Reassessment of Painting: Fine Art Painting and Experimental Computer Animation

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Abstract - Much can be learnt from the masters of abstract fine-art painting who managed to inject life and emotions in their non-representation works. Abstract art is often not as easily accepted by the public as representation art because one might feel that he is unable to identify what he is seeing. However, the point of abstract art is not for the viewer to understand, but to experience it. Abstract Painters of the 20th Century such as the Abstract Expressionists excelled in the creation of dynamic paintings that actively engage and draw the viewer into the work. Reassessment of Painting explores the potential of injecting qualities of these abstract fine-art paintings into computer animation that can sometimes be too mechanical and detached. Through creative use of current industry standard software (Autodesk Maya, Next Limit RealFlow and Adobe After Effects), a personal style of experimental animation is developed that aims to provide the viewer with a new aesthetic experience that is immersive and imaginative.

Keywords - aesthetic experience; painterly abstraction; Maya; RealFlow

1 INTRODUCTION

The evolution of abstract painting is simultaneous with that of moving pictures [3]. Over the years, artists and filmmakers have been increasingly tapping on new computer technologies to create new ways of presenting abstract images to the viewer. Technological advances provided new means for the artist to approach abstract imagery and allowed for more direct viewer interaction with the work. Nonetheless, the aims of the 20th Century Abstract Painters are not forgotten. It is just that many artists now seek a new form of aesthetic expression with the moving image that can better portray a sense of movement of form in space and encompass the viewer in the compositional field.

Unlike still paintings, moving images have the added dimension of time. The composition is constantly changing, thus requiring addition planning and consideration on how the image will evolve from start till end. At any point in time, the paused frame should be able to stand on its own as an attractive composition.

Reassessment of Painting is a continuation of my previous project: Painting Using Experimental Animation which explored creative usage of various industry standard software to generate painterly abstract images. Building upon and refining the techniques created previously, the focus of the project is now on the creation of short animations with meaning that can depict the emotive states. The main challenges of this project are the production of animation clips that can be put together into one unified composition with a lush and immersive quality to it, and also in injecting meaning into these abstract forms.

There is no limitation to what can be used to create abstract art. This project focuses on fluid simulation, attracted by the life in the fluid forms that are constantly forming and dissolving, and also influenced by the dynamic 'drip paintings' of Jackson Pollock. Next Limit RealFlow and Autodesk Maya are the main software used in this project to explore a personal style of experimental animation that fuses qualities of fine-art painting with computer animation.

This paper will discuss the inspirations behind the project and give a detailed outline of the methodology used in the creation of a final animation clip titled 'Gloom'.

2 AIMS / OBJECTIVES

The objective of this project is to create a new form of aesthetic experience for the viewer that is attractive and engaging through the use of experimental computer animation possessing qualities of abstract fine-art painting. Emphasis is placed on refinement and application of the techniques developed from the previous project, Painting Using Experimental Animation, to create short animations of a painterly abstraction that can be repurposed for large scale film projection or art installation.

3 LITERATURE REVIEW / BACKGROUND

The Abstract Expressionist movement formed the main context behind this study. This new American painting style came to notice in the late 1940s and 1950s, characterized by a common expression in highly personal works of art. The works by the Abstract Expressionists, or Action Painters, have no uniform stylistic traits on the surface. What brought them together is the same feverish energy and preference for the monumental scale. They did not represent their emotions, but enacted them before the canvas [4], such that for some artists, the process of painting became the very subject of the painting [2].

Of particular inspiration are the drip paintings by Jackson Pollock. Pollock created his very own unique style of painting by dripping, pouring, splattering, and flinging paint onto a huge canvas on the ground. This method enabled him to create very dynamic paintings from which the viewer can almost feel his action and force when looking at his them. Pollock worked in very large scale and thus when the viewer encounters his highly textured painting, they feel almost engulfed by it, and this is the kind of tactile quality and immersive experience I am aiming for in this project.

Figure 1 (right). Jackson Pollock. Lavender Mist: Number 1, 1950. 3 metres in length.

