Dream: A Short 3D surrealistic animation

Liwei Xia

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Dream

A short 3D Surrealistic Animation

By Liwei Xia

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF FINE ARTS
IMAGING ARTS/COMPUTER ANIMATION
SCHOOL OF FILM AND ANIMATION
ROCHESTER INSTITUTE OF TECHNOLOGY
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February 2012

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Abstract

“Dream” is a graduate thesis 3D animation, telling a surrealistic story about a man who tries to escape from a sand ocean and pursue to his dream oasis. In this 3 minutes 47 seconds story, the main character shows people, in the way to pursue his dream, how to control his desires, resist temptation, conquer himself, drift with tide, and finally persist to his dream to get away from the ocean.

Because the story is surrealistic, I would like to try to approach many new fields in this animation. First, I conceived it as a combination of experimental and traditional 3D animation, creating thought-provoking effect. Second, I still kept focusing on the animation itself, which means the most important part was about the action or movement. At the same time, I would add some 2D animation into it, to create necessary particle effects, and convey audiences the surrealistic and dreamlike feeling.

This report outlines the whole production process, from the very beginning of an idea development stage till final completion stage, and illustrate all my inventions, obstacles, tests, failures and successes, as well as technical specifics.

Figure 01: Dream
Problem Statement

Almost 99% of the 3D animations were designed and animated as round shape, especially Pixar, Disney and Dream Works. Nowadays, animation industry as a whole has been influenced by Disney style. However, in recent times, this phenomenon has come under attack and People have been striving to discover new artistic styles and technologies in order to escape this circle and be innovative. Since last several years, attracting audience’s eyeballs has becoming the primary concern of short experimental animations. From that time on, we began to realize that animation can be highly diversified.

My problem statement is: how to make a stylized 3D animation based on my surrealistic theory? Can I find the perfect adaptation between technology and art?
Documentation

Surrealism Analysis

Surrealism is defined, according to Wikipedia, as a cultural movement and artistic style that was founded in 1924 by Andre Breton, and is best known for the visual artworks and writings of the group members. Surrealism style creates art by using visual imagery from the subconscious mind without the intention of logical comprehensibility.

Surrealist works feature the element of surprise, unexpected juxtapositions and non sequitur; however, many Surrealist artists and writers regard their work as an expression of the philosophical movement first and foremost, with the works being an artifact.

From this aspect, I would like to demonstrate two artworks which inspired me most when developing my story. The first one “The Persistence of Memory”, one of Salvador Dalí’s most recognizable works, which introduced a surrealistic image of soft, melting pocket watches, epitomizing Dalí’s theory of “softness” and “hardness”. The general interpretation of the work is that the soft watches are a rejection of the assumption that time is rigid or deterministic. The second artwork that influenced me is the “Fallen Art,” by Platige Image. The combination of traditional hand-drawn and computer technical skills, dark comedy and surrealism attracted me very much, and guiding me to explore more in these new fields.

Figure 02: The Persistence of Memory by Salvador Dalí
Stylized Animation Analysis

I was inspired by a short animation made by Ubisoft named Rabbits go Home Mini Serien, and attracted by its artistic style and technology. From the first time I saw it, I knew it was the right animation I had desired to make. This short animation is a trailer for a Nintendo WE game called Rabbids. All the human characters are specially designed. They are almost composed by several simply cuboids. The angular shapes make them simple, yet interesting and memorable. After I saw this animation, I knew it was possible to stylize and start to do some tests.

The concept design was not a tough problem after I knew what the characters should look like. My first design for the main characters were long arms and short legs, but I realized that short legs were not fit for the body, and they were difficult to bent and transform. Finally,
I made the design of the skinny, tall body figure for the characters. In order to make the pictures visually attracting, I also drew some pictures for the Sand Ocean, such as island and coco trees.

Last question was about the memory images. At the end of the story, when the main character was sinking in the sand ocean, he began to recall his life, man and boy. All the memory images flushed to his mind, from his birth, his family, childhood, college life to career. This concept was from an article I read many years ago, which talked about the feeling before death: people’s brains would start to project their previous memory instantaneously, like old photos. The images flushed to his memory should be the same situation, so I drew some pictures in black and white. To make it look real, I added some drapes or dents on surfaces and yellowed them with age.

The result turned out very impressive, and both my advisor Tom Gasek, and I were satisfied.

