are nevertheless the result of the real scientific inventions of their time.

Philippe Breton also establishes a relationship between the computer, idealistically imagined by its inventors as a simulation of the human brain, and the working of the mind and intelligence, and a new type of artificial creature. "In this way, the computer is the first step towards an ambitious finality : an artificial intelligent human being."

Today, Computer Science and its capacities of calculation allow new types of simulation : virtual reality. Breton finds in these technologies the possibility of imitating mankind on a mental and also physical level.

From material to spiritual, from physical to poetic

These examples show the ways and extent the symbolic form's conditions of emergence are entwined with the physical characteristics of initial medium, the raw material and action of its elements.

We must particularly question the status of what we have named the work of art's reality, or, basic elements,

in order to approach how it travels from the material to spiritual, and from the physical to the poetic. The informational paradigm qualifying each behaviour and each action from a body and its elements as a significant indication of itself ; we are able to deduce that tautology can be considered a language, or, as already stated, "the medium is the message".

Thus, materiality has an activity, and influences the formal result.

But as soon as it's processed, it discretises in favor of a representation for which it will become merely the structure. This is why the language of materiality, its tautology, is not retained as a signal for meaning. It doesn't create transparency. Its transmissional potential is paradoxically relegated to the appearance of the forms it produces itself.

But the materiality's activity is dominant, because it characterizes morphogenesis. Concerning NTIC, data processing will determine representation. The program's writing, whatever its programming language or information to be processed, is equivalent to the sculpture of forms. The display, or the form it takes, will be marked by the computer programmer's, the author of the program's "cutting", and these aspects will then tell another reality.

It is with such an intent, arranged in the program, that the writing shall be situated.

The writing is considered as an intention, experienced as tension between the material reality of elements exercising an entropic biological and morphologically tautological action, and an organization of the biological material system, meaning a manipulation of the objects, that could produce a different order, presenting a formal appearance distinct from the material order, from the sole logic of life.

From this new order, from this formality, it may be said that we have travelled from physical to poetical, from material to spiritual. In this rupture, the poetic occurs between the order of the world, its meaning as such, and the order of writing, not proposing a new metaphysical point of view, but allowing existence in the world by shaping its contours.

In its morphogenesis, the poetic would therefore be another discourse, another language than that of the basic elements. The emergence of signs through forms. The creation of symbolic forms. Each materiality being at the origin of forms, each formalizes specific representations, related to an idiom.

Plasticity, the physical possibilities of the materiality, are the elements accompanying the writing possibilities, because they inform first and foremost the potential formal aspects.

This is how the medium remains the message. It cannot be separated from material conditions. They define it. They are part of the idiom.

Materiality is the virtuality of the forms to create.

The Plane And The Illusion

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We have an occasional collaborating practice that has resulted, since 1999 in several animation-videos and two architectural installation pieces. In the case of the animation-videos we meet each other somewhere in the middle of an opposite drive and interest. Arnaud departs from the facts. Michael departs from a suspicion. Arnaud's interest is more formal, objective and investigating. Michael's interest is narrative, anecdotic, hypothetical and more subjective.

About the work

We are interested in space and believe that space, as well its representation, can't be three-dimensional enough. Like most mainstream computer applications, computer animation usually shows itself to the observer through a flat representation on a monitor. There lies an interesting paradox in this representation. To achieve a three dimensional image you restrict it to a flat plane. Paradoxically, the more you flatten it, the more the illusion you get. In the selected works presented, the exploration of this paradox is our focus. By pushing flatness to its limits we keep both the plane and the illusion simultaneously.

Bridget Riley was fascinated by the fact that her work (op-art) subjected every viewer to the same optical experience. The work itself did not have a subject. There is a liberating element about this submission, a comforting sort of regression. In this, illusion is always in a strange relation to believing. You know it isn't real and still it works, and exactly for this reason you (like to) believe in it.

This interest in the plane and the illusion is probably a specific architectural or painterly interest and the aspect of computer in all this should remain secondary or rather non-specific.

From our respective points of view we consider what we're doing more as architecture (or architectural research), collage or painting.

About the method - non specific computer art

Explore the Limits (Exploration of Limitations Renders Autonomy)

The specific limitations of a medium, often more than it's obvious possibilities, play an important role in the

awareness and the definition of the autonomous qualities of a medium. When an artist embraces these limitations in an artwork, his work contributes to the identity and autonomy of the medium. When at a certain moment in time the obvious possibilities become functionally redundant, this process of searching for the limits of the medium seems to intensify.

The computer is a continuously evolving medium. Computer Art is an art form based on this technological tool, so it's evolutionary by nature since changes in technology and software directly effect what is possible and what's not. New technologies make new things possible, but at the same time this renders older technologies functionally redundant. The latter is maybe even more important for a computer artists than the first.

ASCII graphics aren't needed anymore, like in the pre-Graphical User Interface days of the Bulletin Board Service, but we still see them appear. The tedious process of chemically developing your own film and pictures isn't necessary since digital photography became available but some artists choose to this process for its specific merits.

It seems that when a part of the functional demand of a medium has faded, the medium itself becomes more autonomous and people become aware of the proper qualities of this medium more easily and use it specifically for these reasons.

In *Painting the Canvas* is traditionally flat. But when Lucio Fontana decided to make a small cut in it, the canvas became spatial. In his painting the canvas isn't just supporting the image, it is the image, it has become autonomous. Paradoxically, cutting into the flat canvas to turn it into a spatial object, intensifies one of the specific properties of canvas in painting: it's flatness.

Don't read the manual.

The computer is a tool made to be used, it doesn't need to be revered. Machinima's are obvious examples of this. The software and the game content that are used to make machinima's are accepted in the form they are available, no questions asked, but the whole is misused to make a movie instead of gaming. Like these very popular machinimas are the result of a process of putting game tools to unexpected ends, every software has possibilities that are not anticipated.

In the light of this Aldo Giorgini's statement in 1974 "using a 'canned' program is like choosing one work from 100 paintings in a gallery, and then calling it your own." gets a whole new meaning. These days presets, default settings, templates and other preconfigured content are effectively accepted a medium that can be used, sampled and misused.

Most contemporary word processors offer a pseudo three-dimensional drawing program. A two-dimensional figure can be extruded in 'depth'. This pseudo-volume can be turned in a limited way but always remains

two-dimensional. Within these limitations everything is possible again. (Friends for Eternity, Animation, 2005 - Michael Van den Abeele).