Figure 2 (left). Image of Jackson Pollock painting

Despite all the frenzy in his work, Pollock described that when he is painting, he has a general notion as to what he is doing. He can control the flow of paint. "There is no accident, just as there is no beginning and no end" [4]. It is perhaps this simultaneous control and lack of control that gives his work its spontaneity and dynamism. The methodology developed in this project looks towards this similar method of working. The general movement of the abstract forms generated in the computer can be controlled, but the exact details of how the small elements move is often unpredictable and seemingly have a life of its own.

In many ways, developments in film and digital technologies provided new approaches and opportunities to achieve the goals of the 20th Century Abstract Painters. Russian painter Wassily Kandinsky believed that colours and lines can be used like music to create moods without a subject. With the use of video and computers, it becomes possible to directly link abstract forms and colours with their own musical orchestration [3]. The large scale canvas favoured by the Abstract Expressionists can also be made possible in the moving image using film projection that can totally envelop the viewer in the compositional field. Abstract painting and the moving image are very much related and concepts used in painting can be applied to computer animation to create new imaginative aesthetics and approaches to non-objective forms.

4 METHODOLOGY

In my previous project Painting Using Experimental Animation, I experimented with a method of rendering in Maya that can give the appearance of streaks of paint. Some limitations of the method was also discovered, such as it could better mimic the appearance of paint when darker colours are used and the polygonal mesh to be rendered has more complexity in its forms. The methodology developed in this project work around these limitations to create animation clips of a lush quality that can be put together into an abstract composition meant for large-scale projection.

The emotion 'sadness' is chosen to be the main theme for exploration because it is associated with dark heavy colours and slow movements which can bring out the beauty in the evolving fluid forms. Rather than simply animating the splashing of fluid or 'paint' that could have been possibly achieved with live-action footage, the focus is on the creation of a main sculptural form in the animation that can depict the emotion state.

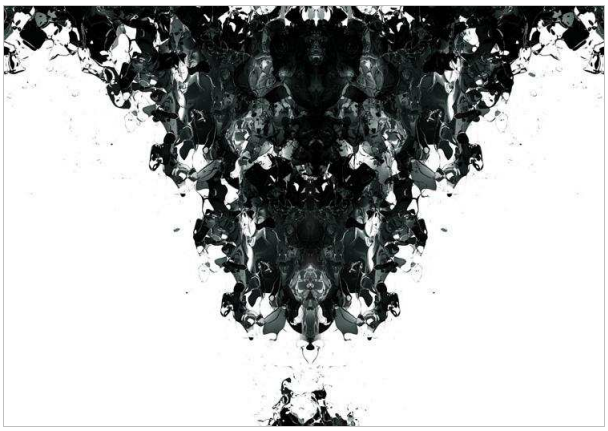

Figure 3. Emotion Study on Sadness

Fig. 3 is an early still image put together in Photoshop as an emotion study on sadness. It is from it that I derived the inverted triangular shape that is top heavy and can thus be used to represent and give the impression of heavy-heartedness and gloom. The study also serves as a guide and reference to ensure that the moving fluid forms generated still possess the same lush and textured quality seen in this composited still. The plan is to create a short animation of paint slowly flowing down from the top of the screen, forming the general shape of the inverted triangle while its details are constantly moving, then flowing down and dissolving away. Different animation clips will have to be created that will later be composited together to achieve the texture and quality desired.

The process begins first with the simulation of fluid meshes in RealFlow. The aim is to generate meshes with relatively complex surface details that can show up in renders. Sculpting of the fluid meshes is done by controlling a combination of emitters and daemons. Emitters emit particles that will determine the shape of your resulting polygonal fluid mesh. RealFlow offers different emitter types such as circle, square, linear, sphere, and you can even import your own object in to fill it up with particles or emit particles from its surface. To make the simulations more dynamic, I often make use of a combination of emitters and animate their

parameters such as 'Position', 'Rotation', and 'Speed' especially to give more variations to the particles movements. Interaction and collisions between the particles generated by different emitters can often produce interesting forms.