Technical Support

After I watched Rabbits go Home Mini Serien, I realized the possibility of making angular shape characters, and they were moveable and transformable, So I did some tests for the both the characters’ rigging and Objects’ transformation. The results turned out just fine, but the joint parts cannot transform very smoothly. I have to keep them in a small angle. I believed they still can be improved. After that, I did a lot of studies in the relationship between edge loop and transformation. Finally, I got the conclusion that adding more edges for the join parts would help the joint parts transform much more smoothly, rather than the regular animation shapes.

Another problem I needed to solve was texturing and rendering, how to create an atmosphere and feeling of spaces and shapes but not too realistic; How to render a scene with dramatic visual effects, vivid colors and attractive background; How to make the skins transparent. I took lots of questions into consideration before the next step. I had to test them
out one by one. I also searched some tutorials which were really helpful, and the most useful tutorial was the particle sands tutorial.

**Animation Consideration**

There is no doubt that animation is the most important part of the whole thesis project. I did lots of study about the swimming movement of human, because the main character swims almost every sequence. Making swimming animation turned out to be much harder than we swim in real life. Every parts of his body had to be coordinated with each other to make the whole motion process looked realistic and harmony. I had to adjust when and how to move arms and hands, and how his legs should perform simultaneously.

I watched different kinds of swimming coaching videos, and went the single frames for instances.

**Production Process**

**Script**

I took a script writing class at my first year in RIT; it was required to submit one script every week. It was my fourth week when I didn’t have any clue for the story. However, I saw a picture about a beautiful island with blue water, this inspired me. What would happen if the water was replaced by sand? The environment must be very difficult and awful, no one would survive in that kind of environment. On the other hand, even though the environment was really harsh, I still believed there was probably some kind of beauty, especially when wind blew the illusions on the massive sand ocean. Base on this concept, I started to conceive the story. The whole story gave people the strong impression of surrealism.

**Concept Design**

If the animation I am going to make was stylized, the concept design appeared very important. I planed to do my concept design based on the story and the style I wanted to explore. My goal for the concept design was going to be angler-shaped, interesting and simple.
Without considering any technical issues, I created my initial concept design. My characters had different personalities. For example, the main character, the man, was honest, persistent and industrious, but on the other hand, uncertain, vacillating and hesitating. The mermaid, another character in the story, should by any means be sexy and attractive. The last characters were the men with shark fins on their backs. I thought they should be horrified, ugly, greedy and dangerous. This concept design would make it vivid and obviously when the three different kinds of characters presented to the audience.

The second drafts were the time I finished all the tests.

Figure 05: Concept Designs

**Storyboard**

I started to draw my storyboards as a assignment at Brain’s storyboard class one year ahead I started my thesis, because the script was finished a year before the storyboard class. I drew several important scenes by using color pencils, after that I worked on drawing the whole storyboard by using Photoshop. I changed several drawings due to the imperfect
camera angles, and improved some poses, movements and backgrounds, until I thought the storyboards was good enough.

I improved my storyboards based on the first about two years ago, because the committee members thought my story was a little confused. I also found another problem at that time. The forms and shapes of that storyboards were not very consistent. When I finished my concept design, I had an idea how everything looked like, so I could add my impression into the storyboards, and made them look one step closer to my goal.

Figure 06: Story boards
Animatic

I actually had two different animatics. The first one was based on my storyboards, and I added some important drawings in order to make the animatics more fluent. The second one was based on my modeling, although I had not finished my rigging, it was a good idea to make a 3D vision of animatic. I could discover some errors, such as the camera angles or perspective. It also leaded me a better rout for the next several steps, how things should go, what improvement did I need, and what kinds of visual effects should I create.

Modeling and Texturing

With nice background and many exercises, I did not consider this part as difficult. Once I finished my concept design and tests, I was confident about modeling and texturing. The only thing I did a lot change was the mermaid. After I finished the original modeling and texturing, my advisor Tom and my friends all thought the mermaid was not attractive, so I went back to the concept and redesign this character. Because of the good edge looping and UV mapping, I did not change the structure of the model; yet, I just changed the shapes, and adjusted the UV texture a little bit. The first textures were almost the same as the final one, except that I added some details to them, for example, the scales and tail for the mermaid, the Short hairs of a beard for the man, the dirt and scars for the “shark men”. Those details were really necessary; especially the final render was going to be a High definition piece.

