Personalities of the Chinese Zodiac

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PERSONALITIES
OF THE CHINESE
ZODIAC

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A Thesis submitted in partial fulfillment of the requirements for the degree of:
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School of Design
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ABSTRACT

3D animation has been trending for many years now. Many stories and the characters in those stories are being re-designed and represented by 3D.

Stories I grew up with in Taiwan are so different from those popular in Western culture. While I enjoyed Snow White, Sleeping Beauty and Mickey Mouse, I also loved many classic Chinese stories, one of them being that of the Chinese Zodiac. This story is about animals having a race to decide who will be the only 12 animals that represent each year. They are rat, ox, tiger, rabbit, dragon, snake, horse, goat, monkey, chicken, dog and pig. In most Asian countries, these twelve animals represent each year in the order from rat to pig and then come back to the rat again, which makes 12 years.

In fact, the story is not just a bedtime story for kids’ it’s actually used as a calendar in real life for people in some of the Asian countries. Besides that, many people believe that human personalities are influenced by the Chinese Zodiac. For example, rats are considered smart and will get whatever they want at any cost. And in the story, the hard-working ox knows he walks very slowly so he starts walking towards the finish line early in the morning. The rat hides in the ox’s hair the entire way and jumps out to touch the finish line at the last second. At the end, the rat becomes the number one amount the Zodiac sign and the poor hard-working ox only got number two.

Since most Asians believe the Chinese Zodiac can affect people’s personalities, I thought it could be interesting to consider those personalities and re-design those characters in 3D. The goal of this project is to design and create a series of characters and show people born in certain years may look like.

1. Wang Chong, Lunheng, 80 CE
INTRODUCTION

Thousands of new animations and games are created every year. While we enjoy those great new stories, the classic stories will always remain in our hearts. However, sometimes it is hard to introduce those stories to the next generation because they are so used to fancy 3D games and easily lose their interest in the old school stories. For many youth in Asia today, it is easy to appreciate cool characters in soldier outfits or pretty princess dresses and castles that don’t exist in Asia rather than their own cultural stories. Because of that, many interesting stories are disappearing one after the other. That brought me to an idea: “What if those Zodiac icons could become cool characters in the games that kids play?” If the Chinese Zodiac could become game characters promoted to the younger generations, the Chinese Zodiac would not just be an ancient story for kids. Those characters would then materialize and become more like real humans with unique personalities. For this reason, I decided to make the characters low poly so they are useable in the game.

The next step was to figure out when is the best time period for the characters. According to my research, the first article mentioned about the Chinese Zodiac is “Lunheng (論衡)”.

2. Wang Chong, Lunheng, 80 CE
My initial idea for the project was to create characters based on the Chinese Zodiac in order to introduce it to the young generations. So I started my research on the history of the Chinese Zodiac, including the time when the earliest document about it was published. To be able to make my characters look like people living during the Han Dynasty, I also researched the clothing and patterns of the time. Later on I decided to focus on showing the personality of each character since Asian people believe the Chinese Zodiac can affect people’s personality. At this point, my research turned to focus on how character design could show the characters’ personality. Finally, in order to create the 3D characters and make them usable for games, I did some research on the technical side.

This literature review has three sections, which include:

- History and Pattern Research
- Personality vs. Character Design
- Technical Research
History and Pattern Research

*Lunheng*

*Wang Chong, Lunheng, 80 CE*

The book Lunheng(論衡), published in 80 CE, includes a wide range of topics about society during the period of the Han Dynasty (206 BC-220 AD). Lunheng is being considered the earliest document that talked about Chinese Zodiac. In fact, the Chinese Zodiac was created by many people through many years and slowly became what it is today. After Lunheng was published, the Chinese Zodiac was officially documented and has stayed the same until today.

*Study of Ancient Chinese Clothing* (中國古代服飾研究)

*Shen Congwen (沈從文). Study of Ancient Chinese Clothing* (中國古代服飾研究)

中國古代服飾研究(Study of Ancient Chinese Clothing) is an important book about all the clothing in Chinese history from the Stone Age to the Qing dynasty (1644-1912). Unlike today, when people can wear whatever they want, ancient Chinese clothing included strict dress codes for people in different social classes. Only certain colors or patterns could be used by certain groups of people. Breaking rules can lead to arrest or even execution. To be able to make my character to fit into the time frame, this book became a very important reference.
Personality vs. Character Design

*Dota 2 Character Art Guide*


This document is the basic guideline of character design. This includes some basic rules such as that characters should be able to be recognized by their silhouettes. It also talked about how to make each character visually interesting by using value patterning. Although this is just a short guideline, the rules are very important and were re-visited throughout the process of my project to make sure my characters are easy to recognize and interesting to look at for the audience.