The emitters also have parameters related to real world physics such as 'Density', 'External Pressure', and 'Viscosity' that will affect the fluid behaviour as well. The default values of these parameters are usually closer to the behaviour of water. To better mimic the thickness of paint, I make use of higher values such as 1500 for 'Density' (density of water is 1000), around 8 to 10 for 'Viscosity' to increase its thickness. The 'External Pressure' is also increased from its default value of 1 to compact the particles and prevent them from flying around in the screen from collisions. It must be noted that there is no standard values for these parameters though as they are affected by the scale of your emitter as well. The bigger your emitter, the more you will have to increase the values of these parameters exponentially. In addition, I often give a low value of around 1 to the 'V Random' and 'H Random' (or 'Randomness' depending on your emitter type) parameters that will slightly randomise the particles. This helps greatly in mixing up the particles to form fluid meshes with smoother continuity at a later stage.

Daemons are also added in to further control the movement of the particles. There are 'killer daemons' that removes unnecessary particles to speed up calculation time, and also daemons to simulate real world environment such as gravity and wind. The type of daemons to use will depend on how you want the fluid particles to move in general. However, 'k.Volume' is a must to use to set up an area to contain your particles. Any particles that go out of the 'k.Volume' box will be removed, or else they can add greatly to your calculation time. I will often add in 'k.Isolated' as well which removes lone particles as they do not affect the shape of the fluid mesh much. 'Gravity' is used when I want to have a downward pull on the particles. Its direction can be changed to make the particles float upwards as well. 'Attractor' is another useful daemon that pulls particles towards its center point of attraction when its internal force value is positive, and repels at negative values. Sometimes 'Wind' and 'Noise field' are also added in to add more turbulence to the particles movements.

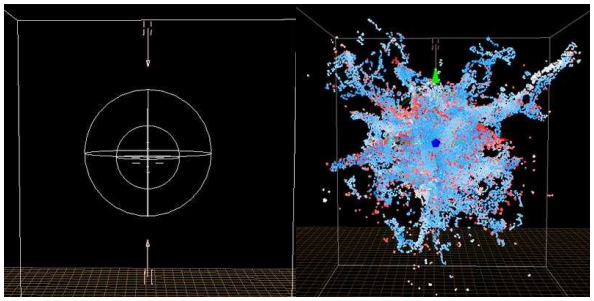

Figure 4 (left). Scene setup using 2 sphere emitters, attractor and repellor daemons to push and pull at the particles from the sphere center, and wind daemons to add turbulence.
Figure 5 (right). Resulting particles.

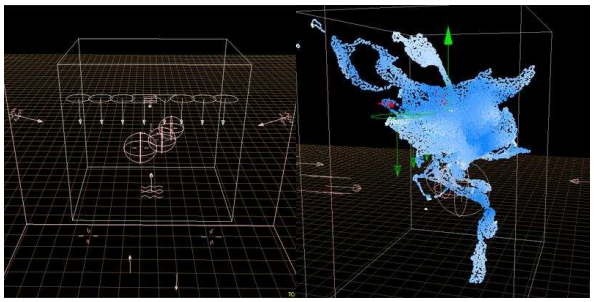

Figure 6 (left). Scene setup using a combination of circle, square, and triangle emitters, attractor daemons to add pulls in different directions, wind daemons to add turbulence, and gravity daemon for a general downward force.

Figure 7 (right). Resulting particles.

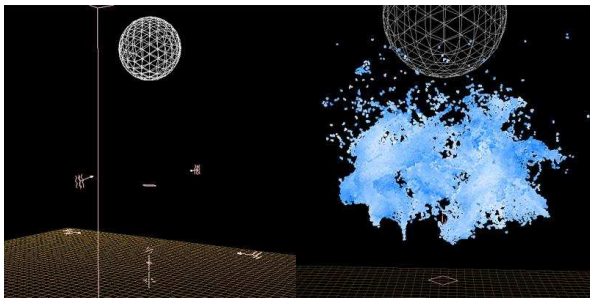

Figure 8 (left). Scene setup using a sphere as fill object for particles, vortex daemons to add spin to the particles, drag field daemon to slow particle movements down, and wind daemons to add turbulence.