In order to show the beauty of the skins, I first used SSS material (Subsurface Scattering). Subsurface Scattering would create three layers of colors, and each of them stood for the depth of the skin. For instance, when the light faced the skin, we could see the transparent of the skin. I drew a texture map as a base layer, and added pink, orange and red as the three colors.

The first render was not as successful as expected. The skin I rendered out was more look like a plastic material. After that I realized the reason that I did not change many settings, and they were default settings, so I tried to deal with all the settings. Finally, I found the problem was the penetrations of three color layers. After I changed the setting to the
digressive penetrations, he result was fantastic. Obviously, the beautiful and natural skin was one of the film’s highlights.
Rigging

Since all the riggings were normal, all I needed to do was to build normal skeletons of human, and apply to different characters. There were three parts that I had never experienced before. First one problem was how to rig a coco tree and make all the branches follow the movement. The method I used was to create a skeleton, paint the skin weight, and use bones to control the trees. Another one was about the facial expressions, because the characters’ square-shaped faces made it hard to deliver facial expressions. For this problem, I used blends shapes, and also tried to avoid the expressions to go beyond the edges of the faces. In this way, I could keep the flat face shapes, as well as solved the facial expression problems as mentioned above. The last one was mermaid’s tail, I searched several videos about fish’s tail, and how it moved and swung. After that, I built the bones, painted the skin weights, and I also built both IK and FK controllers. Consequently I can control the tail faster and easier.
Animation

2D Animation

I planned to create some 2D animations. First, because 2D could help saving me some time, since the workload would be a huge if I made them all 3D, especially the big green island. More importantly, some 2D animation would help to strengthen the surrealistic style.

The first 2D animation part was the big island with house, hill and waterfall; this was the man’s dream place and desired final destination. I created the pictures of the island, coco trees, and birds separately by using Adobe Illustrator. After that, I imported those pictures into After Effects and keyed them, so that we could see the vivid scene: the trees could wag, and the birds could fly. The second step was to simulate the ocean, because the last part I needed to show this big island on the blue, shiny ocean.

The second 2D part was the visual images in his memory. I drew more than 15 pictures to illustrate his entire life, from child to adult. My goal was to make them fly through screen, in hope of giving the audiences the feeling of playing memories. My advisor Tom gave me some really great suggestions. One was to repeat playing some of the pictures, because in the end there was more than 20 pictures per second, the audience would not really see what the
picture was, plus they were motion blurred. This saved my time and effort. Another suggestion was to make the pictures move faster, giving audience a feeling of speed and overwhelming emotion. The last part of the 2D animation was the titles and credits. I tried to make the texts be blown by the wind. However, I did not have any good idea to achieve it, so I checked many tutorials in order to get them right. The tutorials I found was about a plug-in for After Effects called “Red Giant”. The good thing for this is I can download and use it for free. Its foremost advantage was that I could easily create a particle system, and simulate sands falling from texts. The amazing part of this plug-in was when the sands departed from the text, the texts stared to disappear.

![Figure 09: Screenshots of 2D animation](Image)

Dream Island (upper), Sand particles (lower)

**3D Animation**
The 3D animation part took me about half year to accomplish. The time I spent on it was equal to the sum of other works. It had three obvious steps: reference, creation and improvement.

Acting was the core of making 3D animation, so I always acted by myself before animated the characters. I also took video by myself or my friends as a reference. I tried to imagine myself as the main character, and tried to go into this character’s cockles of the heart, and dug his thought. My advisor Tom also provided me some really useful advises. For instance, the man was wondering and thirsty on the sands in the first scene. In order to show his awful feeling, I took the video by myself, and tried to transfer the delicate expressions into the character. I added some expression like pull a long face or pleasantly surprising. I also added some actions like opening the mouth, looking around, rubbing eyes and fanning face.

Most of my scenes were happened on the sand ocean, so the most formidable part was the action on sand. Therefore, how to combine the buoyancy of the water and resistance of the sands became the primary problem I need to solve. The best way for me to begin with was to find some references. I studied some footage about how animals acted when they shifted in the desert. Also, I observed how they dived into the sands and flow out of sands. After that I began to study the resistance and buoyant of water. Compare to the water, sand has more buoyant and resistance. It was really necessary to understand this before I started to animate, but this problem always accompanied me from start to end, especially the resistance. The first vision of the animation did have some resistances in it. For example, when the main character turned his body, his action should be difficult and slow. In order to show this, I needed to assemble the whole body’s actions toward to the force and increase the amount of preparation actions. However, my advisor and I both realized that I did not show enough vigor of the resistance. The only way to strengthen it was to make the action and movement slower, and gave the actions an increasing speed. After many times of tests, failures and improvement, the effect of resistance got better and better.

