Paradise In The East

Hui Ouyang

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Paradise In The East
By Hui Ouyang

A thesis submitted in partial fulfillment of the requirements for the degree of:
Master of Fine Arts in Visual Communication Design

School of Design | College of Imaging Arts and Sciences
Rochester Institute of Technology
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Approval

Chief Advisor: Daniel Deluna

Associate Advisor: Shaun Foster

Associate Advisor: David Halbstein

School of Design Administrative Chair: Peter Byrne

Thesis Candidate: Hui Ouyang
Abstract

Keywords:
Landscapes, 3D Animation, National Treasure, Cultural Treasure, The Red Crowned Crane

“Paradise in the East” is a 3D animation that explores the use of 3D character design, rigging, animation and landscaping to create a hyper-realistic look of some of China’s astonishingly diverse landscapes. This project referenced some of China’s most recognizable locations such as The Great Wall, Zhang Jiajie National Park, West Lake, etc.
Problem Statement

China is the largest country in East Asia, with a large number of spectacular landmarks, astonishingly diverse landscapes and precious wild life. As a Chinese, I have deep love for my country; unfortunately in the last couple of decades the economical development, industrialization and explosive growth has caused people to forget and care about the environment. Factories and other industries polluted a large number of beautiful and serene places, forcing much of the wildlife to face extinction. Paradise in the East is a 3D Animation that mainly focuses on introducing and reminding people to protect of some of Chinas national and cultural treasures.
1. Process

1. Research, Planning and Sketching

The Red Crowned Crane

The Red Crowned Crane represents the Asian culture, and is well known as a symbol of luck, longevity and immortality. In “Paradise in the East”, the Red Crowned Crane will be a guide that leads viewers to experience those beautiful and magnificent places.

In order to make a realistic 3D red-crowned cane, and animate it, there are three major parts of research that I had to do: the appearance of the red crowned crane, the principle of how wings fly and the character rigging technique in Autodesk Maya.

a. The appearance of the red crowned crane.

The Red Crown Cranes are mostly snow white with some black on their wing, which appears to look like a black tail when the birds are standing, but the real tail feathers are actually white. The feather colors on the cheeks, throat and neck are different between males and females. Males are black, while females are pearly gray. In my case, I wanted to make one with black and white feathers, so the male crane was my choice. The bill is olive green to greenish horn, and the legs are grayish black. But the most important part is the pure red spot on the top of crane’s head. It looks a like a crown or a hat, that is why the official name of this kind of bird is “Red Crowned Crane”.


b. The wings’ structure

After researching, I had drawn a rough sketch to demonstrate the structure of the bird wings, in order to help me understand how to rig the wings later on.
c. Character Rigging Technique in Autodesk Maya

Rigging technique in Autodesk Maya was very new to me, so doing research and watching tutorials about rigging became very important. Fortunately, after understanding the principles of how wings fly, I knew what resources I should look for and where I should start in build the rig.

Research about rigging techniques in Maya and the plans for their use in my project:

1) Skeleton
- Joint: Build the basic skeleton for the bird.
  Techniques include Joint Tool, Remove Joint, Disconnect Joint, Connect Joint, Mirror Joint, Orient Joint, etc.
- Inverse Kinematics (IK) Tools: Use for the bird’s legs and neck connection.
  Techniques include IK Handle Tool and IK Spline Handle Tool.

2) Deformers
- Blend Shape: Eye lids and beak movement of the bird. Bird feathers
movement control.
- Cluster: Bird feathers movement control.
- Twist: Bird feathers movement control.

3) Constrain
- Point Constrain; Aim Constrain; Orient Constrain; Scale Constrain; Parent Constrain; etc.

4) Skin
- Paint Skin Weights; Detach Skin; Add Influence; Remove Influence; Smooth Bind; Interactive Bind; etc.

5) Animate
- Set Key; Set Breakdown; Hold Current Keys; Set Driven Key; Graph Editor; etc.