*Creating Characters with Personality by Tom Bancroft*

Tom Bancroft and Glen Keane (Introduction), *Creating Characters with Personality: For Film, TV, Animation, Video Games, and Graphic Novels*

In regard to creating characters and trying to show their personalities, this book is a great reference. It talks about designing each part of the character in detail. For example, a character design can be started from a simple shape. Different sizes and shapes will give audiences different feelings about a character. Beside the big picture of the character, details like eyebrows also matter.
Technical Research

*Creating Game Characters with Maya and ZBrush by Justin Marshall*


This series of tutorial teaches how to import and export models and maps between Autodesk Maya and ZBrush, including UV detaching and baking maps in Maya. Those videos helped me solve many technical issues during the whole process of creating my characters.

*Dota Character Texture Guide*


Similar to the Character Art Guide, this article explains many options of maps that could apply to texture. There are maps that simulate lights and shadows, Ambient Occlusion and color map. This article helped me a lot by letting me know what kind of map I should use when I want to emphasize certain effects on characters.
Thesis Parameters

- Format: 3D low-poly character design
- Length: 1:30
- Target Audience: Gamer, Teenagers
- Software: Autodesk Maya, ZBrush, Adobe Photoshop, After Effects,

Concept

There are two major goals of this thesis project. The first goal is introducing the Chinese Zodiac to younger generations by turning the Chinese Zodiac into game characters. By doing so, those characters are no longer just being described in the stories, but become characters that people can play and fall in love with. The second goal of the project is to show both personality and the appearance of the Chinese Zodiac on the characters.
In Asia, the ox was an important animal because people needed the ox to help with farming. The lives of farmers and their families were dependent on the ox, so Ox is considered very hardworking and dependable. However sometimes Ox could be stubborn because when oxen decided to fight each other, nothing can stop them.
To fit those personalities, Character Ox is an Asian farmer. His strong and muscled body is to show he is hardworking and dependable. A square jaw and serious face shows his stubbornness. (Figure 2)

Real oxen have strong shoulders and big horns, but have thinner legs compared with their shoulders. The character Ox has the same appearance as the real ox. The gigantic leaf hat, which is often used by Asian farmers, is reminiscent of the ox’s horn. (Figure 2)
**Character Rabbit** *(Figure 3)*

Friendly, Gentle, Hopeful, Energetic

Rabbit is a kind of animal that is considered friendly and gentle. Rabbit years are also believed to be hopeful years because the following years are dragon's years. Dragon's years are believed to be lucky years when everything would be wonderful. Because of that, rabbit years are years that everybody prepares to do something big.
Due to this reason, rabbit years are hopeful years for people. This is why people believe that babies born in rabbit years are children with luck and hope. Typically, females make people feel less threatened. To make audiences feel these friendly and gentle aspects, I chose to make my character a female. Children are usually symbolized as hopeful and full of energy. Because of that, I decided to make my character a little girl.

Appearance wise (Figure 4), the character’s hair buns and slippers are symbols of rabbit’s long ears and big feet. Texture wise, I chose red, light pink and light blue. In Chinese culture, red is a color that symbolizes holiness and luck. Light pink and light blue usually are used for babies. So, the light color lets people feel gentle and comfortable.
Character Pig (Figure 5)

Intelligent but appears slow-witted, Rich

In the old time, pigs were considered a sign of major wealth in China, which meant the more pigs you owned, the richer you were. Because of that, the pig is a symbol of wealth. Furthermore, pigs usually appear to be slow-witted but actually they are very smart animals. In an ancient Chinese saying, people who own this kind of personality tend to be successful since they stay low, are not noticed and are ready for everything. Then they rise up when they are ready to fight.
Appearance wise (Figure 6), wrinkles on his head, an upturned nose and a round belly are the three characteristics I used for this character to show pig’s appearance.