Another challenge was the swimming motions. 60% of my scenes began with the swim of the man, because I think it was a good introduction for a new scene. I did not know how to
swim, so as I mentioned above, I did some researches and found some references. I studied so many swimming tutorials with the instructions of each decomposed action, which helped me a lot to understand the frequency and rhythm of swim. I could use them as a reference to key every action clearly. After finishing the regular swim, I needed use Maya’s animation graphic editor to adjust the curve of the action to show the resistance. The speed of the curve should be sinusoidal, so it could tell the action or speed from the condition of rest to move then to rest. My original plan was to show different kinds of swim, including breaststroke, backstroke and crawl. After I found it’s better to keep one swimming style, this would not confuse the audiences. It also kept the animation’s consistency coherence.

![Figure 09: Screen shots for 3D Animation](image)

**Rending and VFX**
I used Render Farm to render all the 3D scenes. Totally were more than 30 shots. I used metal ray to render. All the images I rendered were HD1080. Every Image took 4 to 8mins to render. All the images had Alpha channels, so I can add backgrounds to them, and easy to control. I just used a master beauty layer to render, because I found I already got the effects which I desired.

The VFX was the biggest challenge for me, because the story was surrealistic, and those elements can be only seen them in our dreams. For me, the first change was the sand and dirt. In many scenes, the characters would move and swim in the sand, and those actions would affect the sand by any means, so how to simulate the sand became my primary challenge. I tried several ways, and finally got the best way was to add a round shape object, with waves on its top. I also constrained it to the characters, so this object would move with characters. After that I added the transformation into sand. When this object moved, the shape of the sand would be influenced and showed the waves around the characters.

The second problem was about a scene where the objects turned to sand and blown by the wind. I firstly planned to use particle effects to simulate it. However, the calculation was extremely huge. I tried a 200,000 particles simulation, but the sand still looked rough and unrealistic, so I changed my plan. I also used sand footages as resources, and added three layers of sand falling footages on the particle shot which I rendered. It came out the particle effects, much more variety, depth and smoothness. Base on this experience, I also used falling sand footages to help simulate the falling sands. Compared with the 200,000 particles simulation, this footages approach also saved me a lot of time to simulate the dust raised by the action of the characters. However, the difference was I had to change them into 3D space in order to get the right perspective.

Another problem was the simulation of water. There was a shot about mermaid lain in the bathtub, with clear running water in it. For this part, I also decided to use footages. I used a translucent plane to stand for the water in my Maya scene file first. After that, I did the rotoscope to make sure the water would not go beyond the bathtub. Last job was to adjust the transparency and perspective. The last challenge was the shot when the man found out the
mermaid was just an illusion, the mermaid’s hands started to become dry and kraurosis, and then became sands, disappeared from fingers to elbow. Sands fell from those parts. I did the rotooscope first to the contour of the hands. Then I used two images on the top of the shot as two layers. One layer was to create the color change; another was to create the texture change. I used the same footages to simulate the fallen sands. Overall, I can say the visual effects are professional, but I really learned and practiced a lot, the most importance thing was to develop my mind.

![Figure 10: sand particles](image)

**Music and Sound Effects**

At first I contacted several compositing major students at Eastman Music School. I also tried some samples made by these students. However, I did not believe any of them match this story, because they are too simple, humdrum, and posing. I think my perspective music should be full of power and grandeur. I preferred western desert style, hot music to focus the abominable environment and living space. I consulted several people about the music. Xiaoyu Liu who is the second year graduate student, in Films and Animation College, RIT, introduced me a website called free play music, and the address was: www.freeplaymusic.com. There was some really professional music with deep instrument sounds to accompany. I found two pieces of nice music, one is called “Sitting Bulls”, it was quite fitted for the sandy desert; another is called “Peace Treaty”, very tensional, and it’s good for the sharks’ scene. I tried to
combine them with my unfinished animation, and it had the perfect length. Once I finished all the rendering and compositing, I started to edit music; I customized the music, so it was at the same rhythm as animation.