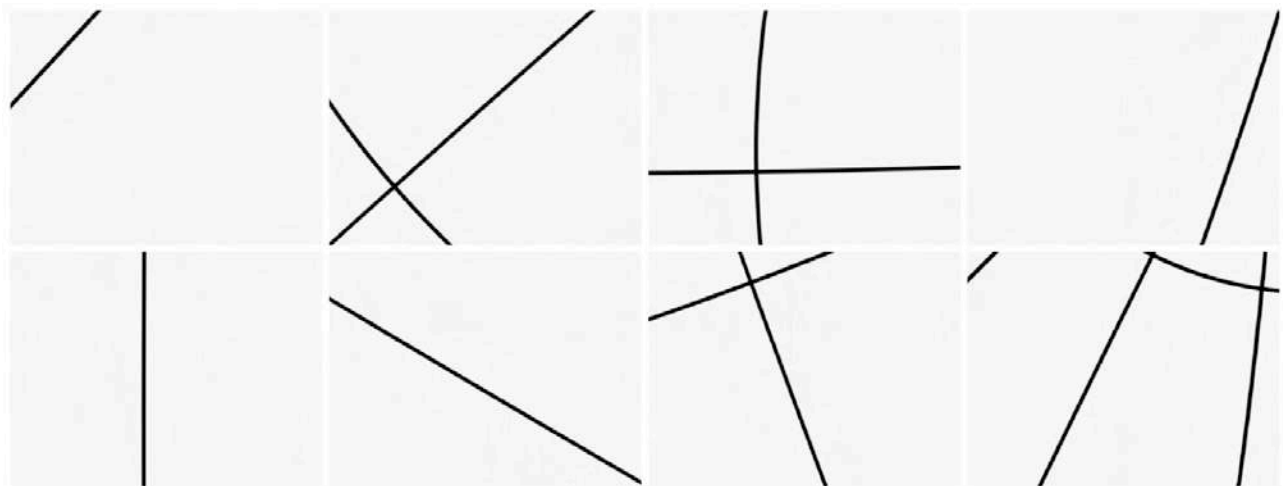
Game level editors provided with first person shooter games, offer a working environment to develop custom game levels. High end real-time three-dimensional graphics guarantee realism and fluent game play. But off course we can also use these high end tools to create simple two-dimensional graphics. (Nopers, Quake II Arena MOD, 2000 - Arnaud Hendrickx)

The Paradox of Identity

An emancipation of computer-art should start by including itself, rather than excluding. The problem is basically the same of any process of emancipation. Take for example feminism: When Taschen publishes the book Women Artists, it is an example of excluding. Such a title and concept states that there are artists in general and women-artists on the side. The idea that artists are generally male is only confirmed by this. Computer-art should not consider itself as a category, in search of it's own identity. You only get the identity when you can let go of it.

Take the example of Ridley Scotts' Blade Runner: the replicants, hunted by Deckard, misperceive themselves as humans. Only when they let go the illusion of being human they are free and able to have their own identity.

Sphere1



Sphere1, CG animation; endless loop, 1999 (Michael Van den Abeele & Arnaud Hendrickx.)

Sphere1 was shown in the exhibition Orbis Terrarum, 2001, at the 16th century printing house Plantin-Moretus in Antwerp (Belgium). It was shown in proximity of the Theatrum Orbis Terrarum, the first atlas ever, printed in 1570.

Sphere1 recreates the spatial feeling of a sphere through vision and it should be projected wall-size in order to be fully experienced. It is about projection in the cartographic sense of the word. A virtual camera travels around a three-dimensional sphere of undefined measures. Basic longitudes and latitudes mark the sphere. The absence of light and shadow reduces the sphere to a two-dimensional line drawing. Like a type of abstract mime the lines seem to perform a ghost dance around an invisible object.

Paraphrasing Rimbaud's *'Je est un autre'* (I is another), the motto for Sphere1 could be *'I is a satellite'*.

It is the most objective piece we have made. It could have been made by anybody. There's no personality in it whatsoever.

Sphere1 is about seeing. More specifically, it is about seeing what is not there.

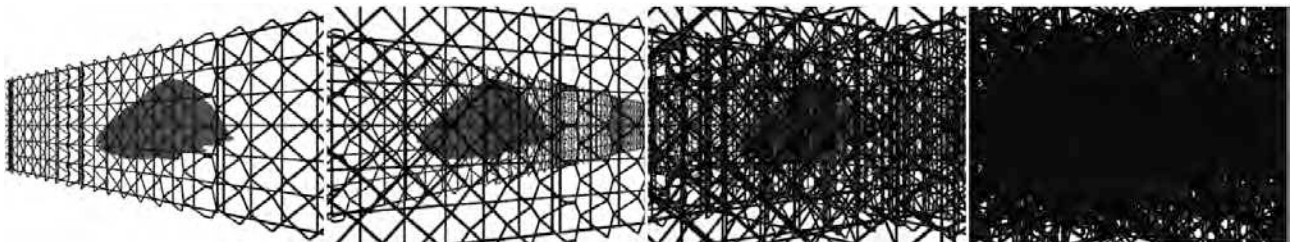
The sphere is too big for the screen. Only one percent of its surface is visible at a time, but the entire surface becomes visible to our mind.

By omitting, more is made visible. In a way the sphere becomes more of a Platonic archetype, an universal geometry, than a visual presence, it is not a specific sphere, it is the mother of all spheres.

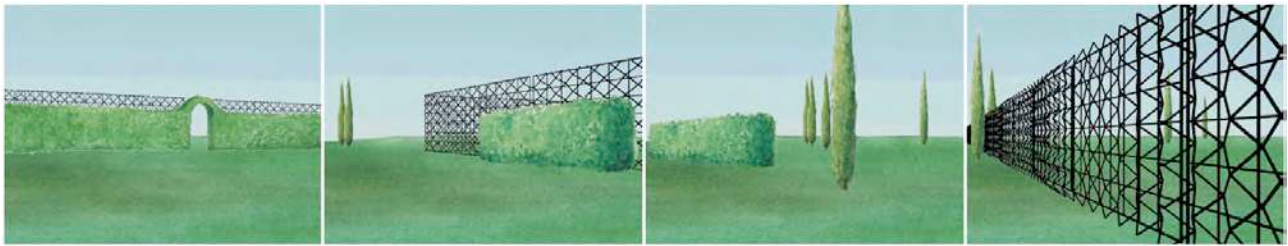
This spatial illusion goes back and forth between two different modes of vision: based on the immediate visual sensation of the things seen (we see lines) and based on assumptions the brain makes during perception (we see a sphere).

"Remember: You are inside an enclosed space with equal height and width. Do your eyes instruct you about the cube merely by noticing it, without giving any additional interpretation? No. You don't really see the cube. You may see a corner, or a side, or the ceiling, never all defining surfaces at the same time." - Bernard Tschumi, 1975

the Sausage Party #2 & #4



the Sausage Party #2, CG animation, 2007 (Michael Van den Abeele & Arnaud Hendrickx.)



the Sausage Party #4, Preliminary sketches for the landscape layer, 2008 (Michael Van den Abeele)

In the Sausage Party #2 & #4, the different layers function autonomous. They were designed, painted or filmed independently and brought together in the montage. The three-dimensional movement of the CSI-layer remains flat in correspondence to the landscape behind it and a layer of filmed dancers in front. It holds three different kinds of relations of perspective.

