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Getting Back The Lost

By

Wanru Liu

AN ANIMATED THESIS PRODUCTION
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE
DEGREE OF MASTER OF FINE ARTS IMAGING ARTS/COMPUTER ANIMATION
COLLEGE OF IMAGING ARTS AND SCIENCES
SCHOOL OF FILM AND ANIMATION
ROCHESTER INSTITUTE OF TECHNOLOGY ROCHESTER, NEW YORK
DECEMBER 2015

Approved for Submission

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Professor, Animation Program Chair
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Abstract

Getting Back the Lost is an animated graduate thesis film with a total running time of 7 minutes and 13 seconds. The film is about a girl seeking hope in a ruined and destroyed environment.

Nowadays, the global environmental problem, which is due to human activities, is becoming increasingly serious. Human beings have overused natural resources in a continuous and reckless way, without caring about their harmful and detrimental effects on this earth. *Getting Back the Lost* is a story that takes place in a former land of oil extraction and production. It is a place that represents what the rest of the world is like – desolate, dangerous, and highly polluted. It is devoid of others, except for the main character of the story, a girl who lives alone in the only place that has some nature left. There's only one tree standing in the whole area that protects a tree house where the girl lives as she is performing experiments on the planting of seeds.

In the beginning of the story, the girl, who is almost robot-like, is trying to find a way to plant seeds in the polluted ground around her to save her small piece of land. Her experiments are failing. The plants she grows are dying. She also finds she has run out of seeds to plant new vegetation and so she needs to obtain more.

The girl ventures beyond her safe area to explore the destroyed world around her with the hope that she will find more seeds somewhere. As she travels further and further away from her home, she journeys onto the “ruined land” on the other side of the mountains where petroleum fields and factories are deserted and in ruins. She comes upon a site that shows traces of recent human occupation, and she finds seeds and collects them. The girl rushes away

from this place because of an unexpected earthquake. During her way back home, the seeds she has collected in a bottle fall out, leaving a trail of seeds behind her. When she arrives at the door of her home, she realizes the seeds in the bottle are gone. She looks back in the direction she ran and sees the seeds spread out on the ground. She feels extremely sad when she finds this. But the seeds on the ground suddenly sink into the earth and magically grow into small plants, and then the whole area becomes green.

Getting Back the Lost is a 3D animation with a 2D graphic style. It is produced primarily in Autodesk Maya, The Foundry Mari, The Foundry Nuke, Adobe Photoshop and Adobe Premiere Pro.

This paper outlines the entire film creation process from the idea development through the final post production stage. It describes all my intentions, obstacles, failures and successes, as well as the technical specifics of the process.

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I am very thankful also to Professor Daniel DeLuna and Professor Mark Reisch, my thesis committee members. They gave many valuable suggestions and feedback during the various phases of this project. Every time the committee members met together with me, we shared options about the storytelling, visual style and production techniques to help improve the quality of the project.

In addition, I would like to thank the film's composer, Mike Mattice, who is talented, smart and patient. I am very satisfied with the music he scored for my film. He deeply understood my film and did the music efficiently in a short time.

I am also grateful in the way Professor Skip Battaglia would respond to my filmmaking. During the first quarter of pre-production on my film, Professor Battaglia was the substitute thesis advisor during Professor Maxwell's sabbatical in New Zealand. He gave me crucial inspirations and helped to clarify the idea of the main character's journey. The final version of the story was built on his suggestions

too.

Last but not the least, I would like to thank my parents, my family members and my friends. Everyone gave me a lot of support so that I could have a chance to finish this film and pursue the Master's degree in film and animation. I am so grateful to them.

Introduction

The making of the graduate thesis film *Getting Back the Lost* began in August 2012 and lasted until December 2015 as a final project in the MFA animation program at the School of Film and Animation at RIT. It was in production for two quarters at school and two semesters while I was working in Los Angeles. The entire work was done under the supervision of my thesis committee members: Stephanie Maxwell, Daniel DeLuna and Mark Reisch. The whole process consisted of:

1. Preproduction: Story development, development of visual style, storyboard and animatic
2. Production: Modeling, texturing, look development and render
3. Post production: Editing, music and sound effects

I had three goals in creating my thesis film.

First, I wanted to direct an animation film that shows what I learned during my years at RIT. Second, I wanted to enhance my ability to perform every aspect of a 3D film production. And third, I wanted to design a beautiful 2D graphic style film using 3D techniques and developed with my own art style.

Preproduction

Story Development

The Idea

A good idea for a thesis film is hard to develop. The idea needs to be solid enough for an audience to understand and enjoy, and it needs to be simple enough to suit the total workload of a 3D animated film. Though there might be hundreds of good ideas in mind, most of them may not fit the requirements when time and workload are taken into consideration. Some 3D-shot films created by students are not focused on story, but rather on actions and funny moments. Since my production was a thesis film, I really wanted to give it a deeper meaning in a concise number of shots.

In the very beginning of the story development, I decided my goal would be to create different environments and let the story emerge based on these environments. During the last quarter of the school year in 2012, I imagined creating two worlds with two dramatically different environments: the *Inside* and the *Outside*. These two different environments would be the crucial components of the work that would lead the story through its ups and downs. Secondly, I wanted to create a story that had a deeper meaning, rather than five minutes of animation performance or a show reel of what I learned in my school classes. I wanted to tell a story of an adventure, with a character who is simple for animation, and with my art style. With many uncertain thoughts in mind, I went to ask if Stephanie would be my thesis advisor. Stephanie was my second-year animation film instructor. For the work I created in her class, I had the basic idea of creating a Chinese painting style animation without knowing

exactly what the story was about. Stephanie helped me give that film a deeper meaning, and the film was very successful. For my thesis film, I felt that since I knew what I wanted to use to express the story and the art style, Stephanie would be the best advisor for me to help me make my animation solid. Stephanie was happy to be my advisor and looked forward to be involved on a film with me again. After talking about all the ideas I had at that time, she provided me with some reference films to get me inspired. The films were abstract works. Even though my film would not be an abstraction, I still felt their magic. During this time of research and watching the suggested films, the visions of the 'ruined places' and the 'destroyed environment' caught my attention. I asked myself, "Why can't I create some transition from a well protected environment to a totally ruined one.?" When I searched the Internet for references on ruined and destroyed places, I noticed that most of the destruction of these environments was because of the human activity. I wondered what the world would be like after the destruction and damage to these places. What will people's lives be like after the *end of the world*? I was curious about this and I believed that others would want to know what happens after an apocalypse.