Texturally, since pig means wealth in China, the character’s clothing and the tools he holds are made out of jade, silk and gold with exquisite embroidery and carved patterns. Back in Han, this kind of cloth was worn by some very powerful officials and wealthy people.
Clothing, Color and Pattern

The earliest record of the Chinese Zodiac was in Han (漢). Due to this history, I decided to make the characters appear to be people living in Han.

Through research, I found that for common people like farmers, there is no specific rule for them. The only request for their clothing was that it was easy to move and work in. Back in Han, farmers usually wear shorts or short robes made of rough fabric. For the character Ox, I chose to make him wearing shorts in order to show his muscles, which is a very important characteristic that makes people feel he is strong and reliable. Children wore short robes in Han based on my research. But since I needed to show the rabbit’s round bottom, I added a pair of knickerbockers underneath her short robe. On the other hand, to show she is energetic, I made her sleeves shorter to show her energy.

Short robe for girls (Figure 7):

Figure 7

Fig. 7. Short robe for girls, 直裾素紗禪衣.

For my pig character, because pigs are considered wealthy and smart in Asia, a businessmen would be a good setting for him. In order to introduce the beauty of the cloth that existed in earlier times, I did some research on cloth of the government officials as well. For the officials, the rules around their clothes were very strict and detailed. I basically followed the rules of government officials in Han for my character’s outfit, just changing the pattern slightly. I changed the pattern on the front of the robe from a dragon to a pig so it better fits the character’s identity. I also added jewelry on the belt, the hat and the Chinese calculator to show his wealth.

Figure 8

4. Shen Congwen (沈從文), Study of Ancient Chinese Clothing(中國古代服飾研究)
This was one of my early sketches (Figure 9), which was abandoned because the character’s outfit did not match its history:

Figure 9
Early sketch of Character Pig.

Human or Animal

The first challenge was what should those characters look like? Human? Animal? Or something between human and animal? At first I plan to make the standing animal because Chinese Zodiacs are 12 kinds of animals. Later on, while I was modeling, I figured out that my character should be human beings because those animals representing human personalities.

As a human being, we survive in a world surrounded by other human beings. We have to recognize the differences between people so we can respond properly. Because of this, our brains gave up the ability to recognize other animals’ faces in order to focus on human faces. Because of that, we can definitely infer people’s personalities better than other animals.
Since we can tell personalities by human's appearance more so than with animals, and the main goal of my thesis is to show personalities, I decided to make all of my characters human but still make the audience feel some characteristics of animals.

Since I decided to make all of my characters human beings, I could not simply apply an animal's appearance to a human being (such as put an ox's horn on a human's head). How to show an animal's characteristics but still make my characters human beings became a major problem.

There was even some conflict between the appearance showing personalities and an animal's characteristics. One example is the size of Rabbit's feet. Children's feet are small and soft. Furthermore, traditionally beautiful women's feet should be small and white. However, rabbit's feet are big and strong. How could I make these contradictory characteristics exist at the same time? The solution my instructor and I figured out is to make Rabbit a pair of slipper to represent the rabbit's big foot but still let her have small, soft feet.

Research & Design

There are several things I was focused on during the research step:

1. The time period - Han
2. Personalities vs. appearance
3. Character Design rules

In the beginning of this project I was planning to make my characters walk like animals, as the sketches below show. This thought was not being seriously considered; it was just an idea influenced by many of the characters that exist already. However, after some research and struggle, I decided to make my characters human beings instead of animals. There are some pros and cons of this decision.
Pros:
1. Human skin and wrinkles are a very interesting aspect to address and to show personalities.
2. Audiences will be more able to relate to the characters.
3. This avoids having to fashion the body hair of animals, which takes the computer program a lot more time to generate and also might not be able to be used by game.

Cons:
1. Audiences will cast a more critical eye on human characters so every detail matters.
2. All of the details could not be covered by fur or hair anymore.

Human skin and wrinkles

From the projects I have done before, I found human skin and wrinkles are a very interesting topic to research. The texture and color of skin provides a lot of information about this character. The color of the skin could show where it was born, it’s race, and even the character’s life style. For example, it could show if the character lives in a place with a lot of sunlight or if the character’s job requires a lot of time under sunshine. Take my characters as examples: the Character Ox has darker but shinier skin because his job is a farmer so he tends to stay in the sun for a long time. His shinier skin shows he is healthy because of all the work he does. The Character Pig gets a very pale skin color because he works indoors most of the time. He is also very rich so he might get to move around in a sedan chair shielded from the sunlight.