3D Landscapes Design

a. Real Places Reference

China is well known by its’ spectacular landscapes in the world. In my animation, I chose three famous tourist interests to represent the “Eastern Paradise”. In my mind; The Great Wall, Zhang Jiajie National Park, and West Lake were the best and most distinguishable choices.

1) The Great Wall

Known as one of the most famous tourist interests in the world the Great Wall is called “the spine of the dragon” in the East, and is a precious culture heritage in China with thousands years of history. The Great Wall was built in Qin Dynasty but at great cost. All the bricks and stones were built and laid by human hands. Millions of people’s lives were buried under the walls during the construction. For centuries, the walls experienced damage and restoration over and over again, but it was still lying on “the back of the dragon” and offered great defense for countless wars. I chose the Great Wall for its’
unshakable position in all of our Chinese minds. We were proud of it.

2) Zhang Jiajie National Park

Zhang Jiajie National Park is located on the northwest border of the Hunan Province in China. The park is famous for the extraordinary pillar-like mountains, and the scenic areas are a world-famous natural heritage. The reason I chose Zhang Jiajie National Park as an inspiration, was because it was not only a world-famous natural heritage, but also because the scenery over there was what I pictured heaven to look like.
3) West Lake

West Lake represents the natural beauty of China and was also a great place that inspired a lot of poets and painters throughout the history of China. Lotus is the flower that represents Asian culture. In China, there is a famous description about lotus flower: “出淤泥而不染”, which means although lotus roots grow from mud field, the flowers and leaves never get dirty by the living condition. It is used as a metaphor to describe a persons’ pure heart should not be effected by the chaos environment. I particularly love the sprint of the lotus represented, so I would love to put the lotus park inside my project.

![West Lake images]

*Figure-6: West Lake*

**Technical Aspect**

Creating realistic landscapes in 3D applications is very challenging. Although I had been using Autodesk Maya and Maxon Cinema 4D for a few years, I still
thought it was very hard to get the results that I wanted in a limited amount of time. So I started looking for other applications to help create a more efficient way to work on the landscapes.

After more research, I discovered and began to delve into Vue Xstream. It is a very powerful application to create realistic natural environments, as well as being compatible with other 3D packages such as Autodesk Maya and Maxon Cinema 4D. Like a coin, Vue Xstream also has a down side. Render times were a huge problem, because there were no computers at school that had Vue Xstream. I could only use my own computer to render out everything. Eventually, I made up my mind to learn this application, and figured out how to solve the rendering issue as time went on. I found a large number of tutorials on Digital Tutors and Lyda.com, which helped in learning this new 3D software.

**Storyboard.**

*Figure-7: Storyboard*
2. Modeling

The software that I used for this part was Autodesk Maya 2014. In order to help myself undertake this part of the process I put together a list of models that I needed to create.

<table>
<thead>
<tr>
<th>Model</th>
<th>Level of Details</th>
<th>Rigging</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Red Crowned Crane</td>
<td>High</td>
<td>Full</td>
</tr>
<tr>
<td>Dragon fly</td>
<td>High</td>
<td>Full</td>
</tr>
<tr>
<td>Pavilion</td>
<td>High</td>
<td>-</td>
</tr>
<tr>
<td>Willow Tree</td>
<td>Medium</td>
<td>-</td>
</tr>
<tr>
<td>Pine Tree</td>
<td>Medium</td>
<td>-</td>
</tr>
<tr>
<td>Lotus Flower (Far)</td>
<td>Medium</td>
<td>-</td>
</tr>
<tr>
<td>Lotus Flower (Close)</td>
<td>High</td>
<td>Full</td>
</tr>
<tr>
<td>The Great Wall (Close)</td>
<td>High</td>
<td>-</td>
</tr>
<tr>
<td>The Great Wall (Far)</td>
<td>Low</td>
<td>-</td>
</tr>
<tr>
<td>Bridge</td>
<td>Low</td>
<td>-</td>
</tr>
<tr>
<td>Stone Lion</td>
<td>High</td>
<td>-</td>
</tr>
<tr>
<td>Zhang Jiajie Mountain</td>
<td>Low</td>
<td>-</td>
</tr>
</tbody>
</table>