After a long time searching for references and inspirations online, I felt depressed because of all the facts I was learning. Human beings benefit from the natural world. But, instead of caring for the environment, we constantly do harmful things and ask nature for more and more. At first, I wanted to present the dreadful facts about the environment in my thesis film as a warning about an ominous future for our planet. But after more research about this thesis, I gradually lost the motivation to only show what is happening to the

environment nowadays, and I realized that this kind of presentation is not a story, which I wanted to do. I finally decided that I could make an animated film that would encourage people and present the sense of hope. The audience would realize the hard work and effort of the film's main character, and the salvation at the end of the film.

So, here came my ideas:

1. Show a transition between a well maintained environment to a ruined one.
2. Call people's attention to our environment and our future.
3. Pass a positive attitude to the audience by inspiring hope at the end of the film.

The Process of Creating an Integrated Story

The process of creating an integrated story was the next important step to take. With all the fundamental ideas in hand, I started to write the first version of my thesis proposal following these steps:

1. Describe the world behind the story.
2. Create the structure of the story.
3. Define the ups and downs.

First was to create a background world behind the story.

Because of time limitation and the storytelling structure, it was hard to indicate every detail about how the whole world is ruined and polluted in this

animation. But what the story needed to include would be evident everywhere in the concept design and in the background 3D environment to help reveal the situation so that the audience would better understand the story theme and what I want to express.

During my research for reference pictures, I noticed that lots of pollution is caused by the exploitation of oil. Such as what happen in 2010, the Gulf oil spill is recognized as the worst oil spill in U.S. History. Eleven people were killed in that accident and the pipe leaked oil and gas on the ocean floor about 42 miles off the coast of Louisiana. Besides, the pollution increases during the refining of the oil, and can be a constant problem after tens of years. At the same time, I was inspired by movies that showed life after our civilization, and I started to ponder this question: What will happen if the oil wells finally become empty one day?

The design of the world in this animated film was constructed based on this question. In the final version of the story, the main character is living in a vast oil field, which is everywhere as far as the eye can see. The environment of this place was green and clean before the production of oil. An oil refinery stretches across the land and the deeper one ventures into this wasteland, the worse the pollution and destruction become visible. After so many years of large-scale production, the environment became badly polluted, and the residents of this place gradually disappeared. So the whole environment is an open landscape and empty of people. The main character is a girl, who is the only one left in this land, living by the only tree that has survived in this place. She is trying to plant seeds to bring back the vegetation. It is her personal way to restore the natural environment. This plot seems to be impossible in our real

world. But since the story is an animated film, the main character represents the theme of “hope”. Her experiments with the planting of seeds is her hope for the land and the preservation of her own home. Finally, the main character herself represents hope. She decided to stay in this area to save the land. Her work may seem to be hopeless, but she keeps on doing it.

In my thesis proposal, I describe the motivation of this work:

In the whole environment of the world, what an individual can do to create change is limited. But there is still hope. The power of a committed individual can be focused so well and so deeply that it can affect great changes in the world.

Second is to create the story’s structure.

When thinking about the structure, what we often think of is to a beginning, a process and the ending/result of the story to make it seem whole. Although I already created the background of the environments of this film, it was still not easy to figure out what will happen in this place to convey the theme to the audience. After talking with Stephanie about the two environments in this world and what I wanted to present, she suggested: *Why don’t you give her a journey out of her safe and green world. She needs to have courage to face the world outside and find what she wants and must do.*

Living in a safe and peaceful place, as the main character does, meant that the journey out would be a great challenge. It shows how much courage she must have to overcome the difficulties and save the land. So, the journey out is selected to be the main plot of the story. But, what is the beginning and resolution of the story? There must be a reason that motivates the girl to leave her home and step into the dangerous and polluted land. After creating the

background story, the reason became obvious to me. The girl keeps planting seeds in the ground with the hope that they will grow and re-vegetate the land and save the world. What happens in the story, however, is that her experiments with growing seeds are failing and she is running out of seeds and needs to find more seeds to carry on her experiments. This is the reason she travels to the destroyed land – to search for seeds. This motivation seemed logical and reasonable to support the theme of the story.

The ending of the story needed to convey hope. So, when the girl goes to the destroyed land, she comes upon an abandoned place that once grew vegetation and she finds seeds. The girl grabs the seeds and runs back in the direction of her home. In the first version of the story the girl plants the seeds and they instantly grow as trees and cover the land, meaning the world might be saved. There would be hope at the end of the story. But, since it is hard to tell the story with only visuals to help convey the story, I planned to add a voice over to the story and make it like a bedtime story told by grandma to her grandchildren. But I also needed to keep the story as simple as possible. Without a voiceover, the problem I faced was to find a way to shorten the time of the animation because of production concerns and still get the results I intended. In other words, there had to be some way to show how the world becomes green and healthy again in the short time of this film so that the audience will see the results of the girl's persistence and hard work. At this point, the idea I came up with was to have the girl plant a seed and then the day after she finds it has sprouted. Meaning, there is hope. When talking about this with my thesis advisors, I was told that one bud growing out of the ground will not be strong enough to convey the hope idea. I knew that this was true and

although it was very logical, it was not a strong ending. Sometimes when creating a story personally, something might seem very logical and workable to me because I am so close to the work. But, it might seem different to others who can point out the problems with the work because they are responding from a more objective point of view. That is why it is very important to find others, no matter if they are committee members or classmates. After getting the advice of my thesis committee, I decided to add some magic to the whole story. As it is an animated film, it does not need to follow all the rules in our real world. I finally decided that the seeds will sprout shortly after they reach the ground and the girl's home and workplace would become green and nature would be restored.