All animations and the drawings of the fence used in Sausage Party #2 & #4 deal in a graphical way with space, depth, territory, ornament, boundaries, ... This approach originates from a project Michael and I did together in 2007: Gated art community 'Breughel's view', Mechelen (B). (The image to the below)



Friends for Eternity



Friends for Eternity, Animation, 4:55min, 2005. (Michael Van den Abeele)

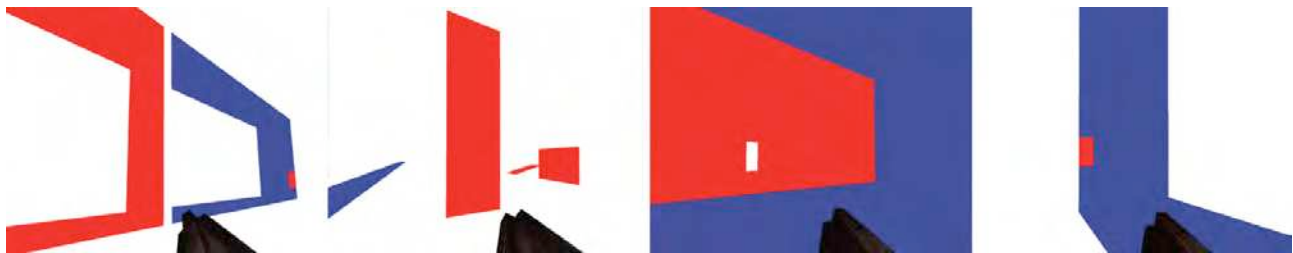
The space in **Friends for Eternity** is narrow, too close and yet there is an undetermined distance between the plane of the action and the surface of the monitor-screen (or projection-screen). The flatness of the image does not coincide with the surface of the screen. It is very hard to locate the area or determine the dimension of Friends of Eternity.

As an erotic movie (no flesh involved though), Friends for Eternity, is ultimately about distance and desire, this is what makes it so desperately lonely and lost.

The entire video is horrifically flat. The erotic pictures are pasted upon grey containers in isometric perspective. The movement of the containers is an illusion. The containers are drawn in Word and the movements are realised in Photoshop through layering. They don't move freely in three dimensions but merely up, down, left and right.

It was never meant to be an allegory of whatsoever. Some people think it is about the Internet or that it holds a critical distance towards internet-porn, but it's not. It originated from the simple desire to make a dirty picture. Eventually it turned out more tragic. More science fiction.

Nopers



Nopers, Quake II Arena MOD, 2000. (Arnaud Hendrickx)

In the classic science fiction book Flatland: A Romance of Many Dimensions, Edwin A. Abbot describes the life of A. Square, a flat square figure living in a plane, his flat two-dimensional world. At a certain point in his life, the square finds himself talking to a voice from outer space (outer plane in this case). It turns out to be the voice of a Sphere, a spheric solid inhabitant from Spaceland. The Sphere tries to explain the third dimension to the square by introducing height. He succeeds in this by moving from above the plane of Flatland to underneath it. While the Sphere slowly passes through Flatland, the Square perceives first a point, then a tiny circle that slowly grows bigger and then slowly starts becoming smaller again until it becomes a point and finally disappears.

Thus the Square comes to understand a solid sphere as a stack of circles, and a cube is later on explained as a stack of squares. But when the Square leaves Flatland and sees a perspective view of a cube, he sees the contours as a Plane. Light, shade and perspective are new to him, so he just sees a Plane and not a Solid. It is only when A. Square touches the Solid that he starts to understand.

In Nopers we try to explore the adventure of A. Square in Spaceland, not by letting the spectator touch, but by letting him move. This game of grasping space seems to generate interesting interactive graphics and it tests the viewer's spatial insight. This 'game' was made in a first person shooter computer game (Quake II Arena). We removed the shadows and put full omnipresent light everywhere and reduced the textures to a

minimum. The powerful three-dimensional engine, capable of (almost) photo-realistic representations, now produced a simple and completely flat graphical image. When touching the mouse or the keyboard the composition of this image changes. At first this just seems like an interactive graphical image, but after a while we begin to grasp the image as a flattened representation of space. We are not moving the graphics but we are moving ourselves. How the coloured planes move, how they become bigger or smaller, and how one plane is obstructing the view of another gives us clues about the form of the space.

minE~i+)_mire

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PiM's minE~i+)_mire : MiM-cK.swf

In what the Computer Is art bound to the art ? When Henri Matisse paints in 1911 the picture “Intérieur aux aubergines”(1) exposed to the Museum of Grenoble, he invents a complex layout of frames imbricated from the central motive for the eggplant. By the dissolution and the progressive abstraction of this subject borrowed from the still life Henri Matisse imagines and composes a prototypique system of interactive information. All the elements have a dialogue in data network : the mirror, the folding screen, the tablecloth put on the raised table or still the window answer and allow us to circulate, to slide on the surface of the painting, to move from a frame to the other one. And no shade throws some prospect. So the surface seems as *rétroéclairée* : brought to light represented by several sources leans on a set of forms and of colors which all aggravate the planeité of the picture. The composition so asserts itself as a frontal collage ; a wall

patchwork which makes screen - a system "Dashboard / Statement" (2) - and sends back to the importance of the support.

mine~i+)_mire is realized from five Julien Guinand's photos : "Les tireurs"(3). This "PiM's"(4), also in the form of patchwork, is built around the gradual emergence of the object "©box"(5). From conception to exit *ateliers curial enseignes*. Fifteen scenes successive compose a blend of information cross. But each of these requires a table out of a slip, a course of the mouse to encourage us to seek and discover in the area of the file, other information developed network ; always interconnected with the whole work and other work presented on the ©box, such as *U & i...* There is interactivity between the viewer and the computer containing the work, between the spectator in the ©box containing the computer, the spectator watching the audience watching the computer. But the process of playing around the concept of surface is substantially similar to that which we can observe with *l'Intérieur aux aubergines*. We surf - hundred years away - in a maze voluntarily open to the outside. *L'intérieur aux aubergines*. We regrowth outside the scene. To real.



©box, into the future, installation Centre Art Contemporain Lacoux, 2007

To :

To serve as a target or targets to use ? In the beginning, on the Julien Guinand's photos, *Les tireurs* are pointing a target that is not seen. The information is not given. It is assumed, as we ungraded. We do see that show, at the precise moment they are shifting their focus to perhaps better to concentrate on the point to be achieved. Subcultures already that the target word is linked with its Germanic roots to the idea of cutting and carving. In *mine~i+)_mire*, *Les tireurs* become in turn targets, *to be detailed*.