*Table 1: Model List*

**The Red Crowned Crane**

I began to model the crane based on the sketches that I had done previously and thought that everything was fine until I got to the rigging stage. Thanks to Raymoud McCarthy Bergeron’s guide for rigging, I found out the pose of my Crane was not right making it very difficult and inefficient to rig. So I had to remodel the crane so that it was suitable for rigging.
Modeling the wings of the crane was a big obstacle for me. The structure of the wings was very complicated for it contained hundreds of feathers, and if I created all the feathers by using fur, the render time would be predictably very time consuming. So, in order to optimize my scene file when it came to rendering, I decided to use image planes instead of fur. Based on the sketches of the wings, I followed the structure and created layers of image planes. (Figure-9)
The challenge of modeling landscapes was not only the objects themselves, but also how to model everything together efficiently in order to save computer memory. Landscapes contain a large number of objects i.e. buildings, trees, grasses; and each object contained thousands polygons. The scene could become huge easily and costly when it came time to render. The mission that I gave to myself when I started to model landscapes was to try to keep everything small making the render time more affordable.

The structure of the Great Wall was built by stones, which mostly were inorganic geometry, so compared with organic shapes like the Crane, the modeling process of this part was not that hard. In order to save computer memories, I decided to only model the parts that in front of the cameras in higher detail, on the other hand, intentionally make the objects in the back less detailed. Plus, in my earlier plan, I had three distance camera views: Far Away, Middle Range, Close Up. So I created three separated scenes with different detail levels.
The technique I used for modeling the Great Wall was mainly Extrud and Insert Edge Loop Tool. In the far away scene, the polygons of the mountains and the Great Wall were very basic, they were mainly just cubes and hard edge curves, which contained literally no details. Plus, there were no actual trees in this scene, since with that far away in reality; an audience can only see the overview of the scenery. So I didn’t model trees in this scene, instead I used displacement map on the mountain plans when I started texturing. In the mid range view and close up scenes, I created more details for the Great Wall, and modeled trees.

The scene of Zhang Jiajie National Park contains thousands of trees and plants. It was really difficult to manage so many trees in Maya. From the research I had done in the beginning, I came across new 3D software called Vue-Xstream, which was well known by its powerful function of generating eco system. I spent one month to watch tutorials, and taught myself how to use this software.
3. Texturing and Lighting

After finishing modeling in Maya, I started to do texturing and lighting. I used two major software to accomplish this part, Maxon Cinema 4D and Vue Xstream.

For the Great Wall close up scene, West Lake scenes, and the pavilion of Zhang Jiajie National Park scene, I exported all the models as .obj file format, and imported them into Maxon Cinema 4D. At that time, I explored a new plug-in called Octane Render in Cinema 4D. This render engine could apply a really realistic render result, and the price of this plug-in was affordable for students compared with another render engine called V-ray. But the methods of texturing in Octane render were different. Through more research I was able to learn the Octane render texturing technique in a short period time. So I played with this plug-in, using Octane texturing and lighting techniques and the final results came out very nice.

![Texturing and lighting in Octane render](image)

At the same time, for the Great Wall far away and mid-range scenes, and Zhang Jiajie National Park far away scene, I imported the .obj files into Vue
Xstream. Learning Vue Xstream was quite a challenge for me since there was nobody around me who ever used this software before, so I could not seek help from friends. The biggest resource that helped was from watching tutorials on Digital Tutor. I spent around one month exploring how to create realistic terrains and to populate eco-systems with various plants. While I knew more about Vue Xstream, I found out there were a few disadvantages by using it: first, the animation renders were very flickery with lowering the render quality. Second, the rendering time was unaffordable when the atmosphere contained a lot of particles and the render settings were set to high. So I had to look for some solutions to balance these two disadvantages. In the end, I decided to render out multiple passes and layers with decent quality (not best quality), to save on rendering time, then try to get rid of the flickers in post-production.