Third is to give unexpected ups and downs to enliven the story.

I added another character, the "old mad man" to the story to give it some drama. When the girl goes out of her living place and looks for seeds, there would be something, or someone to act as a barrier to her and turn her journey into a challenging adventure. In the first several versions of this story, the backstory of the old man was that he was a former worker who worked in the oil refineries. After all the people desert this place because of the pollution and the oil production has stopped, he stays on and tries to find a way to save the place. And his way is to grow vegetation. But the harsh environment of the land and the continual failure to successfully grow anything makes the old man become insane. The only thing he does is continually plant, but his plants die right away once they sprout, but he keeps planting anyway. He has the same goal as the main character does, but he is a threat to her when she encounters him during her search for seeds because of his madness. Because of the

existence of this madman character, there was a challenge for the main character, who wants his seeds.

During the process of creating the characters in this story, Stephanie gave me lots of valuable suggestions about how to create a crazy but poor man. She provided some reference videos for me to get inspiration, and finally the old man became an interesting part of the whole story. But unfortunately, this character needed to be dropped in the story because of the limited amount of time I had to make this film. But since the madman character became so crucial at that time, there had to be something else to take his place in order to push the story forward through to the end with the same intentions. After considering the difficulty and time limitation of this project, I decided to replace the old man with an earthquake in the destroyed land. The girl finds the site of an abandoned planting area and discovers some seeds left behind. And she takes the seeds. But an earthquake happens and the girl rushes and runs all the way back to her living place. But on her way back, as things are falling apart around her because of the earthquake, the seeds fall out of the container she has put them in. When she reaches the door of her home, there's nothing left in the seed container. This is the second "down" point of the story.

This "down" is then followed by an "up" to create the hope theme of the story and the climax of the film where all the efforts of the girl are not wasted. In this case a "magical" sequence was added. The seeds dropped on the ground on the girl's way back sink into the ground and immediately begin to sprout, and the whole place turns green with lush vegetation everywhere. This symbolic sequence helped to enhance the theme I wanted to express in this story.

Finally, the story becomes solid after many discussions and changes. It was not easy to make these kinds of decisions, especially when facing the time limitation and knowing I need to abandon the important character of the old man that might weaken the story and make it flat. But the sacrifice needed to be made when I considered the reality and constraints of time and production demands. Fortunately, I feel I made the right decision.

Development of Visual Style

There are many visual styles to choose from, or to create when talking about 3D animation. The most typical way is to make it as a traditional 3D animated film, like what mainstream animation studios are doing. Or, there are other ways to make it a stylized work, like many independent shorts do.

For typical 3D animated films, the creator will need to consider the process of creating an animation from concept to the final post production. This is also the most common way that a student will proceed in order to use all of what she has learned about making films in school. In my first and second quarters at RIT, when I first started to create a story, concept and models, it was the way I chose to. I wanted to be an environment artist at that time and mostly liked to create stunning environments. After working for two quarters, I left school for a while and then had an internship in Los Angeles. At the same time, I was continuing to work on my thesis film. During the working time in Los Angeles, my main task was to create textures and shaders for characters and assets. And the render engine we used at that time was *Arnold*, which is a pretty efficient render engine. But even though we had computers with high configurations

and the best software and working pipeline, the rendering time was still not that short. It is okay for a company, but almost impossible for a student making a film without the needed resources for an independent film production. If I were at RIT, the school's render farm would have been the best facility I could use to do the render. But, not in Los Angeles. Although not having the convenient facilities and software would be a very good way to showcase all the skills I learned at RIT, it was still a risk to my thesis film because of the schedule and deadline. After two quarters of working with a particular style, I decided to make a big change on the final style and find another efficient way to create the style in the film.



Footage of Frozen by Walt Disney animation studios 2013

Another way to proceed with my work away from RIT was to have all the 3D techniques to create the animation, but to render it in a 2D effect. It was what I did in my second year film too. During this production, the rendering time was dramatically shortened with the renderfarm so that I could have time to focus on other aspects of the production. But my second year film, which was a Chinese painting style animation, was quite different than my thesis film. After research on different film styles, I found there were plenty of 3D films using the 2D rendered method. Among them is a film called *Fol' Amo*, which was created by the Goblin School of Animation. The 2D painting method is what they use for totally 3D films. After the research, I decided to do something like that.



Footage of Fol' Amor by Goblin School of Animation

Character Design

There were originally two characters in this story and finally I kept only one in this animation because of the deadline and time limitations, without harming the theme of the story. The main character is a girl. She is the only one living in the abandoned world and she is trying to research and grow plants to

save the world. There are actually other “characters”, but they don’t really appear in this animation, but they are seen within the photos that the girl finds on the ground in the destroyed land. These are photos of people who once lived there.

3D animation seems to have less freedom than 2D animation, because the 3D animator needs to think about the technique issues when doing the rigging and how to make the character move properly. In 2D animation, the character could be in any reasonable shape and style. But, in the 3D world the extreme shapes of a character is something to avoid.