Figure 9 (right). Resulting Particles

As the fluid simulations are meant to convey the emotion of sadness, slowing down the particle movements is an important step and challenge. RealFlow is designed to create realistic simulations that mimic real-world fluid motion. Thus, many values have to be greatly reduced in order to slow the simulations down to observe the beauty in the evolving fluid forms. For example, I often use very low values between 0 to 5 for the speed of the emitters and strength of the various daemons, sometimes even going below 1 to further slow down the particles. If the particles are still moving

too quickly, another method will be to change the frame rate. Particles can be simulated at higher frame rate (e.g. 50 frames per second) by changing its simulation options, and later exported at its normal lower frame rate of 25 frames per second after rendering. This will help to slow down the animation. It must be noted however that at higher frame rate in RealFlow, the 'MAX substeps' under the simulation options has to be lowered or RealFlow will give an error message. Lower 'MAX substeps' values accelerate calculation in RealFlow but at the expense of accuracy. Changing the 'Time Step' from 'Adaptive' to 'Fixed' is another option to allow for higher frame rate but this will usually cause calculation time to increase [5]. Thus I would prefer to adjust the emitters and daemons parameters first as much as possible.

Fluid particle simulation is the most important step in the animation process. Next will be adding and building a polygonal mesh over the simulated particles. This step is more straightforward and only has 4 main parameters that require adjustment - 'Polygon Size' and 'Relaxation' under the mesh node, and 'Blend Factor' and 'Radius' of the emitter node. I usually start with a value of 0.04 or 0.05 for the 'Polygon Size' to ensure that enough details can show up within acceptable calculation time. Next, the 'Filter method' is set to 'Yes' which brings up the 'Relaxation' parameter. I usually leave this at its default value of 0.1. Higher 'Relaxation' values thin out the edges of the mesh, useful when the mesh appears too much like blobs of matter rather than fluid. 'Blend Factor' and 'Radius' are trickier to control as they counter each other. I prefer to start by giving a value of 0.01 to 0.03 for the 'Radius' and adjust the 'Blend Factor' accordingly. Higher blend factor increases continuity in the fluid mesh.

The polygonal fluid meshes built is then imported into Maya to be rendered using its Mental Ray engine. I made use of a special mental ray node called 'dielectric material' as the shader for the meshes. 'Dielectric material' is often used as the material for water and glass and is favored for its ability to simulate realistic reflections and refractions. In this project, I used this shader in another way to mimic the appearance of paint in my renders.

The 'dielectric material' only has a few parameters to control but small adjustments can have huge changes in the appearance of the renders. 'Col' affects the colour of your fluid as a whole and I would set this to white or near white. The 'Outside Color' shows up in the more complex or overlapping areas of your mesh. I usually set this parameter to a dark colour that is close to black, and it is what that gives the renders the appearance of streaks of paint. The 'Index of Refraction' (IoR) controls the amount of reflections and refractions that show up. Its default value of 1.5 gives a realistic render of water, and I usually reduce it to a value very close to 1 (between 0.9 to 1.1) for a more paint-like appearance. At a value of 1, the renders will appear very flat though so I would avoid setting the 'IoR' to this neutral value.

The interesting part is the final renders can be quite different from the appearance of the initial polygonal mesh even though the general shape stays the same. By simply changing the camera view, a number of different animation clips can be rendered from a single fluid mesh, maximizing its uses. The resulting renders gives the appearance of streaks of painting forming and dissolving due to its unpredictable nature.