SU :

Staying in the axis ? Texts box, the *mine~i+)_mire* cartridges are somehow posted in reserve, waiting in the letters. *D/placed* by movement of the pointer, these fragments appear through the letters in reserve, *which*

hold attention. The targets are revealed at the time or the foreground witness fades gently with the mouse, to return loudly opacifier the surface after any new movement. The shooters give us a time delay.

cK :

Ritournelle ? The important thing is not today (*on the day of the i* as information or as the *i* subject) to create images, but to select and begin working. The movement must lead to re-reading. Targeting the target to avoid being too quickly become a target. The sniper *in/form*ation behind the screen (télé-viseur) is still embarrassed by the too rapid movements, successive bonds, the different points of view.

tHE :

i-deal ? With *minE~i+)_mire* You should always wait a bit ... Re-play or advertisement Anne Duguet, to foil the image game. The idea of *®≠Make*, This already *re-play at work* in the *société i matériel*, is always linked to a matter of perspective. *i* went through *i* if *i* go back there. A single shot being fired. A whiplash. A small click for a big couac. The information should reach its target and unlike our *i* subject, focused, must once again focus on the screen the information that concerns us. At what level surface ? At what moment ? The movement of the *InstantPortrait* is given in the long term. *i-deal* : a month for me. Etienne-Jules Marey invented in 1882 the photographic rifle capable of photographing on nature. Nature is no longer a point in central prospect. It is now digital experimenting with a scanning surface. The target can therefore be seen that side. Distributed around and on a screen. To see something of a test line of fire curve.

i :

i believe in U ? The information interactivity requires us to design the landscape digital image perceived as a network electromagnetic moving, always *in/visible*, so posted at the edge of the visible. We can see then only *in/between* ; readjust shooting through several areas which act as screens. Wait and see, with the line of sight *le saut du loup*.



Visual device called le saut du loup : the vision restores the linear perspective by hiding the information track...

Material :

The trajectory - the aims - is being built now from the outside inwards. Looking back now enables us to go beyond the simple *i* material architecture. The idea of the *saut du loup* marks a partial absence of vision, masks temporarily *an element of the landscape, an information track*. This is the uniformity of the distribution stream which form the essentiality medium as a specific trait of modernism, wrote Françoise Parfait. *minE~i+)_mire* stress, over a matter of time, a system of flows seen as an electrical reflecting pool. We are exactly in the inter/Made. In the friction of an information pile always in movement (an *i-mobile* pile), several surfaces managed by the same stream make a question of time ; an *entre/temps*.

SubS :

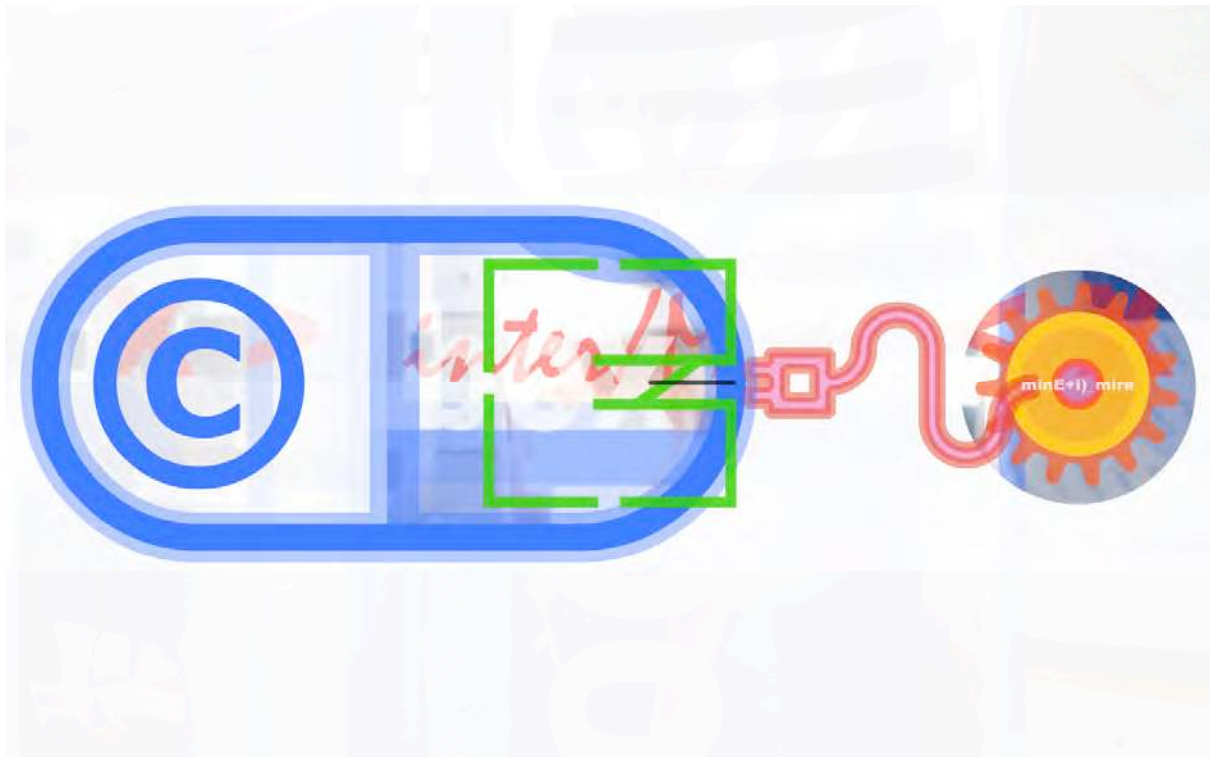
The surface of the tube sighting akin to the surface of the target, Itself *infomédiaire* (intermediary adviser) of the surface of the target ; *in/visible* bottom. *minE+)_mire* makes a new single space between the two spaces. The trajectory. *Verum Eikôn*. The *true image* implies the idea of a veil associated with an image (in the case of Véronique, the image of the Christ), in movement. Moved, the translucent veil masks partially the bottom on which it's temporarily put. The ®#Make picture turned inward (®#turned) because made by duplication send back to one an outside, the real world.

T@ :

True ? That's the raison why the *true image* is always linked to an issue of trajectory between two surfaces. The idea is not simply not measure the accuracy of the result but to measure the ability to fully assume virtually the distance traveled. Because It's physically impossible to verify the resemblance - the image of Christ model - in the Véronique's veil as it is physically impossible to see the ball during its course. The impossible space to cross for the shooter locked in his box, behind the barrier of the shooting - the sensitive space - becomes a friction zone, a *sensory surface*.

N! :

®#Make. The different trajectories model the flow. As drops on the surface of a lake. But the rainy curtain is not uniform. Thus, in *Sniper* of Samuel Bianchini, the important thing is not to view the outcome (*in/predictable*), but to test the flow of information ; to interfere in its breadth, its strength ; to perform its *resistance potential*.



PiM's minE~i+)_mire : MiM-©E.swf

©E :

minE~i+)_mire describes a perceptible form of trajectory, pierce ?, break ? via two entrances, two checkpoints : a text around the process envisaged by the *société i matériel* to build the deconstruction of information and all fifteen scenes articulating another text a slogan-cut, stretched-detailed somewhere measure inability to put an end to this trajectory...

offf :

In this tension gesture of the Zen archer, To operate a transverse aesthetic body movements enters the desire (of the sense) and the logic of the ego (to reach its target). The image *minE~i+)_mire (die)consisted* becomes by metaphor the sensitive scratch raised visibly on the surface of a frozen extent ; screen *figure skating* on which the viewer moves.

iN :

Gliding on the stream. Crossing a stream of excitement at the crossroads of art and new media such as Christiane Fricke wrote about Nam June Paik ; to create a space e-neoreality Global Groove - whose interface where communication is at the center the approach *that of a culture of television and information throughout the world...* We prevailed to a new epic.