Main Character

The design of the girl took a long time to finish. First of all, the character design had to help support the story, and the hairstyle, the clothes and the shape needed to follow the environment she lives in. At the same time, the difficulty of modeling and rigging are things that needed to be taken into consideration too. On the other hand, I wanted this character be somewhat cute so that the film would be children friendly, which fits my style. Although the whole story is not happening in a peaceful environment, I didn’t want the look of the film to be too dark and depressing. So, I made my first version of the character design, and the main character was wearing a vest and jeans, like a common modern girl we can find on the street.

In talking about the character design with Stephanie, she pointed it out that the girl’s clothes looked just like she bought them in a shopping mall, which would not be suitable to the storytelling in a desolate world. After that, I made a second version to have the girl wearing a bag-like robe, with a very

simple design. That character design got approved, but then it still needed to be changed because of practical reasons. That design was not that convenient for rigging and animation.

This final character design was finished during the time I was working in Los Angeles. At that time, we were doing a pure 3D animated TV series for teenagers, and the character design in that series was brilliant and cute. Influenced by that and also referencing pictures I found online, I made an outline on the principle to make it simple, friendly for rigging and animation, and cute. Following these rules, the final design was created. In this design, the character is symbolic and is wearing clothes with leaf patterns.

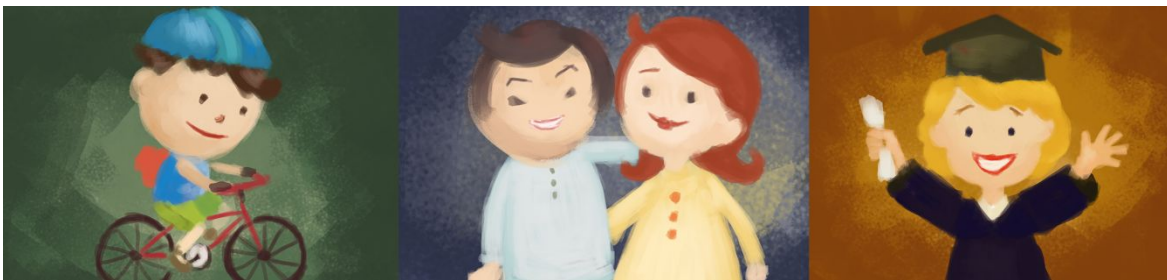


Design and final render of the main character

Characters in the Photos

Besides the main character, there are be other people in this story, who once lived and worked in the oil refinery area, but needed to leave because of the pollution of the environment. But since they have already left this area, the only remains of them are shown in old photos that lay on the ground in the

destroyed place. When the main character passes the oil wells, she finally reaches a place where there are signs of past human life. Among all the debris that lay on the ground are the photos of a family that used to live there. The design of the photos of the family is vivid and warm, which has a sharp contrast with the depressed environment, telling us that there was a dramatic change for those populating the area in the past.



Design of the people in the photos

Environment Design

At one point in time I was not sure about the final look of the environment and I was struggling to find a way out. I would have liked to keep my own art style, and use that art style to enhance the story, too. I tried to find reference pictures and paint over them to attempt to figure out the best style to develop. After many trials with this I still wasn't satisfied with what I came up with. At that time, when working in Los Angeles, I got to know a co-worker, He Jung Park, well, and we always spent our lunchtime together. She was the concept artist on our team and worked directly with the art director to create the incredible worlds of our animations in production. Since I already had all the models for the environment in hand, I asked her if she could help me make

some designs for the color and mood based on my environment models. She was willing to do this, and the following illustration is one of the pictures I sent to He Jung as the reference to create concepts and set up the style.



The environment set up as the reference to create concept art

He Jung is very good at creating mood and she asked me what I would like to have, and also what the thesis film story was about. I told her about the story and wrote a description to her to give her a quick understanding of what I would like to have and what I wanted to tell the audience in this film. Basically, the tree and the tree house would be a safe and green place surrounded by mountains (the “inside world”). But, the “outside world” would be very different from the inside world. It would be a dangerous and scary place with thickly polluted air, and that when the main character finally reaches the tent (i.e., the shelter the last people lived in before they abandoned this place) it would be a cold and silent place, giving the sense of death. After getting to know all the details I described to her, she came up with the concept picture shown below.



The concept of the main character's living place by He Jung Park



The world outside the main character's living place by He Jung Park

Storyboard and Animatic

Storyboard

Different versions were created when working on the storyboards. In the first stage, several shots were created before the character was designed and the environment was designed to study camera movement. And, it is the part

that was most discussed when having thesis review meetings every week in the first two quarters of the project. For a 3D animation, storyboards are a way to find out what the camera angles and positions of characters are, using the principles of film language, and where they need to be to make the film flow and be understandable. And, it is another way to represent the storytelling. One issue I usually had when doing the storyboard was that I wanted to keep the number of shots as low as possible to make the whole story straight forward and simple. On the other hand, the storyboard is a way to maintain efficiency for 3D animation. But sometimes it can make the film language unclear and cause difficulty for the audience in understanding what the character is doing or what the director wants to tell them. Stephanie helped me a lot on this issue. As an advisor, although she already knew about the story, she could still jump outside to view it from the point of view of the audience, who sees the story for the first time. Some shots were added based on her suggestions, which made the story much more understandable and reasonable.