Figure-12: Landscape modeling in Maya
4. Rigging and Animating

Character rigging was a huge challenge for me, because I had never done rigging before. I was glad that Raymoud McCarthy Bergeron, a very talented animator in School of Film and Animation, helped me at that time. Raymoud patiently showed me some basic rigging knowledge and how to start rigging the wings. With his help and watching tutorials online, I successfully learned set driver/driver key, connection editor, component editor, blend shape, cluster, curve deformer, twist, expression and some basic Mel scripting. In the end, I rigged a very complex bird rig. Although I had a lot of difficulties during that time and there might be other ways to make a better rig, I was really happy with my final result.

*Figure-13: Crane Rig demonstration*
I started with searching for videos of a crane flying when I was working on animating the crane. I understood in order to make the animation look real and comfortable, I should animate it based on how a crane flies in real life. I took reference images from life videos, and organized them frame-by-frame in Adobe After Effects, then I picked out some key frames, which gave me a good direction to set up the key-frame poses in Maya.
5. Staging and Composting

Once I had finished all the environment scenes and the animation of the crane, I would then begin character staging inside each scene. In order to create the flight path of the crane throughout the animation I drew some brief sketches based on the scenes that I had created to give me a good idea how the crane should fly in and out in each shot.

<table>
<thead>
<tr>
<th>Scenes</th>
<th>Movement Sketches</th>
<th>Crane Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Great Wall far away range shot</td>
<td><img src="image1" alt="Sketch" /></td>
<td>From middle left bottom to middle right up</td>
</tr>
<tr>
<td>2. Great Wall middle range side view</td>
<td><img src="image2" alt="Sketch" /></td>
<td>From up left corner move slightly to right.</td>
</tr>
<tr>
<td>3. Great Wall middle range top view</td>
<td><img src="image3" alt="Sketch" /></td>
<td>From left to right</td>
</tr>
<tr>
<td>4. Great Wall close up shot</td>
<td><img src="image4" alt="Sketch" /></td>
<td>From up right curvedly move to up left</td>
</tr>
<tr>
<td>5. Great Wall close up shot</td>
<td><img src="image5" alt="Sketch" /></td>
<td>From bottom left to up right</td>
</tr>
<tr>
<td>6. Zhang Jiajie middle range view</td>
<td><img src="image6" alt="Sketch" /></td>
<td>From up left corner move slightly to right.</td>
</tr>
<tr>
<td>7. Zhang Jiajie close up shot</td>
<td><img src="image7" alt="Sketch" /></td>
<td>From right to left</td>
</tr>
<tr>
<td>8. Zhang Jiajie close up shot</td>
<td><img src="image8" alt="Sketch" /></td>
<td>From left to right</td>
</tr>
<tr>
<td>9. West Lake far away shot</td>
<td><img src="image9" alt="Sketch" /></td>
<td>From up right corner move slightly to left</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>10. Sun</strong></td>
<td><img src="image" alt="Sun" /></td>
<td>From right to left</td>
</tr>
<tr>
<td><strong>11. Side view of Pavilion close up shot</strong></td>
<td><img src="image" alt="View 1" /></td>
<td>From right slightly move to left</td>
</tr>
<tr>
<td><strong>12. Side view of Pavilion close up shot</strong></td>
<td><img src="image" alt="View 2" /></td>
<td>From right slightly move to left</td>
</tr>
<tr>
<td><strong>13. Top of the pavilion close up shot</strong></td>
<td><img src="image" alt="View 3" /></td>
<td>From left move to the middle and stop</td>
</tr>
</tbody>
</table>

*Table-2: Staging Plan.*

After getting a good idea about staging my character, I started composting. There were a few major parts that I needed to do in the Composting stage. First, because my crane was created and animated in Maya separately, I had to compose the crane animation into the environment. Second, in order to save on render time, for the far away scene of Zhang Jiajie National Park, I rendered out multi-passes and layers in Vue-Xstream without highest quality settings. In doing so I needed to use After Effects to get rid of the flickering and add atmosphere. Third, I was planning to do the majority of the clouds in After Effects during post-production as well.