The wrinkles also give lots of information about the characters. First of all, obviously the characters age. Second, wrinkles also shows the healthiness of the skin or even how much the character likes to smile. From an artist’s point of view, wrinkles are also very interesting to sculpt. The wrinkles on human faces grow in a certain way. The length, depth and directions are all very important. If the wrinkles are sculpted in the wrong way, our brain will automatically recognize they are not formed naturally and might instead indicate disease.
If this happens, instead of telling people the character is old, it might actually tell people the character is sick, which is far from what the artist wanted to show. Over all, human skin and wrinkles are a challenging but interesting issue to work on and I decided to change my characters from walking animals to human beings.
These are the original sketches of my design (Figure 10, 11, 12, 13):

**Figure 10, 11**
Original sketches of character Rat and Ox.

**Figure 12, 13**
Original sketches of character Tiger and Rabbit.
PROCESS

As aforementioned, I decided to make my characters all human beings. Since my characters would be shown together, I had to make each of them unique so that people could recognize them immediately. At the same time, I also had to make them look like a series. So, I decided to make them unique by using the different basic shape then use the similar pattern and texture to make them look like a series.¹

Figure 14
Basic shape and size of the characters.

5. Tom Bancroft and Glen Keane (Introduction), Creating Characters with Personality: For Film, TV, Animation, Video Games, and Graphic Novels
Bones and Muscles

After the size and shape was decided, the next thing to consider is the muscles and bone structure of the characters. As with the skin, the amount of muscles and the size of bones also show lots of information about the characters. Also, from a modeling and animation point of view, the wire frame needs to go along with muscles and bones in order to be formed correctly when it is animated.

Everybody has the same amount of bones and muscles. Muscles can grow bigger or smaller and the size of the muscles tells many things about a character. Muscles represent strength and power, so characters with bigger muscles show the character is strong, energetic, and powerful. Muscles also show the character’s lifestyle. The character Ox has a lot more muscles because his job requires a lot of strength and he has to do physical work in order to survive. The character Pig has a lot more fat than muscles because his job does not require strength. Traditionally many Asians also consider chubbiness as a sign of happiness and wealth.

Since all of my characters not only have to look like human beings but also need to carry the looks of the animals, I looked into the bone and muscle structure of both animals and human beings. I found that the largest muscle in the human body is the thigh, but oxen have bigger muscles in their upper body. In order to make my character have the look of a real ox, I enhanced the muscles in his upper body and kept the muscles of his lower body the same as the average human being. This way, he has bigger shoulders than normal human beings, which makes him carry the look of an ox but still looks like a human being. (Figure 15)
Here are the sketches of final design (*Figure 16, 17, 18*):
At this point I only have sketches for two of my characters. The reason is because I changed the workflow a little bit for the character Ox. The major point of drawing a T-pose sketch of the character is that the sketch can be placed into Maya and be the reference for modeling. When I was learning modeling, this technique was the most efficient and standard way to start modeling a character. However, during the working process, a new technique was invented. The difference of this new technique is instead of modeling the character in Maya, the character actually started from sculpting software such as Mudbox or Zbrush. By using the default human shape, it was faster and easier to sculpt a basic shape of the character. After I finished the sculpting, there was a new tool in Zbrush that could build polygons onto the finished character. By doing so, I could basically sketch in 3D and my sketch could be the base of my 3D character. Even that was a newly invented technique, so I decided to give it a try on my last character, Ox. For the character Pig and the character -Rabbit, the first step was importing the T-pose sketch into Autodesk Maya and create the low-poly model. The major goal of this step was to create the overall shape of the character and keep the number of polygons as low as possible. For the character Ox, thanks the new technique, this step could be skipped.
Working log of building characters

Modeling & Sculpting

Modeling
Tool: Autodesk Maya

Output to Zbrush

Sculpting
Tool: Zbrush

Texturing
Tool: Zbrush

For Character-Pig and Character-Rabbit, the first step was importing the T-pose sketch into Autodesk Maya and create the low-poly model. The major goal of this step was to create the overall shape of the character and keep the number of polygons as low as possible. For Character-Ox, thanks to the new technique, this step could be skipped.