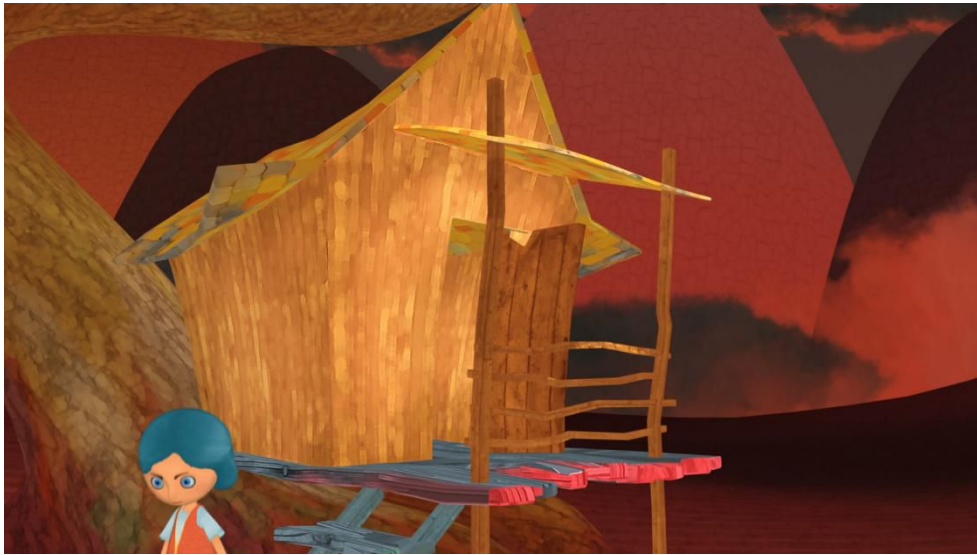
Animatic

The animatic, or the layout for 3D animation acts as a moving storyboard, and in the case of this 3D animation, it determines the timing of the first version of the blocked animation. The importance of the animatic is like the foundation to a building. Since it uses all the simple or work-in-progress models and all the camera angles in the storyboard to create a 3D story telling experience to audience, it has all the pivotal elements in it.

First it sets up all the cameras in the 3D world based on the storyboard. If

the storyboard is the blue sheet of the whole story, the animatic is to make it solid in a 3D world. In the animatic, the storyboard is always used as reference to create 3D cameras. The camera angle of view and focal length both work together to influence the final view of the shot. Whether a wild angle or a long shot is needed is based on the storytelling, and also if the main element in the shot is a character or an environment.

Second, it links all the cameras together to confirm the timing and continuity of each of the shots. Timing plays a very important role in any type of animation. The storyboard can help with camera angles and the time length of each of the shots. I used most of my time doing timing in this animatic and talked with Stephanie and other committee members many times when we had the chance to meet with each other. Adjustments of the timing started from the very beginning until the last semester during both processes of pre-production and production. Everything, including the cutting point of each of the shots and the duration of the camera movement, need to be taken into consideration. In some of the shots a character will have a movement going off screen and that movement needs to continue at the beginning of the next shot. One example is when the main character jumps down from the tree house to the ground and walks to the table in front of the camera. The camera angle changed after her jumping down to the ground from the stairs, but the movement needed to be continued from the last angle. Picture examples are given below.



The main character goes down in the first shot



The movement continues in the next shot

Production

The whole process of the production started in the fall quarter 2012. It was stopped for a period at the end of the winter quarter, and was restarted in the spring semester of 2014. The main production of the final version of this animation was finished during my co-op in Los Angeles. There were several steps when doing the production of this thesis film:

1. Modeling
2. Texturing
3. Development of the look of the film
4. Rendering

Modeling and Texturing

The first step in production was to create the model and texture from the concept work. It was the step to have a secondary design of the assets used in every shot. The first hand model and texture reference materials I got was from the environment design (i.e., the concept art by He Jung Park shown previously) to give the basic style of this animated work and to help to see whether it had a cartoon style or a more realistic one. The concept art had the basic elements of the reference, but not every detail. What a modeler and texture artist needs to do is to find some other reference iamges, no matter if they have an existing style similar to the concept art or just references in real life to get an idea about a specific object. For example, in order to model and texture the shelter (the tent) that the main character finds in the abandoned land (which was not

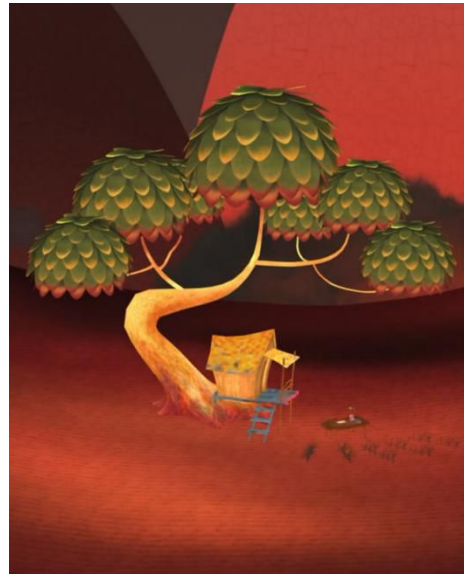
shown in the original concept art), I found reference pictures of real tents and designed the tent in my film to make it have a similar style in line with the visual style of the whole work. In the reference on the left in the picture below, the tent appears to be a mysterious and bright one with a girl sitting in it with a cat. According to the mood of my thesis animation, the tent had to be in a ruined place, which means it would be worn and torn and smudged with dirt all over. The color would not be as warm as the one in the reference picture, but instead it would be cold colored and fit the environment.



The reference and the redesign of the tent

Other examples are the tree and the tree house. Considering the render efficiency, I wanted to have a cartoon style tree with solid polygon leaves, instead of using paint effects or other software to make the leaves as realistic looking as possible. In this way, it fits the style of this cartoon 3D animation too. But how simple, or how complex the tree would be was something to consider. If the geometry of the tree is as simple as a sphere with textures, it would lose a lot of details, and not really match the style I wanted, even though it would be

pretty fast to render. Or, if the tree is too realistic, which means it will have thousands of leaves as polygons, and each leaf might need to be textured or might interact with digital lights, it would be almost impossible to finish. These detailed kinds of methods for creating trees are used in many films and requires professional equipment to render, which would be very hard for me to realize since I need to do that independently. After searching online for reference pictures, I found a style that was in between and the final version was very satisfying to me. I did the texture according to He Jung's concept. The only difference is the gradient of the color. Because of using this style, no light would be used while rendering, so that the texture painting and the look development becomes the only two ways to suggest light in the shots. This will be discussed later on in this paper.