*Figure-16: Composting in After Effects before vs after.*
6. Color Correction

The final challenge of this project was color correction. Because I used 3 different 3D software to render this project: the crane animation was rendered out in Autodesk Maya, a few close up shots of scenery were rendered in Maxon Cinema 4D, and some of faraway scenes were rendered from Vue-Xstream. The colors of all the pieces were totally different. My mission in the end was color correcting all the parts and making them look like a whole piece.

I primarily used After Effects for color correction. All the renders were 32-bit high resolution images, which allowed me to adjust each color channel flexibly.

![Figure-17: Color correcting in After Effects before vs after](image)

During the working progress review with my thesis committee members, Professor Daniel Deluna pointed out that the color tone of each scene should be changed depending on the time of day since the animation started from sunrise and ended with sunset. The color transition between West Lake scene and pavilion scene was too different at that time, which made the audience feel like there was a huge jump in terms of the timing. So I purposely added more orange color into the West Lake scene, aimed to make the environment close to sunset.
7. Final Refinement

The last step was adding music and sound effects. Zhen Dong is a singer in China, and the style of her songs fit my piece very well, so I asked her permission and used her three songs to edit the music for my thesis. Besides the background music, I also added some ambient sounds effects, such as bubbling stream, wind, wings flapping, etc.

The software that I used for editing the music and sound effects was Adobe Premiere Pro. Because I used three different songs, I had to learn how to make nice transitions between each song, and make sure the music flow fluently. The razor tool in Premiere was very useful and it could break one song into pieces easily. For the transitions between each sound clip, I used audio key-frames. Although key-frames could bring a decent result to the transitions, some of the parts still did not sound quite smooth, so I added some sounds effects, such as wind, wings flapping, to cover the hash transition.
8. Distribution

I submitted “Paradise in the East” to a few film and animation festivals through the world, and so far it had been entered and screened in Animex Awards 2015, International Noncommercial Animation Festival BEAR, Student Art Festival and International Eurofilm Festival. The status in a few festivals remained “In Consideration” so far, so I believe that “Paradise in the East” will keep bringing good news.
Conclusion

This project was one of the most satisfied outcomes during my graduate school. It took two semesters to finish it, and the amount of knowledge that I had learned during that year was unbelievable. During the whole process, I realized how important the early planning was. Being well planned in the beginning and managing time well helped me process my project so much faster. Besides, there were another two major parts I would like to point out.

Technically, modeled different scenery depending on the levels of details needed, realistic environments were created by using proper materials and shading and diverse lighting set-ups, complex character rigging were built by self-learning as well as learning a new 3d software Vue-xStream which I was able to teach myself through watching tutorials and inquiring experts in this field. Having good time management allowed me to finish and render complex 3D animation on time.

Artistically, from composition, color to music, my goal was to aim to make a beautiful piece to represent the breath-taking sceneries in China. So not only did I pay attention on the aesthetics aspect of each object, but also I spent a large amount of time choosing the perfect camera views.

Overall, this project was well produced within my expectation. Although there were some parts that definitely could be better, I was very happy and satisfied with the result of this project. I think this experience not only taught me a huge amount of knowledge in the 3d design field, but also for me understand how much potential that I could dig out from myself by working hard and exploring new.
Reference:

The Art of 3D Computer Animation and Effects (Third Edition)
Written and Designed by Isaac V. Kerlow. Published by John Wiley & Sons, Inc, Hoboken, New Jersey. Print.