The second step for Character-Pig and Character-Rabbit was to output the geometry from Autodesk Maya as an OBJ file and input it to Pixologic Zbrush for sculpting. During this step, all of the small details, such as wrinkles and scars, were created. For Character-Ox, since the process started from Zbrush, the output and input process could be skipped too. All three characters are now being sculpted in detail. The rest of the steps are the same for all of them.

The third step was to paint the texture on the sculpted geometry. All of the patterns on the cloth and skin textures were applied in this step.
Different people have different length of bones or even bone thicknesses, which makes one person taller or shorter than another. Although in the real world the major influence on bone size is more genetics, the size of the character also impacts how the audiences feel about this character. For example, it is really hard for a short character to make people feel he is powerful, no matter how big his muscles are.

Modeling in Maya is a process wherein every artist can make his own way. My way was start from the polygons around the eyes and use extrude to expand the polygon and fit the sketch each of the characters. (Figure 19)

![Figure 19](image)
For the character Pig, I started by modeling his entire body without cloth. Even though his entire body is covered by cloth, in order to use ncloth to get the best result, a correct body shape is necessary. After I finished creating the body, I created a basic T-pose shaped cloth and apply ncloth effect to get the natural looking fabric. (Figure 20)

Using ncloth requires a lot more polygons than a low-poly character should have. After getting a nice looking fabric, the next step was to reduce the number of polygons by deleting Edge/Vertex but still preserving the overall shape of the fabric. After the cloth was created, the part of the body that goes underneath the cloth has to be deleted because having two layers of polygon may cause animating problem such as polygons intersect with each other.

After finishing the modeling in Autodesk Maya, the second step for the character Pig and the character Rabbit was to output the geometry from Autodesk Maya as an OBJ file and input it to Pixologic Zbrush for sculpting. During this step, all of the small details, such as wrinkles and scars, were created. For the character Ox, since the process started in Zbrush, the output and input process could be skipped too. All three characters are now being sculpted in detail. The rest of the steps are the same for all of them.
Since Zbrush and Maya read data differently, directed output maps and textures from Zbrush were not the best choice. Because of that, I chose to bake all of the maps and textures within Maya. First, I detached a rough UV in Zbrush for carrying the texture back to Maya. Then I output the lowest level geometry as an OBJ file and input it to Maya. The UV in this step was automatically generated by Zbrush. The only purpose of this map being created was to carry the texture over to Autodesk Maya. Those maps are not going to be usable in game. This is what the auto-generated map looks like: \textit{(Figure 21)}
In those maps, it was obviously pretty broken. When the 3D artists are detaching UV, the No.1 rule is to make the polygons as gathered as possible. (The correct UV layout is shown below)

After the UV was generated, the next step was to output the lowest level geometry as an OBJ file and input it to Maya. This geometry would be the target geometry and also would be the one being used for the final result.

After that, the UV of this low-poly model had to be detached carefully in Maya. UV detaching was a very important step because it greatly affects the texture map. If the UV is detached wrong, all of the maps are going to be baked on the wrong UV and none of the map would be usable. The UV of the characters needs to be placed in a square with the same width and height because this is how Autodesk reads the map. The width and height also need to be numbers that are the power of two. The reason for this is that the program generates the texture. UV layout is also very important because it will seriously impact how the texture is shown on the 3D model.
This is what the UV would look like in Autodesk Maya: (Figure 22)
Working log of building characters

**Baking Maps**

1. Set low-poly geometry as a target mesh. 
   Tool: Autodesk Maya

2. Set high-poly geometry as a source mesh. 
   Tool: Autodesk Maya

3. Adjust envelope and make it best fit both target and source mesh. 
   Tool: Autodesk Maya

4. Bake maps (Texture, Normal Map, AO map) 
   Tool: Autodesk Maya

Map baking was the next step. This included making the Texture map, Normal map and Ambient Occlusion map usable in Maya. First, I set the low-poly model as a target mesh. Second, I set the high-poly model as a source mesh. I adjusted the envelope to cover both meshes but positioned them not too far away from the meshes at the same time. After map baking, I applied all of maps onto the characters.
This step actually took me quite a while to research because I needed to use several different pieces of software to make different texture maps. First, I needed to use Maya to model the characters, then I needed to output the models to Z-brush, and finally I needed to bring all the maps back to Maya and to animate, set up the light and render. Since different software reads data differently, many problems happened when I tried to input the data that was outputted by different software.