Reference and final render of the tree house

Character modeling is a challenge to me because what I was practicing is to create the model of the environment, but not organic models like the characters. I did a draft version of the character model and asked another co-worker, Oscar, who was the modeler on our animation team in Los Angeles, to

do some adjustments to give it an accurate shape as in the concept art. Oscar did a good job by fixing the topology and smoothing the outline of the character model.

The software I used to create the textures and models include Autodesk Maya, Pixologic Zbrush, Foundary Mari and Adobe Photoshop. The basic workflow was to have the concept art or the redesigned references in hand, and to create a low-poly model in Maya, with the right topology and some of the rough details. The model created in Maya was to be exported as an OBJ file and imported into Zbrush in order to add details quickly. The textures were finished in Mari, and sometimes in Photoshop, if necessary. During my time working in Los Angeles, I spent some of my time learning Mari and asked the texture painters at my work questions about the program. I found that Mari was a powerful tool and I finally decided to use it in my thesis production.

Look Development

The function of “look development” in most 3D animations is to create the shader and apply texture to the model together with the shader in order to achieve a great look on the surface of a model. But in my case in this 3D animated film, since there is no light there to provide brightness or color bleeding when rendering with the render engine, the only way to have control of the brightness is to work on the look development.

The shaders I chose to use were surface shaders and ramp shaders in order to achieve a 2D render style. In some of the models, like the main character and the tree, ramp shaders were used for the shadows, or shades, on one side of the final look model to give the render a sense of 3D. For other models, like the

mountains, and most of the background objects in the outside environment, surface shaders were chosen to provide a flat color on the final render. In each of the shaders, I applied a color remap node in front of the texture node in order to have control of the brightness on each of the model pieces to achieve the specific requirements in each in the shots. The principle is to make the main character stand out from the environment, or lead the audience's eyes to what the director wants them to focus on. In most cases, the background elements are darkened and the character is turned to be brighter to catch attention.



The character is brightened and the background is darkened through Look Development

Character Rigging and Animation

Advanced Skeleton is the tool I chose from other Maya rigging plug-ins to create the rigging of the character. Tirumalaimuttu Shanmugam (former colleague at RIT) helped me to do the whole set up of the rigging in this

animation.

The animation was another crucial aspect of creating this thesis animation. The basic pace of the animation would be smooth and slow according to the theme. That is to say that the animation would not be exaggerated or extreme. Most of the movement of the main character would be simple and clear. To achieve this, I designed the animation based on the shots themselves and the animatic to decide the time length of each animation sequence and what kind of performance the main character would have. The basic timing is finished in the animatic, so it provided for less work when creating the design of the animation.

Technically, I used every key frame I had in the animatic to make the basic blocking before adding anything else to the animation. Then, I smoothed the curve between every key frame. Problems can appear in this stage because some of the animation curves may go out of control, so the next step is to refine them and add subtle movements by twisting the curves, but not to add more key frames.

Rendering

The rendering process is a quite important, but tedious, process at the end of the production. Because of the usage of surface and ramp shaders, which are comparably complicated surface shaders, the rendering process did not take as long as a fully rendered animated film. So, during the rendering process, the challenge I had was to find a workflow to make everything organized.

The workflow I created was to reference each of the environment scenes

with models and textures, in the basic setting up for look development. The character model, rigging and textures are in another reference file too. In the rendering file, the environment and character files are referenced to a file to complete a shot. In the rendering level, look development works are done based on each of the shots, and what each shot will show to the audience according to the plot in the story. The render frames are written down based on the animatic to offer a clear overall control of each length of the shot. This method to organize the documents of each of the render shots is to label the render folder following the camera name. All the files would be rendered under the “render” folder in a local disk and then be separated by the folders named after the camera shot. (See sample below.)

	A	B	C	D	E	F	G	H	I	J	K
9	108		0	172							
10	209		0	197							
11	210		7	178							
12	211		0	72							
13	212		0	193							
14	213		0	477							
15	214		15	91							
16	215		0	221							
17	216		29	261							
18	217		0	95							
19	218		0	79							
20	319		0	130							
21	320		0	167							
22	321		4	139							
23	322		4	149							
24	423		10	124							
25	424		31	228							
26	425		25	91							
27	426		0	76							
28	427		0	100							
29	428		0	430							
30	429		9	259							
31	430		0	399							
32	431		0	399							

Sheet to record camera numbers and frames

Post Production

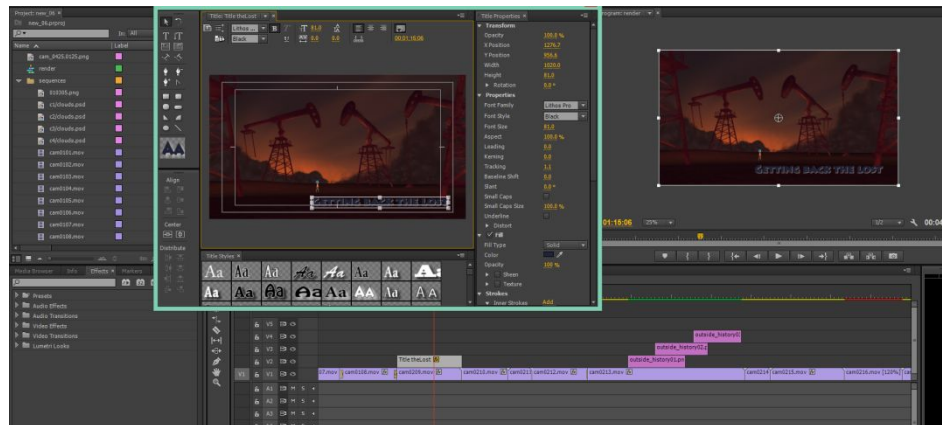
Editing

Editing was the final step in creating this thesis animation. The basic function of it is to put everything together including the rendered frames, the additional animated elements, visual effects, sound effects and the music. Adobe Premiere Pro was used for this process.