The Art of 3D Computer Animation and Effects (Fourth Edition)
Written and Designed by Isaac V. Kerlow. Published by Wiley;

Introducing Character Animation with Blender (Second Edition)
Written by Tony Mullen. Published by Sybex (February 22, 2010). Print ISBN:

Zbrush Character Creation --- Advanced Digital Sculpting (Second Edition)
Paperback (February, 2011).

Introduction to Sculpting Fluid Dynamics: Real Flow Techniques with Wayne England
Actors: Wayne England, Director: Alex Alvarez, DVD Release Date: April 24, 2007, ASIN: B000Q66FC0

Yuan Ming Yuan (the Royal Palace)
A documentary directed by Xue Jijun.
Web link: http://www.youtube.com/watch?v=Owz1qVQww&feature=related

Realism In Vue – Special Edition
D. Pandhi
Thesis Proposal for Master of Fine Art Degree

Heaven in the East

Submitted by Hui Ouyang
2012.11.7

Thesis Committee

Daniel DeLuna. Associate Professor, Computer Graphics Design Approval

__________________________________________
Signature of Committee Chair         Date

Shaun Foster. Assistant Professor, Computer Graphics Design

__________________________________________
Signature of Committee Member         Date

David Halbstein, Assistant Professor, Computer Graphics Design

__________________________________________
Signature of Committee Member         Date
Abstract

**Keywords:** Landscapes, Chinese Culture, Breath-taking

China is the largest country in East Asia, and China's landscape is vast and diverse, there are a large number of spectacular places are breath-taking. As a Chinese, I deeply love this magnificent land, I want to introduce some parts of China to the world, and let more and more people know about this country. So I propose to create a 3D motion graphics piece. Through the piece I want my audiences to get known about Chinese culture.

Project Description

**Keywords:** Landscapes, 3D motion graphics, The Red Crowned Crane

In eastern China there are some spectacular landscapes; The Great Wall, Summer Palace, and so on, which are well known by the world. ZhangJiajie National Park, located in the south of China, Hunan Province. The scenic area hosts many natural features including: mountains, forests, caves, lakes and waterfalls. They enjoy the reputation of “Original Picture on Mountain and River of China”. “The Heaven in the East” is a 3D Motion Graphic piece that introduces the magnificent scenery of ZhangJiajie National Park. The red crowned crane is a traditional bird that represents the far eastern part of the world, so it will be used as a guide on the journey to the “Heaven in the East”.

Target audience

The purpose of this project will be to introduce great landscape of Zhangjiajie
National Park so that viewers of all ages (native and foreign) will be able to enjoy, respect and become more knowledgeable about both Chinese culture and the country.

Main Focus

3D Character Design: The “Red Crowned Crane” will be the main character and center piece that will lead the camera on the journey, so it will need to be modeled, textured, rigged, and animated.

3D Landscape Design: Zhangjiajie National Park scenic area hosts many natural features including: mountains, forests, caves, lakes and waterfalls, so I will focus on the modeling, texturing, and lighting of the landscape.

Methods

To create this I will primarily be using Autodesk Maya to model, texture, light, rig and animate the various scenes and characters, combine with Vue software and Zbrush, Mudbox, Cinema 4D. For the score and sound effects I will be using Adobe Premiere and/or Final Cut.
Sketches
The red crawnd crane
<Heaven in the East> Storyboard

Scene: 01
Note: Sun rise

Scene: 02
Note: Zhang Jiajie Mountains panoramic view

Scene: 03
Note: The crane is flying into the view

Scene: 04
Note: The crane is flying through the mountain

Scene: 05
Note: Crane lands on the woods (flowers, trees, river)

Scene: 06
Note: From the crane's view, seeing the environment

Scene: 07
Note: See a squirrel jumping and climbing in the tree

Scene: 08
Note: Crane turns around seeing a pavilion on the top of the mountain
<Heaven in the East> Storyboard