At the end, instead of outputing maps from software, I chose to bring the sculpted result back to Maya and bake all of the maps from Maya. Since Maya bakes the map itself, Maya can read the data just fine.

New technologies are being invented everyday and there are always new options for maps that will improve the quality of 3D characters. For example, after I finished my characters, there was a new technology called “Cavity Map.” A cavity map is basically an AO map but it is able to show the texture in more detail. This is potentially going to be a very important or even standard step for 3D art. If I have a chance to re-visit my characters, a cavity map will be a great option for me to improve them.
Color maps

Character: Ox (Figure 23, 24)

Figure 23, 24
Color maps of character Ox.
Color maps

Character- Rabbit (Figure 25)
Color maps

Character- Pig (Figure 26)
Normal maps

Character- Ox (Figure 27)
Normal maps

Character: Pig (Figure 28)

Figure 28
Normal map of character Pig
Normal maps

Character- Rabbit (Figure 29)
Working log of building characters

Finishing Up

Rigging and posing characters
Tool: Autodesk Maya, Set-up Machine

Baking lightmaps for Subsurface Scattering
Tool: Autodesk Maya

Fixing texture maps and AO maps
Tool: Autodesk Maya, Photoshop

Rendering and making movie clips.
Tool: Autodesk Maya, After Effects

In order to pose the character, I used Setup Machine to rig the characters and pose them into the gestures that show their personalities the most. Then I finished the basic lighting. For Subsurface Scattering to work, lightmap baking had to be done. After that, I adjusted the maps using Adobe Photoshop, set up the camera to move 360 degrees and rendered.
One more technique that was used during the rendering process was “Subsurface Scattering.” This tool is used to simulate the opacity of human skin. People may not notice this quality very often but human skins are actually slightly transparent. For example when you put your hand on a flashlight, you’ll see the light penetrate through your hand and the color of your blood can be seen. Subsurface scattering is extremely important when it comes to human characters. Without it, the characters could fall into a world known as the “Uncanny Valley.” Uncanny Valley describes the phenomenon when a 3D character looks like a human being but looks creepy for some reason that you can’t quite understand. Many things can cause this phenomenon and the skin is probably a major reason. If Subsurface Scattering was not applied on the characters, their solid colored skin would look lifeless and the character would looks creepy because our brain would automatically think of it a dead body.
After baking the lightmaps for Subsurface Scattering, the next step was to render a turntable video of the characters in several paths. To get the best results, like the texture maps, several layers of rendered image were produced as well. Those images needed to be combined in After Effect and the transparence of them adjusted in order to get the best results.
Below are the different rendered images:

Figure 30: Ambient Occlusion Path.
Figure 31: Beauty Path.
Figure 32: Wireframe.
Figure 33: Ambient Occlusion Path
Figure 34: Beauty Path
Figure 35: Wireframe
PROCESS

Figure 36: Ambient Occlusion Path
Figure 37: Beauty Path
Figure 38: Wireframe
As mentioned earlier, the silhouette is a very accurate way to check if the character is recognizable to the audience. After I finished my characters, I rendered out a black-and-white silhouette of them to check if my characters were easy enough for my audience to recognize. Below is the silhouette of the characters (Figure 39). As you can see, my characters are obviously recognizable even without any label to tell who they are. The overall shape of the characters also fit the original design, which reassures me that the final 3D characters successfully follow the basic rules of character design.

Figure 39
Silhouette of the characters.

Human beings tend to have critical eyes toward other human beings. We can easily recognize two different people by their face but not many of us can see the difference between two monkeys. Since my characters are human beings, any little detail going wrong can totally change the overall feeling of the character.

I started the texture by painting the skin texture for the rabbit character. Since this character is supposed to be young, I made her skin color relatively light in order to get the feeling of a child’s skin. However, after showing committee members, other designers and classmates, I found the pale skin actually make my character seem unhealthy and lifeless. After I slightly changed the hue of the character’s skin color, almost everyone commented that she is a lot cuter and more like a real human being.