/ :

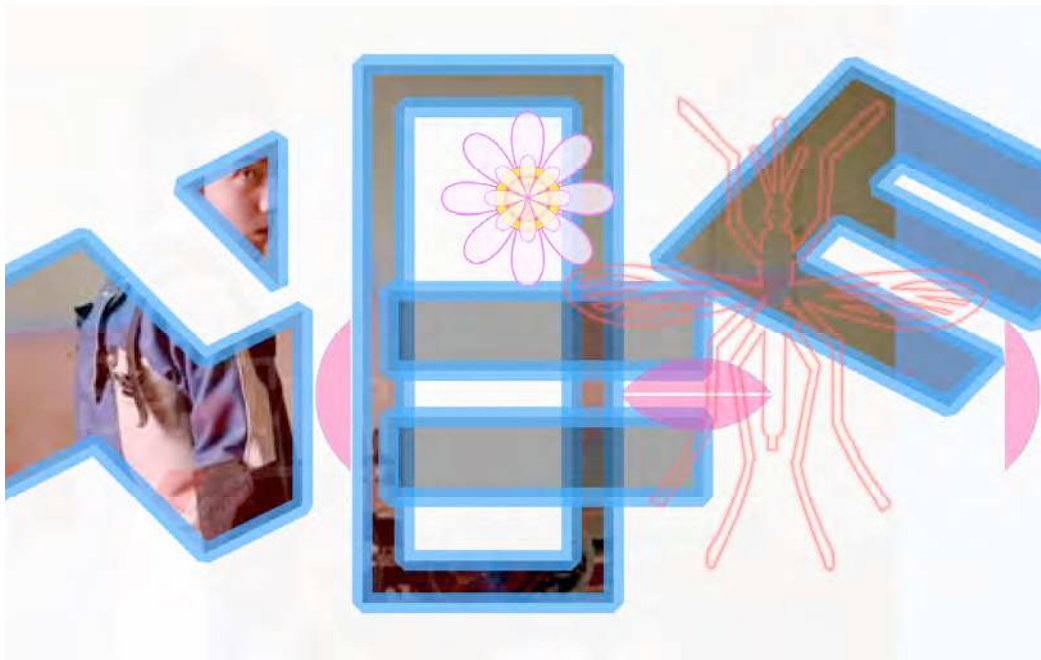
Lose the key for indéfinir the program, deprive its any perspective of the end. In the codes of the Japanese garden the *shakkei* (borrowed landscape) makes visible only with frames and limits added by successive plans to the already existing frame of the garden. In the third plan the wall which encloses the space hides the outside elements unwanted. But this wall creates not only an *interface* between an inside and an outside, it creates a *super surface*, a sort of wire netting from which (or on which) consist the learned implementation of internal elements arranged in border of the garden : stones, sculptured vegetables (*karekami*), foam... operators' a whole set interacting with the outside to compose a picture in/visible which is going to absorb, to capture outside elements without different break (pagoda, temple...) by returning them to the surface; the borrowed landscape constituting in a sense the fourth plan veiled by the precedent.

visible :

Ikedori (alive capture). With *minE~i+)_mire* appropriate itself a set of images by making them play, correspond, slide without absorbing them completely... But by a choice of details operate an operating collage of sense, transverse between plans, in the thickness of the superimposed layers.

language :

To follow, to point with the finger (through the mouse) the emergence of a reading in its infancy - risky - enters the importance of words left in reserve, always pushed aside by the raid of signs / images. Finally play the appearance of the language as *determining moment*.



PiM's minE~i+)_mire : MiM-tHE.swf

®+U experienced?

In *minE~i+)_mire*, there has thus a set of *determining moments*. In and out, around every picture. Indeed if we examine the time of actual passage between every picture. There is really no space ; just an *interactive option*, an *entre/acte*. Because the suggested interactivity between is not hardly different from that, forced in. Choose *between* two. To move the mouse enters one of fifteen fragments *agents of surface* to enter. Then attempt to accelerate voluntarily / to slow down the movement, the rhythm of the mouse *in this extract*, to see ; create this *entre/deux*. And, gradually, by the experiment of this interactivity, lose foot in this dislocation of the space transformed into sensitized *super surface*. So, following the example of walls separating both garages of a shooting gallery, the passage from one to another is only re-producing the *entre/acte* ; the gunshot. The moment of aim being translated in the immediate of the gunshot erases any distance crossed by the ball between the rifle and the target ; immediate one similar to the principle of the simple action of the *click and go* provoking the connection. We find here the idea of the Étienne Jules Marey "photographic rifle"(6), transposed by Edward Muybridge into so many cameras to seize the various movements of a galloping horse. Every photographic cliché underlines only the moment of an intermittent movement, that is made, split up by the interaction of all these threads activating shots. The shot group is structured only in a sum of actions although, conversely, the action to act on this movement not only to try to understand the *interactivity* but also to make various points of view determines only an *experience of the possible*, *réellise*, verify then a theoretical option. The extract of moments determines the information.



Henri Matisse, *Intérieur aux aubergines*, Collioure, September 1911, tempera in the glue on painting, 212 x 246 cm, Museum of Grenoble.

On the *oilcloth* of the *Intérieur aux aubergines*, we are also in front of the same problem. For example the visible landscape through the opened window, to the right, stimulates only an assembly of already present colors on / around the table. To isolate (to recentre ?) one of the elements ; train, smoke, bridge, fence... it is necessary to separate it from the other motives using the same color. The momentary dispersal suggests, composes an interactivity except any story; a dynamic experience. The table raised in the center of the room *signs* the *trompe-l'oeil*. The impossibility to see the set without decrease of the story, without *sticking to the surface* provokes connections by a requirement of the detail. An on *this side paradoxical* in the composition. Because the more this detail seems to appear clearly, the more the coherence of the set - already or still in movement: the surface of the *Intérieur aux aubergines* moves as a drumskin - disappears *clearly* for the benefit of this one. So ; Daniel Arasse underlines it for "Piero di Cossimo, l'excentrique"(7) ; the visible incoherence of the connections impose an extravagance of the glance, the brilliant wandering of details in detail : "in this glance of detail and in the euphoria which it arouses, the spectator gets lost himself - he drowns himself, as we shall say later. He mixes the categories and the references. In closer of the painted surface, carried in front of the place which would assign him the *justifiable construction* of the reasonable representation, it is too disrupted and loses the coordinates which guarantee a reasonable perception"(8). This strategy sends back to us to a measure of our point of view, a forciori *i-reasonable* ; that is reasoned with regard to the information which we are supposed to measure, since the chosen control point (*checkpoint*). This point of fall becomes sense / target *minE~i+* _mire.