Scene: 02
Note: A view of pavilion

Scene: 10
Note: Crane flies to the pavilion

Scene: 11
Note: Crane is flying to the pavilion

Scene: 12
Note: Stone steps on the mountain lead to the pavilion

Scene: 13
Note: The crane stand on the top of the pavilion, camera moves around the view- aim at the crane

Scene: 14
Note: Close shoot of the crane

Scene: 15
Note: From the crane view seeing the sun

Scene: 16
Note: Crane flies to the sun
Process of developing the project, Timeline

3D Motion: Heaven in the East

Dates

Months

Thesis Timeline

Committee meeting
Thesis review
Tesis defense
Research

Finalizing

Composing
Initial sound effects
Preliminary visuals

Character animation

Scene lighting
Scene layout
Scene modeling

Ciren rigging
Ciren laying
Ciren modeling

Proposal accepted

Storyboarding

Research
Model List

<table>
<thead>
<tr>
<th>Model</th>
<th>Level of detail</th>
<th>Rigging</th>
</tr>
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<tbody>
<tr>
<td>The Red Crowned Crane</td>
<td>High</td>
<td>Full body</td>
</tr>
<tr>
<td>Squirrel</td>
<td>High</td>
<td>Full body</td>
</tr>
<tr>
<td>Rabbit</td>
<td>High</td>
<td>Full body</td>
</tr>
<tr>
<td>Butterfly</td>
<td>High</td>
<td>Full body</td>
</tr>
<tr>
<td>Red carp</td>
<td>High</td>
<td>Full body</td>
</tr>
<tr>
<td>Zhang jiajie mountain</td>
<td>Low</td>
<td>None</td>
</tr>
<tr>
<td>Pine tree</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>The tree in the mountain</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>Pavilion</td>
<td>High</td>
<td>None</td>
</tr>
<tr>
<td>River</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Peach tree</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Willow</td>
<td>Medium</td>
<td>None</td>
</tr>
<tr>
<td>Peach flower</td>
<td>Medium</td>
<td>None</td>
</tr>
</tbody>
</table>

Anticipated components
Computers contain soft wares such as Autodesk Maya, Autodesk Mudbox, Z-Brush, Adobe Premiere, Adobe After Effects, Adobe Photoshop, Vue, Cinema 4D, and so on.
Survey of the Literature
My survey focuses on two aspects: the red crowned crane character design, and the landscape design.

The Art of 3D Computer Animation and Effects (Third Edition)
Written and Designed by Isaac V. Kerlow. Published by John Wiley & Sons, Inc, Hoboken, New Jersey. Print.

The Art of 3D Computer Animation and Effects (Fourth Edition)
Written and Designed by Isaac V. Kerlow. Published by Wiley; 4th Revised & enlarged edition (April 13, 2009).
These two books is useful to me on how to use Maya to create animation. It offers techniques, which I can use to create things that require complicated movement, such as the crane fly. The lessons inside can help me learn about building my characters and animate them in the project.

Introducing Character Animation with Blender (Second Edition)

Zbrush Character Creation --- Advanced Digital Sculpting (Second Edition)
This book is very useful in terms of sculpting the details of the mountains.

Introduction to Sculpting Fluid Dynamics: Real Flow Techniques with Wayne England
Actors: Wayne England, Director: Alex Alvarez, DVD Release Date: April 24, 2007, ASIN: B000Q66FC0
**Yuan Ming Yuan (the Royal Palace)**
A documentary directed by Xue Jijun.
Web link: [http://www.youtube.com/watch?v=oWfzz0qVQww&feature=related](http://www.youtube.com/watch?v=oWfzz0qVQww&feature=related)

There are many traditional Chinese scenes which created by 3D software in this documentary, it will be a very good reference piece for me to build the scenes in my thesis project.

**Dissemination Plan**
To make this video public, I will submit the work to some famous competitions in China, such as China Computer Graphics Festival (CCGF), China (Beijing) International Student Animation Festival, and so forth.

In addition, I will submit the work to competitions in America and other countries. It will be a good opportunity to introduce China to the world.