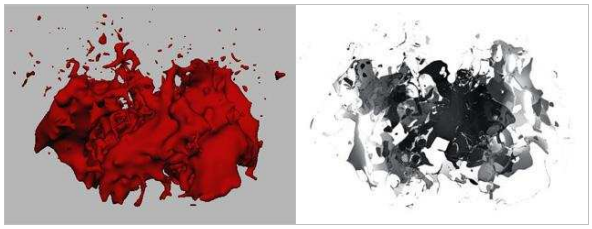

Figure 10 and 11. Fluid mesh and corresponding render at 'Col' white, 'Outside Colour' grey, 'IoR' 1.030.

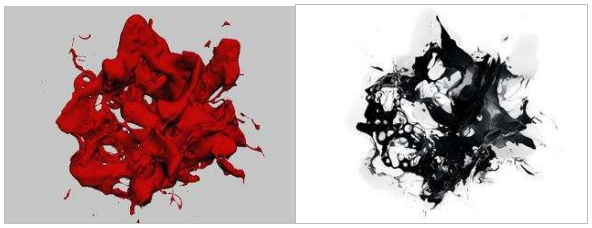

Figure 12 and 13. Fluid mesh and corresponding render at 'Col' light grey, 'Outside Colour' dark grey, 'IoR' 0.950.

Figure 14 and 15. Fluid mesh and corresponding render at 'Col' white, 'Outside Colour' dark grey, 'IoR' 1.100.

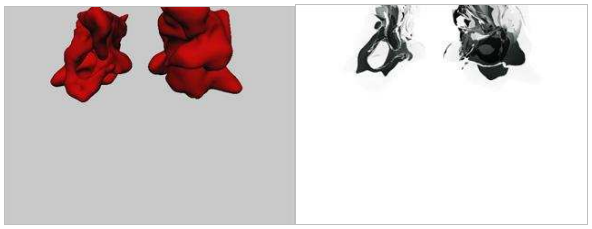

Figure 16 and 17. Fluid mesh and corresponding render at

'Col' light grey, 'Outside Colour' dark grey, 'IoR' 0.950.

Lastly, the rendered animation clips are brought into After Effects and composited together. As all the fluid meshes are rendered against a white background, they are layered on top of one another and blended together by setting the layer blending options to 'Multiply' or 'Darken'. Some animation clips are also animated in their translation properties in order to form the inverted triangle structure as seen in the emotion study (Fig.3).

5 RESULTS

Through this project, an approximately 1 minute animation clip titled 'Gloom' is created which depicts the emotion state of sadness through the formation, interaction, and dissolution of the abstract forms.