It is thus necessary to think *minE~i+)_mire* as a sum of *surfaces borders*, in the idea of *dissolving views*. With “EINS. UN. ONE...”(9) exposed by Robert Filliou for the first time in Düsseldorf in 1964, the artist evokes the idea of an unpredictable jet, a shape of rudimentary programming, experimental, signed in the place (and the time) of presentation by the spectator, *codifying* the space of exhibition of one 1.0. Our *minE~i+)_mire* produced a questioned glance. The interactive program in fifteen acts multiplies the protocols of approach, intended to control, with more or less of chance - and in a risky way - the apparation of the information about the *super surface* of the screen. It is necessary to dare to lose the thread... Because *the spectacle seems already begun*.

Notes

- (1) Henri Matisse, *Intérieur aux aubergines*, Collioure, September 1911, tempera in the glue on painting, 212 x 246 cm, Museum of Grenoble. Henri Matisse hesitated to paint around the picture a frame painted by motives floral as the watercolor *Intérieur aux aubergines* shows it (aquarelle, 21,4 x 32,2 cm, private coll.).
- (2) Applications system allowing on Apple Macintosh to open and close one or several present windows on the surface of the screen, without closing them however.
- (3) Julien Guinand, *Les tireurs*, color photos , 95 x 115 cm, contrecolled on dibond, 2006.
- (4) PiM's : *Personal investigation Material*. They are small interactive films created and proposed on Internet by the *société i matériel*.
- (5) ©box is an art work and a box which contains works. Single pill, her allows a virtual enlargement of the place that exhibits it. Real point of information generated from contemporary works protected under creative commons, created, managed by computer and effectively questions pictures in movement, ©box suggests constantly exchanges between public and private space, enters real and virtual; of new collaboratives experiences. You can see this art work on two websites : <http://www.cbox-office.com> + <http://www.cbox-office.fr>.
- (6) In 1874, the astronomer Jules Janssen invents the photographic pistol, intended to register the movement of celestial bodies. Marey is inspired by it and finalizes, in 1882, the photographic rifle which allows him to photograph on nature a being in movement on twelve poses. This camera has the advantage to be light and mobile. He uses hit it only some months, but the invention remained famous. Étienne-Jules Marey asserts that a galloping horse sees its legs coming loose of the ground, but this vision is deeply disputed. Among the numerous and rich customers of Edward Muybridge represents Leland Stanford, fascinated by racehorses, breeder and trainer. It is by this character that Muybridge acquaints of the debate on the running of the horse. A prize is promised to the one who will resolve the problem. To cut the question, Muybridge is going to use the photography. In 1878, he commands in England 24 cameras which he arranges along an equestrian track. By activating them at distance by means of tense threads, he obtains the famous cliché which confirms the theory of Marey.
- (7) / (8) Daniel Arasse, *Le sujet dans le tableau*, Éditions Flammarion, coll. Champs, Paris, 2006, p.95.
- (9) Robert Filliou, *EINS. UN. ONE...*, Installation distributed on a circle 9 metres in diameter, 5000 dices blue, red, yellow, black and white with various sizes, with on every face a single point. The title of the exhibition *Von hier aus* - From here - is premonitory...

Urban Journal

Experimental Installation for the Mobile Phone Network

Chun-chi Wang

Independent Artist

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Technique employed: Programing language: Sheng-Po SHEN

Technical material used in the production:

Hardware:

1 x Multimedia Projector, 2500~3000 Ansi minimum

1 x Pentium 4 PC 1 GHz Processor Minimum, 512 MB Memory,

1 GB Hard Disk, 10/100 Ethernet Card, Matrox Dual Output Card, Soundblaster - Audio Card, System Windows XP, Monitor, Keyboard, Mouse

1 x Bluetooth Mouse

1 x Nokia Card Phone 2.0 PCMCIA

1 x Mobile Phone SIM Card

1 x Internet access (or Hub) with 100 KiloByte minimum upload speed

Software:

Windows XP

JDK (Java Development Kit)

Processing

Google Earth

Flicker

iSMS

Nokia Card Phone PCMCIA

Presentation support:

1 x Multimedia Projector, 2500~3000 Ansi minimum

1 x Internet access (or Hub) with 100 KiloByte minimum upload speed

Installation Architecture:

Size of The Room installation 350 cm x 380 cm

Size of Exhibition Room to include back projection 800 cm x 800 cm minimum

(Exhibition Room must be entirely blacked out)

1 x Projection Wall, freestanding for Back Projection, 230 cm high x 330 cm wide

Additional Material: Net Cables (1), Extension Lead, Gaffa Tape Black

Description of artwork

The work will consist of

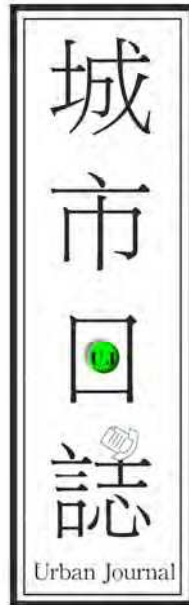
A - An room installation in a public gallery space and

B - A specially designed Mobile connected to the Public space installation

URBAN JOURNAL - Concept

"Urban_Journal" is a location sensitive mobile media art piece that facilitates interaction and exchange between people. New media technologies, such as the mobile phone, overlay older forms of communication to constitute a new type of urban space in the form of a social communication matrix. The sending of text

messages (SMS) via mobile phones has become a ubiquitous component of such communication practices, enabling every inhabitant with access to a phone to take part in the "Urban Journal" by recording their daily impressions and forwarding them via their mobile phone.



Mon nom est Chun-chi Wang
Je travaille sur une projet artistique intitulé :
"Journal Urbain" qui raconte l'expérience de vie urbaine.
Vous êtes invités à vous joindre au projet
en partageant votre histoire.
Envoyez-moi un SMS avec votre histoire
+33699771744

This phenomena creates a shared cultural platform and through its global media dissemination this leads to the local region entering a global city dialogue.



CAMAC/Centred'Art Marnay Art Centre , France



Cite des arts Paris , France

Computer Art, Media Art: a Social Hyper dimension

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Modern art has the merit to announce new perceptions and practices of creativity into the art universe. It has liberated the concept of “Art”. Moreover, contemporary modern Art has brought the recognition of conceptual art, which has revolutionized the relation between artists and creators with all kind of materials and spaces.

Media art has respected this deal and suggests to increasingly liberating the creative universe. Contemporary artists move beyond classic and traditional art rules; in some respect they are no longer mandatory but optional. More important, the whole spectrum of universes and theirs objects are subjective matter. Art is a prolific set of concepts and practices where tools can be used to imagine new universes, objects and materials.

But subjectivity in media art encounters a social dimension when artists take into account that they can collaborate, anytime, anywhere... A piece of artwork is then not only completed with the active participation of other artists but also with unknown or anonymous spectators. We perceive that artists are experimenting with liberating the “work space” from two important elements: time and space. Media Art has overcome the interest and necessity of some artists to integrate collaboration and collective intelligence schemes with new universes and immersion in them.