From people’s feedback, I realized how some small details can really impact how people feel about the characters. After further research and lots of tweaks on both the texture and the sculpting, the characters overall look more like realistic human beings but maintain a cartoony feeling, which is appropriate since they are game characters.
CONCLUSION

After finishing my thesis project, I was reassured that personality really is the key to put soul into CG characters and make people emotionally relate to those characters. When I finished the low-poly model in Autodesk Maya, I could tell that my characters were human beings in different forms and sizes, but they looked more like statues rather than human beings. After all of the different maps were applied and all the details tweaked and fixed, the characters became real human beings whose personalities I can picture. I believed I successfully reached most of my initial goals.

In the beginning, I didn’t expect that I would run into so many problems, both technical and artistic issues. But soon I found that all of those problems became doors that led to opportunities for me to learn more about character design. In order to solve some of the problems, I needed to learn some new functions in Maya and even new software. During the process, I learned Zbrush, map baking and Subsurface Scattering and I am very grateful to have had the opportunity to do so. I also researched how human muscles and skin works along the way. Last but not least, I learned even more about my own culture during the research. This experience helped me to understand that only when I work in a hands-on manner on a project can I really know what problems I might have and how the whole process is done.

This project was an excellent end to my graduate training and a great beginning to my career as a 3D artist. I was helped by many people who either offered feedback or gave me wonderful suggestions. I learned how to take all of this advice and not get lost at the same time. I enjoyed doing this project and learned many lessons from it. I believe all of those experiences will be helpful for every project I work on in the future.
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- Romero, A Brief History of the Chinese Zodiac, NY Times, Released 2009


APPENDIX: THESIS PROPOSAL

Thesis Proposal for the Master of Fine Arts Degree
Rochester Institute of Technology
College of Imaging Arts and Sciences
School of Design
Computer Graphic Design

Title: Chinese Zodiac in Palace- Returning the personalities back to the animals.
Submitted by: Tang-Hsuan Liu
Date: September 29, 2010

Thesis Committee Approval:

Chief Adviser: Assistant Professor Shaun Foster, Computer Graphic Design

Signature of Chief Adviser      Date

Associate Adviser: Professor Marla Schweppe, Computer Graphic Design

Signature of Associate Adviser      Date

Associate Adviser: Assistant Professor Dan DeLuna, Computer Graphic Design

Signature of Associate Adviser      Date

School of Design Administrative Chair Approval:

Administrative Chair, School of Design: Patti Lachance

Signature of Administrative Chair      Date

Situation Analysis
There are many interesting stories in this world, and some of them have been told for a long time. Nowadays, 3D animation technique is being created and introduced; the stories and characters in the old stories are being re-designed and the stories are being represented by 3D. So far, the characters in the Western stories such as: Snow-white and the Seven Dwarfs, Robin Hood, Little Red Riding Hood and so on are all well designed in the 3D world. Sadly, compared with the Western world characters, the characters in Chinese ancient stories are rarely being designed in the 3D world. Since the Chinese characters that we could see today were designed a long time ago, the styles of them are usually very old-fashioned which does not attract and does not get the attention of both Western and Eastern world children in this modern world.

“Chinese Zodiac” actually means twelve kinds of animals. In most Asian countries, these twelve animals represent each year. The Chinese Zodiac comes from an ancient story which tells why these animals were being chosen. In this story, every animal has its own personality and that’s also part of the reason why they are placed in the way that we know and follow today. For many Asians, Zodiac means a lot because there are many traditional rules that follow the Zodiac, and Asian people’s lives follow the rules especially in the important days such as Weddings, Funerals and Festivals. However, so far the design of the Chinese Zodiac usually shows the bright side of the character that does not fit the rules of character design. The design of the character should show personalities, no matter if it is bright or dark.

Problem Statement

The major problem of character design of the 12 animals now is that they rarely show their personalities, which is told in the story. Therefore, fewer and fewer young generations don’t know or even are not interested in the story of Chinese Zodiac. The reasons might be because the designs of the Zodiac are always very old-fashioned and cannot get the attention of younger people. Furthermore, sometimes the design of the characters does not actually reveal Chinese culture. The 12 animals sometimes wear modern clothes or Western style clothes. Since the twelve animals are from ancient Chinese world, what they wear should fit the time period.

Because of the reasons above, I want to re-design these characters. I will make the characters have their personality and make them unique by making them wearing the ancient Chinese clothes. The goal is to promote Chinese Zodiac and ancient Chinese culture to the world.