Sound Design was a hard part, because the sounds is really important for this film, the good sound effects would really help the audiences understand the story. I collected at least 100 different sounds include environment sounds, sand sounds, noises. The sound of the main character and the mermaid was recorded by my girl friend and me. We tried many times in order to get the right sound with right length and mood.
Conclusion

In my opinion, this project was a success with all expected objectives achieved. Interesting and stylized designs were well prepared; attractive models were created with surrealistic style; the texture and rigging works were meticulous; the animation showed felicitous actions and acting; the visual effects influenced the forming of story efficiently.

To sum up, the final product actually achieved my own creative and technical expectations through extensive research and problem solving. The experience I gained during this project is invaluable.

The chief area of professional growth for me was the story telling, stylized performance and the combination of art and technology, how to use and learn new technologies to express my ideas and achieve them.

Overall I think I grew both personally and professionally through the development of this project. I understand even more myself and my future role in 3D computer animation field.
Appendix A
ORIGINAL PROPOSAL (SUBMITTED MAY, 2010)

1. Synopsis

This is a surrealistic story about a man who wants to escape from a sand ocean. In this story, he will show us how to control his desires and conquer himself; how to get away from the ocean.

2. Rationale

Because of the story is surrealistic, I will try to approach many new fields this time. For me, it’s more like a combination of experimental and traditional 3D animation. I want to focus on the animation itself, which means the most important part is the action or movement. At the same time, I need particle effects, maybe a little 2D animation in it, in order to give the audiences the surrealistic and dreamlike feeling.

I want to say Salvador Dali’s surrealistic paintings give me a lot of inspirations; for example, “The Persistence of Memory.” It’s really interesting and challenging. The second artwork that influences me is the “Fallen Art,” by Platige Image. I like this short piece of animation; it’s a little dark and surrealistic.

3. Treatment

The Dream

This dream begins with a grain of sand. In several seconds, it duplicates and spreads countless times. Finally, it becomes a boundless golden desert.

A wind passes across with sands and heat. A hand comes out of the sand, then another one. A man worms out of the sand. He pats the dust from his shoulder and looks around the new environment. There is nothing here except sand. He feels thirsty but there is no water.
The heat is going to melt him, he thinks. At this moment, he feels hopeless and collapsed. He kneels on top of the sand.

Another wind passes by; all the sand begins to move melodically like dancing. He wipes his eyes. It is not an illusion. The sand rises up and falls down like ocean waves. Suddenly, the sand sucks him under. After a short period of darkness, he feels that he floats on the sand. He doesn’t feel thirsty anymore; instead, he is full of energy and courage.

He decides to leave and swim out of the desert although he does not know how far the desert is and how long he needs to swim. The most important thing is that he does not want to stay here forever.

He starts to swim in the sea of sand. Sometimes, it seems that the mountainous waves will turn him over. However, he does not stagger in his resolution and hope. In his mind there is only one thing: to get out of the desert. He stops and then swims forward with his arms. Suddenly, he sees a beautiful “island” with green coconut trees and pure blue pools in it. There are mermaids in the water beckoning him to approach the island, but he does not waiver or change his mind; he turns his head away from the island and continues on.

He starts to grow tired as he swims and swims. However, he spots sharks’ dorsal fins. The sharks are not trying to attack him but swim around him like ghosts. Fear spreads through the sand like a contagion. His face becomes dark and gloomy. He feels that he is becoming weaker and weaker. His arms and legs are not powerful anymore.

Finally, he loses his belief, strength and hope. He sinks down like a stone. On the bottom of the sand, he sees the real features of the sharks. He is frightened at that moment. They are not sharks; they are men who look exactly like him. The men’s dorsal fins are on their backs
and they have villainous smiles on their faces. They are reflections of other people’s weaknesses. The darkness comes, it returns to the black world. He has lost his faith and hope.

He raises his head and ready for the last stare at this dark world, however, everything changes at this moment. He sees the sand begin to melt into the water on the top of the ocean. Just that little bit of blue color, and his courage comes back again. He feels that he is filling with hope and energy. He holds his last breath and swims upwards. The sharks laugh at him with their horrific faces, he is not scared. He swims through their bodies. Yellow turns into blue. He feels cooler and cooler and is filled with joy and hope as he surfaces to the top.
Appendix B
SCHEDULE

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BUGET

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