For this 3D animation, most of the parts of the editing had already been done in the animatic. Although the animatic is not even the first version of the finished animation, it has the timing of all the shots with additional animated elements included. What needed to be done is to replace the animatic shot sequences with the rendered shots.

There was one problem I found when doing the editing. During the process of doing this thesis film, I had restored my computer with all the software in the computer. After the restoring of Premiere Pro, it gave me a warning that some of the sequences I used in the animatic were not readable. I checked the problem out online and the problem was described as a bug in Adobe CC software. After further researching online, I choose to create a new file and import and animatic editing file as a sequence. It made the work complicated since I needed to manually delete all the .avi files before I saved it. Otherwise, the warning will appear again the next time when opening the Premiere file. This problem was solved by checking each of the resource video sequences and deleting the ones that caused the problem.

There are some elements that needed to be added and animated in editing. While most of the sequence animations were done in Maya, some of the animations, like clouds and memorial pictures, were added directly through Premiere. The title and the credits were added too using that software.



Title is added in premiere

Music and Sound effects

The music was created by Mike Mattice. I came to know about him through an RIT email that I received that said that Mike was looking for students to collaborate on scoring the music for a film or animated project. I contacted Mike and we discussed the thesis film via emails. We exchanged ideas back and forth from September 2015 until December 2015 when I laid the music file with the visual for the screening premiere of the work.

My Improvement

I had done many projects before my thesis film and expected I would experience improvement during this time. I did a collaborative film in my first year of graduate school. At that time, I had a chance to work together with Tirumalaimuttu, who was a very experienced rigger, and he became the rigger for this film too. I finished my graduate second year film by myself, from concept through post production. But, at that time, the story of the second film was very simple and slowly paced. What I wanted to do in my graduate thesis film was to create a faster pace of the timing and to tell a story properly. After many times talking with Stephanie and other committee members, I found my weakness. It is in the telling of a story in the language of film that can be understood by an audience with no confusion. After realizing this weakness, I did several versions of storyboards and animatics, and with each version I sought the insights and suggestions from others on my work so that I could understand and improve my storytelling effectiveness. The script and proposal could insure that I had a solid story in hand, but to transform the story to the screen was what I sought to achieve. After many corrections on my preliminary work, the final version of the animatic was approved, and this became one of my achievements in the improvement I sought.

The second improvement was about the use of color to render the mood. In my first and second year animations, the color was not vivid and strong. What I wanted to achieve for those films were soft and pretty colors. But in my thesis film, strong colors were needed. The red color of the outside and the dark blue color of the abandoned place are so symbolic and a great help in creating the mood of the story.

Conclusion

My film, *Getting Back the Lost* was premiered at RIT on December 13, 2015 in the School of Film and Animation end of fall semester screenings. I made a short speech as a conclusion to my learning experience at RIT, and I expressed my gratitude to the people who helped me during the process of making this film. Lots of compliments were given on my achievements with this work, as well as positive comments and advice for improvements. Generally, people liked the visual style, especially the texture and shading work. The most memorable advice was to improve the character animation.

My thesis film, *Getting Back the Lost* was the conclusion of my studies at RIT. I applied the knowledge I gained at RIT and my experience working in Los Angeles to my thesis work. This film has the designs I wanted and all the styles I wanted to use. It is a unique and lovely film created and directed by me! I feel the results are very good and I am glad I had the honor to be a student at RIT. I learned from all the professors there, and I am proud of my achievements today, with gratitude!

Appendix

GETTING BACK THE LOST

By

Wanru Liu

MFA Imaging Arts/ Computer Animation
SCHOOL OF FILM AND ANIMATION
ROCHESTER INSTITUTE OF TECHNOLOGY
ROCHESTER, NEW YORK
May 2012

Approved for submission by:

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Committee:
Mark Reisch, School of Film and Animation
Daniel DeLuna, School of Computer Graphic Design

Working Title: *Getting Back the Lost*
Director: Wanru Liu
Technique: 3D

Synopsis

In the whole environment of the world, what an individual can do to create change is limited. But there is still hope. The power of a committed individual can be focused so well and so deeply that it can affect great changes in the world.

In this fictional work, a journey by a young woman into the regions surrounding her beautiful and isolated mountain village reveals a polluted world where life was once flourishing, but now is dying. Her journey shows her what is happening to the earth beyond her village. She confronts the devastation of the earth because of environment pollution and destruction. The young woman returns to her home after the journey with a commitment to protect her village environment so that life can continue and hope survives.

Treatment

In the early morning, the sun is just about to rise over the tall mountains and the grand river mist is curling through an isolated village. Inside a small house, a young woman packs her rucksack, grabs a walking stick, and heads to the front door of the house.

The young woman begins a journey to discover the world outside her village. She walks through the village. Everything is quiet -- people are still asleep, birds and small animals are beginning to wake up and move. At the edge of the village, she fills a glass drinking bottle with water from the river that runs at the edge of the village. She holds the bottle up against the growing sunlight. There are some particles in the water that are green and yellow and they are glowing! The girl stares at these particles for several seconds. She then

closes the bottle and puts it into her rucksack and then takes the path leading away from the village.