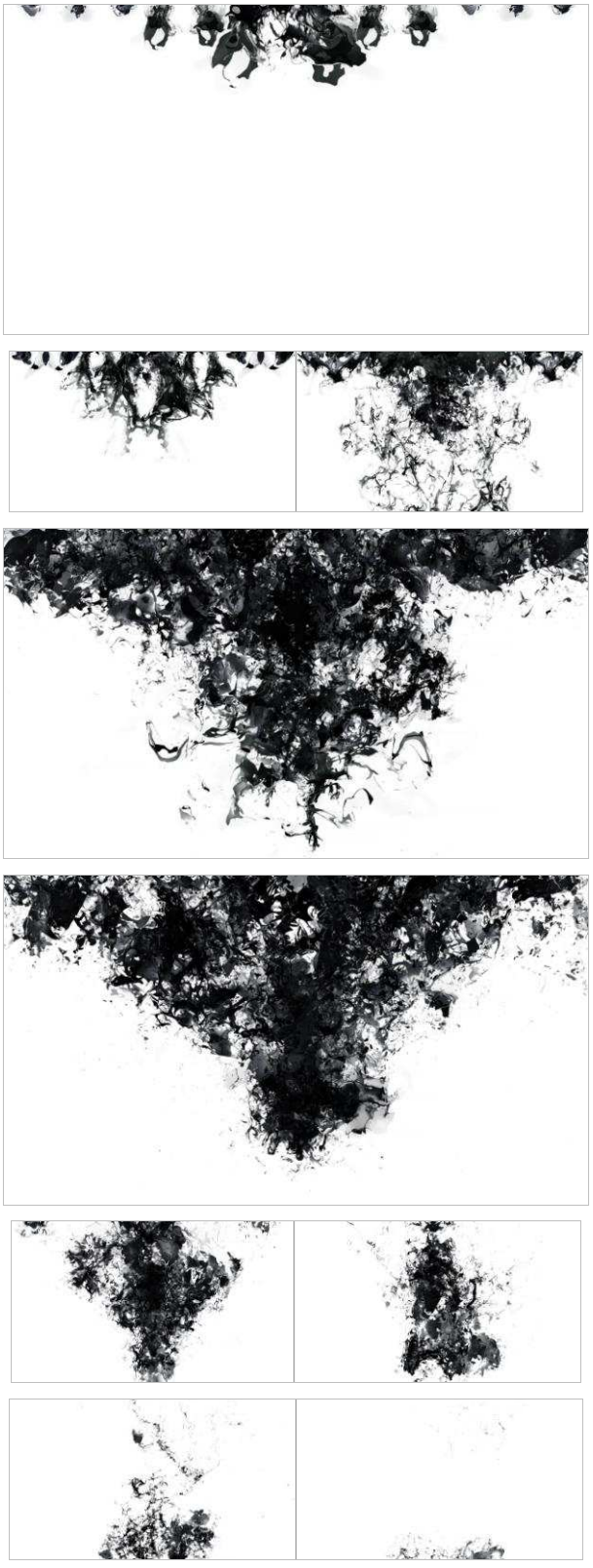

Figure 18-26. Still frames from the animation 'Gloom'

6 DISCUSSION

In order to obtain the dense and highly textured quality similar to Pollock's drip paintings, 'Gloom' is made up of around 50 layers of animation in After Effects, carefully placed and timed so that the abstract forms would appear to drip down slowly from the top of the screen to form naturally into the inverted triangular structure. Giving these abstract forms life and meaning is the focus. Like how Pollock's works have a strong sense of rhythm and flux, the abstract elements in 'Gloom' are also in a constant state of becoming. Even though they are made to form a sculptural structure, the composition is never static. The abstract forms are in a constant state of growth, forming and dissolving as though having its own life cycle. Emotion is injected in a more subtle manner through the composition and speed of movement of the abstract forms that aims to look inwards, to appeal to the inner self and pulls at you subconsciously.

The personal style of animation and rendering method developed in this project offers an experimental form of animation that seek to bring to the viewer a new aesthetic experience - Something that is not plain abstract and detached, going beyond computerized animation to inject in personal ideas and impressions.

7 CONCLUSION

In abstract cinema, an experimental form of cinematography, images are usually produced first from the artist imagination, and then transferred to visual form by creative animation techniques [1]. It is hoped that the abstract art will in turn, generate more images in the viewer's mind. The imagination is then carried on.

The methodology developed in this project works along the same line. The unpredictability of the fluid simulations meant that I often only have a general control over the direction and speed of movement of the fluid particles, but not in the exact details. This is a limitation of the developed method, but also what that gives it its spontaneity. Thus even though there is an image that serves as a guide for the animation 'Gloom', the starting point in the creation of each animation clip is often from my imagination first rather than from the guide. I get ideas about various possible ways of sculpting the fluid meshes and try them out in the software. The resulting simulation can be similar to what I have imagined or something very different but pleasantly surprising.

The animation clips created in this project is also used in collaboration with the project by another student, Tan Cheng Quan, to explore how stereoscopic 3D may be used for the animations. A new technology that many, especially feature film companies are turning to now, stereoscopic 3D offers an even greater potential in engaging the viewer by bringing in the dimension of

depth to give the viewer the impression of the painterly abstract forms generating as though right before them.

Interactivity is also an area that can be explored for future work which will bring added value to the immersive experience this project aims to convey. By allowing the audience to interact with the work, such as controlling the general movement of the abstract fluid forms with their own motion, the audience can participate in the artwork physically and emotionally that offers another way of engaging t.

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