Information technology (IT) devices seen as meta-medium, capable to converge multiple representational codes and stimuli in one support, can also be analyzed as an open-close universe. Any IT user experiences in Media Art its openness as it is out of time, space and traditional concepts. Post-modernism has popularized the idea of the possibility of different lectures within a piece of art, however, in Media Art, these lectures may change dramatically according to inter-subjective schemes and the “living” will of the work: every time we come back to the work, it has changed in substance.

The closed character of Media Art is tightening with the fact that it is completely dependent of information technology. To this respect, common issues on Computer Art such as exhibition, distribution, reception and preservation require to consider the language of digital media to tackle them. It seems that a double logic rises: on one hand, users become literate about manipulation of computer symbols; on the other hand, those symbols not always conciliate a transparent and intuitive interactivity with users.

Since the last decade, two challenges of IT have been the human-centered design and the development of user-friendly systems. The result has been that much of IT tools are available to non-specialists. To this respect, for example, it is not difficult to observe that IT-based teaching and learning supports have allowed

a large amount of users to pretend mastering creation tools. Those tools increase in number and decrease in prize. Furthermore, we find them on a wide variety of formats: open source and Web-based.

We cannot deny that those features play an important part of Media Art recognition. Besides user-friendly predispositions in front of a Media Art object, a kind of confusion has been installed between creativity and mastering tools.

What we consider a seminal characteristic of *creation* is that creation is not the same thing as production. Production is more related with perceptive processes found on cultural-based modes of seeing: we *produce* meanings when we perceive objects. From this perspective, creation is more related with innovation; with structuring new universes out of forms and objects.

This is a reason why artists tend to go beyond and refashion predisposed tools. Media artists create their own tools. They experiment with high level objects inherent to Media Art such as programming, connectivity and development of electronic devices, the design of new algorithms and all kinds of CGI. Thus, creation is not only something visible or tangible for users, it can be a subjective representation used to understand other objects.

But the question on social hyper dimension is latent and leads to consider a delegation of responsibility from artists to users and spectators. Media Art objects need active participation to discover its sense. Within social and collaborative environments, participants may be confronted with challenging graphical user interfaces that demand to adopt different positions on exploring and interacting.

Nevertheless, democratizing access to creativity universes has some important advantages:

- emerging hidden talent.
- discovering Art
- living a kind of “creativity” experiences
- acquiring new “subjective” culture to appreciate the “Creativity”
- challenging artists to more creativity

In sum, Media Art, more than Computer Art, will very soon announce a new Art wave; a new Art Era: the **Post Digital Art!**

Gaia Fading

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Description of artwork

As soon as our ancestors began to walk the Earth, the belief in some universal life-principle arose. Be it the natural world surrounding us or the primordial energy dwelling within our psyche, Gaia is slowly fading into the darkness. Should her vibrant spirit extinguish itself, what will become of us?

For the ancient Greeks, Gaia was the primal goddess of the Earth. She was an anthropomorphic figure and, as such, depicted in countless ancient and neoclassical works of *figurative* art. Mother Nature, otherwise known as Mother Earth, is considered an even older personification of nature, also embodied in feminine form. Jungian psychology sees it as a variation or derivative of the Mother archetype, embedded in the collective subconsciousness. If Mother Nature appears as the caretaker of the environment and the source of nurturing for all living beings, Anima Mundi was thought of as the world soul. This philosophical idea of a universal spirit that pervades all matter as a human spirit pervades the body was initially attributed to Plato, but it actually has its roots in eastern philosophy. Anima Mundi is thus related to the Hindu concept of Atma (commonly translated as “the Self”), which ultimately reconciles one’s true soul with the universal soul – the soul of the world.

These ancient religious and philosophical concepts have recently found their way into the realm of science. During the Sixties and Seventies, Dr. James Lovelock formulated an ecological hypothesis and named it after the Earth goddess of the ancient Greeks. Gaia hypothesis was born, or perhaps reborn, and with it the debate about whether or not Earth can be thought of as a single organism, a complex interacting system formed by living and non-living parts.

Subsets {B[65], A[29], C[55]}, {C[70], B[32], A[74]} and {A[51], C[72], B[69]} belong to my recent series of computer generated images, entitled Gaia Fading. Although *abstract* in style, they could by no means be labelled as “non-referential”. During the creative process, I was driven by a deep desire, an “inner necessity” in Kandinsky’s terms, to capture the very essence of Gaia.

The founders of abstractionism rejected the rhetorical transparency of the canvas surface, making it opaque, two-dimensional. Since then, abstract artists have emphasized flatness over depth, formalism rather than illusionism. In my work I try to break up with the sterile tradition of photorealism, usually associated with computer animation and computer art. If I returned to the classical concept of perspective, often referred to as Albertian or Renaissance window, it was only in order to make Gaia appear more real in its unreality. Nevertheless, this illusionism is only apparent, as my artworks depict landscapes that only the inner eye can see. Alberti’s window onto the world becomes a window into one’s soul (coinciding maybe with the soul of the world).

Despite significant advances in the field of non-photorealistic rendering (NPR), most commercially available 3D modelling and animation packages are still bound by the paradigms of realism and figuration, implicit in the way they are advertised and designed to be used. Rendering is only one task, one stage of the creative process. Can it alone make *all* the difference?

Although working with an off-the-shelf software that has moderate NPR capabilities, I did not use any of these for Gaia Fading. Instead, I found my own ways to subvert and play with the above-mentioned paradigms. By using LightWave's tools for purposes other than they were meant for, I sometimes turn software limitations into artistic advantages.

Techniques employed

Software: NewTek LightWave 3D (version 9.3); Hardware: PC (Pentium D dual-core 64-bit 3.7GHz, RAM DDR2 8GB, GeForce 7900GT); Technical material used in the production: photo paper (Kodak Endura), acrylic glass, composite material (Dibond); Dimensions: 92 x 69 cm (36 x 27 inches); Technical material required for the exhibition: lighting equipment, wall hanging system.

By modelling organically shaped objects and morphing them into one another, I was able to animate Gaia's expansions and contractions in relation to Nyx (Gaia's dark counterpart, consisting of several layers of blackness). All base objects and morph targets were defined by subdivision surfaces and made invisible to the virtual camera. I used morph targets to animate particles in a specific way. Each time the Nyx-emitter would make "polluted" particles explode (blow outwards), the Gaia-emitter would respond by making the "unpolluted" ones implode (blow inwards), and vice versa. Once the animation was done and the dynamics calculated, I started surfacing particles, or better, assigning voxels (volume elements) to them. During this phase, hundreds of frames were rendered. The process of comparison allowed me to gradually refine the results and achieve that lyrical, deliberately painterly look that distinguishes the Gaia Fading series.