The girl has walked for many miles. She climbs up a very steep mountain to the top. She looks out from her viewpoint to the landscape that lies infinitely before her. The landscape is very different. It is a dead place and there is a thick, reddish haze in the air so that the sunlight barely reaches the ground. The surface of this land is made up of rocks and destroyed buildings, rusted metal structures, and broken and twisted glass and plastics. As she views the landscape, her attention is drawn by something very odd: Everywhere are glowing green and yellow boulders inlaid into the ground below. She stands still looking at this strange landscape. Then she sits down to rest for a long time before she continues the journey down the other side of the mountain into this destroyed landscape.

As she comes down the mountain, she begins to see the new environment closer up. Many, many weathered and broken objects lie half buried in the ground, and abandoned buildings have no windows or walls and are falling apart. Along her way she sees posted signs with warnings about the deadly pollution in the new landscape.

Going further into the devastated landscape, she reaches a destroyed oil well. The metal surface of the oil derrick is rusted and the well is collapsed. The girl stares at the oil well and the story of the land rises up to her mind: The oil well is working, the sky is blue with warm sunshine making the surrounding green grasslands sparkle. She hears the sound of the drilling machines and workers with tools. The landscape suddenly changes and becomes dry and ugly

with deep holes appearing everywhere in the earth bordered by giant piles of rock. A growing wind and the worker sounds become harsh. All plants in the area of the oil well disappear and the glowing green and yellow stones begin to appear in the earth.

The girl suddenly opens her eyes and the flashback stops. She continues her journey forward. She comes to a strange lake. Destroyed benches, tables, swing sets, and barbecues are strewn around haphazardly. A ruined sign shows the place was once a park. There are fluorescent particles floating thickly in the water, and the color is neon green and blue. It is difficult for the young woman to breathe near the lake and she gasps for air as she looks at the lake. The girl stares into the lake and has a vision: The water is clean and glittering under the sunshine. She can also hear people's laughter and music near the lake. Suddenly, a wave of green and yellow color is discharged into the lake. The voices of people and music disappear and the young woman returns to her present view of the lake.

Suddenly she is distracted by a strange noise. She sees a silhouette at the edge of the lake, The silhouette is of a man filling dozens of glass bottles with the liquid from the lake. The man emerges into the young woman's view and he ties the bottles together in a chain with a rope. The girl watches the man finish filling all the bottles. He then wraps himself in the bottle rope chain and lumbers into the distance. The young woman follows him to a small shelter erected from torn cloth and found objects, and it is open on one side. The young woman can see that a pad on the ground is a bed and an old box serves as a table. Water bottles and different gardening tools occupy most of the space in the house. There is a banner-like piece of cloth that is hung in the air above

the shelter. It has the logo of an oil company barely readable on it.

The man moves to what looks like a backyard. There is a line of bushes planted there. Those at one end of a line of bushes are alive, but those at the other end of the line are dying or dead. The man waters all of them using bottles that he just brought back from the lake. The glowing particles in the water coming from the bottles infiltrate into the soil.

The girl approaches the old man and attempts to speak to him. But as soon as she reaches him, she suddenly steps back away from him. There is mud all over man's face and clothing, and he does not even realize the young woman is there. He is planting seeds into the ground, one by one. He mumbles to himself. After the old man finishes putting the seeds into the ground, he hobbles back to his crude living shelter and lies down. He is so weak that he sleeps like he is dying. The girl is shocked by what she sees. She holds back her tears and approaches the row of bushes. There are seeds on some of the bushes that are still alive. She collects some of these seeds and puts them into her pocket and she runs away.

The young woman is headed back to her village. On her journey back, it seems as if she is walking in an illusion where the present and the past interchange. She can see the once flourishing landscape in warm brilliant sunlight and all its health and beauty. But, these visions fade to the dark and blue reality of her present journey. She is overwhelmed by what she sees and falls down into tears.

There is a little spot of light suddenly in front of her. She opens her eyes and knows that her village is near. She raises herself from the ground and she continues walking toward the light.

On a later day, it is another morning in the village. The young woman goes out of her house before sunrise when the village is still sleeping. But this time she carries a shovel and a pail. On the border of her village she can see that the purple chemical mist from other side of the mountains is approaching her village. She takes out a sack containing the stolen seeds from the devastated land beyond the mountains, and she kneels down and plants her first seed.

Rationale

The reality of the environment now in the world is more dangerous than most of the people know. The fast speed of the development of human society feeds on the destruction of the our living space: our natural earth.. I would like to make a film in an extreme situation and send out the message to warn people that it is time to make a change and save ourselves.

Approach

My thesis would be a short 3D animated film. The software would be used are Autodesk MAYA, Adobe After Effects, Adobe Photoshop and Final Cut Pro. Texturing and lighting are going to be concentrated in this film to create a painting style environment and to create the contrast between the old time and the reality that the girl sees. The music will be finished during the collaboration of a composer and me.

Time Line											
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Pre:											
Character Design											
Storyboard											
Visual development											
Character Modeling											
Environment Modelling											
Surface											
Rigging											
Single frame test											
Prod:											
Camera											
Previsulization											
Animation polish											
Special Effects											
Post:											
Lighting											
Rendering											
Compositing											
Sound Effects											
Music											
Credits											

Budget			
	Qty	Cost	Total
Pre:			
Pencil& Paper	5	\$4	\$20
Reference Books	3	\$30	\$90
Research Films	3	\$20	\$60
Prod:			
Computer Software	1	\$200	\$200
Computer Hardware	0	\$0	\$0
Hard Drive 1TB	1	\$100	\$100
Post:			
Music Composers	1	\$300	\$300
Music Recording	1	\$100	\$100
DVDs	15	\$4	\$60
Contingency	20%	\$186	\$186
			Total: \$1116

1