Three different prototypes of Gaia were made, denoted by the capital letters A, B and C. For exhibition purposes, nine images (three per prototype) were selected and rendered in high-resolution. Subsequently, they were prepared for digital C-print and face-mounting onto acrylic glass (process known as Diasec).

Further developments

As opposed to images, the "real" Gaias behind the surface of the screen (be it a printed picture or an electronic display) are neither flat nor rectangular. Instead, they exist in algorithmic space as bioluminescent constellations of floating entities, fluctuating particles and meticulously arranged light sources. My dream as an artist is to present them on a volumetric display of some kind. Such a display could either show simple, static versions of Gaia (virtual sculptures) or allow for dynamic forms to emerge, with inner and outer volumes constantly shape-shifting and changing over time (virtual structures). An even further step would be to program some self-awareness and responsiveness into them, which would make them virtual organisms. They could react to the presence of the viewer – now elevated to being a user – and transmit a unique message to the Self.

The Gaia Fading project could thus become a powerful metaphor, showing global consequences of human activity on Earth. A central engine would connect Gaia to external sources, retrieve results of scientific measurements and transform numerical inputs (such as levels of air, water and soil pollution) into highly suggestive visual and audio outputs. The higher the pollution levels, the lower Gaia's intensity in terms of light, colour, structural expansion...



Gaia Fading A[29]



Gaia Fading A[74]



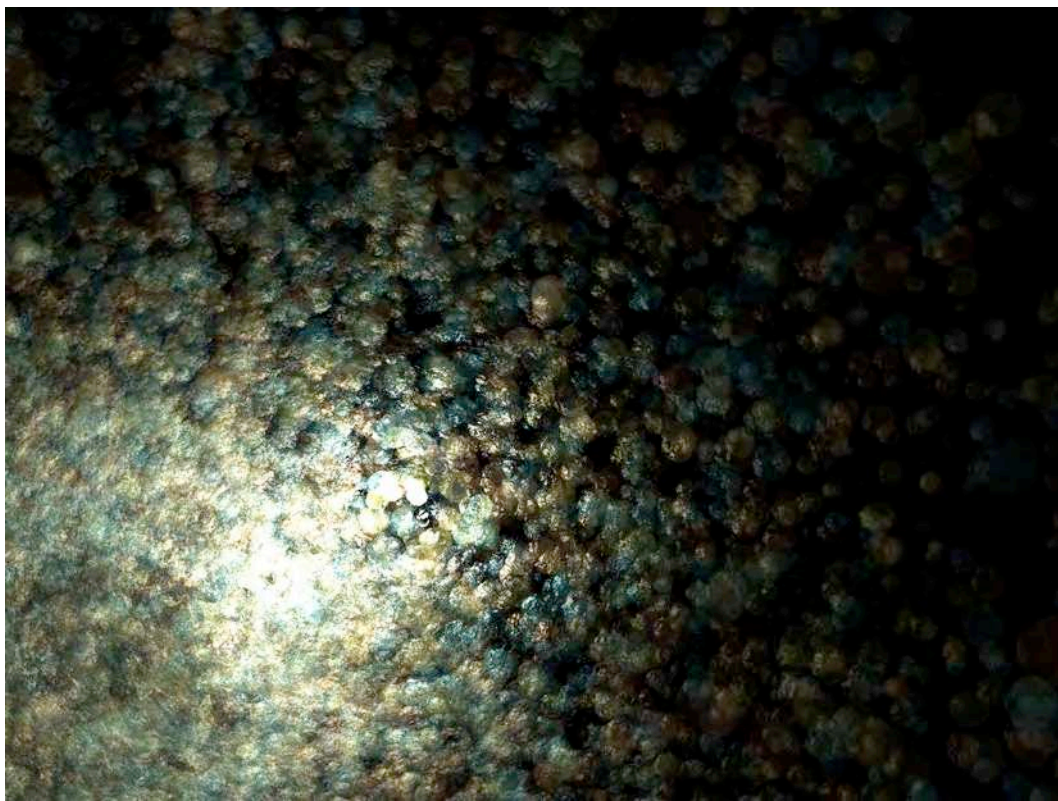
Gaia Fading A[51]



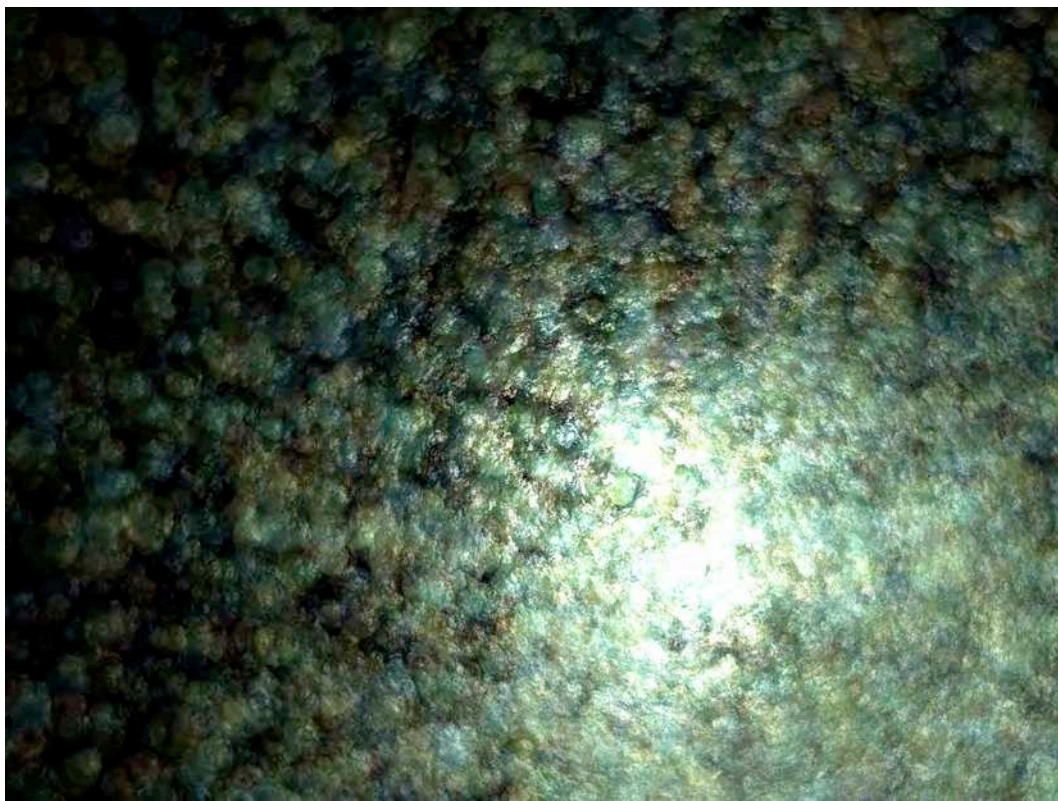
Gaia Fading B[69]



Gaia Fading B[32]



Gaia Fading B[65]



Gaia Fading C[55]



Gaia Fading C[70]



Gaia Fading C[72]



CARGRAPHICS

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