The project will mainly focus on redesigning the image of Chinese Zodiac based on the ancient Chinese story. The first goal is to make the viewers feel the characters’ personalities as soon as they see the characters. To substantiate the character, I will set the Zodiac as people who live in Chinese Palace and all of them will have specific positions that most represent the personalities of the animals. Second, the characters’ personalities will make viewers curious about the background stories of the characters. The final purpose is to introduce the Chinese Zodiac to children around the world.
Survey of Literature

Chinese Astrology
1. Author: Shelly Wu
2. Date of Publication: June 2005
3. Publisher: New Page Books
4. ISBN-10: 1564147967
6. Date of Access: 9/21/10
7. Intended Audience: People who interested in Chinese Astrology
8. Objective View on my Research Topic: The relationship of Chinese Zodiac and Chinese Astrology will help me to define the character’s personalities and appearances.
10. Evaluation: There is a paragraph about the personality of the animals are actually represent human emotion, including positive ones and negative ones:

   Applied to Chinese Astrology, Qi is the marriage of divine spirit with human personality. Each of the 12 animal archetypes is a mixture of positive and negative attributes. Positive traits such as loyalty, forgiveness, perseverance, and compassion reflect the alignment of personality with spirit (Qi). Negative traits such as bitterness, anger, jealousy, and possessiveness reflect a great separation between human personality and spiritual essence.

Compared with the ancient stories, Chinese Astrology explains the Chinese Zodiac in a more psychological way. This book gives me a broader background knowledge of Chinese Zodiac and helps me to define the personalities and the appearances of the twelve animals.
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Story of the Chinese zodiac
1. Author: Monica Chang, Arthur Lee, Arthur Lee
2. Date of Publication: 1994
3. Publisher: Yuan-Liou
4. ISBN: 9573221446, 9789573221449
5. Date of Access: 9/20/10
6. Intended Audience: children
7. Objective View on my Research Topic: The story is about the reason why these twelve animals became Chinese Zodiac.
8. Coverage: The story tells me about the personalities of the animals.
9. Evaluation: Different from the Chinese Astrology, this book tells a story about Chinese Zodiac in an interesting way which might be more attracting to young generations. Since my main target audience is young people, this story can be a good foundation source.

Ancient Chinese Costume and Accessories
1. Author: Chou Hsun, Chun-Ming Kuo
2. Date of Publication: 9/1/2002
3. Publisher: Wen-Jin
4. ISBN: 9579400040, 9789579400046
5. Date of Access: 10/15/10
6. Intended Audience: Chinese history researcher
7. Objective View on my Research Topic: The Costume and accessories of ancient Chinese
8. Coverage: The book listed all the costume and accessories of ancient Chinese which helps me to know the real costumes people wear in certain period of time. Since my goal is to promote Chinese culture, this source is very helpful for character design.

Maya character creation: modeling and animation controls
1. Author: Chris Maraffi
2. Date of Publication: 2004
3. Publisher: New Riders
4. ISBN: 0735713448, 9780735713444
5. Date of Access: 10/15/10
6. Intended Audience: Character designer
7. Objective View on my Research Topic: Tips of Character design and technical information of animation
8. Coverage: This book is a useful resource because it introduced about the technique of character modeling and animating.

Gesture and thought
1. Author: David McNeill
2. Date of Publication: 2005
3. Publisher: University of Chicago Press
4. ISBN: 0226514625, 9780226514628
5. Date of Access: 10/15/10
6. Intended Audience: linguistics and psychologists
7. Objective View on my Research Topic: The relationship between body gesture and thought
8. Coverage: The gesture of the characters is a big clue for the viewers to know their personalities. Since I am going to design the characters that can express their personalities, this book could offer me some psychological information.

Digital Sculpting with Mudbox: Essential Tools and Techniques for Artists
1. Author: Mike de La Flor, Bridgette Mongeon
2. Date of Publication: 2010
3. Publisher: Elsevier Science & Technology
4. ISBN: 0240812034, 9780240812038
5. Date of Access: 10/15/10
6. Intended Audience: Artists
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7. Objective View on my Research Topic: Sculpting with Mudbox
8. Coverage: Since I am going to use Mudbox to create details for the characters, this book will be a useful reference.

A Brief History of Chinese Zodiac
1. Author: FRANCES ROMERO
2. Date of Publication: Sunday, Jan. 25, 2009
3. Publisher: The New York Times
4. Title of Journal: TIME
5. Web site: http://www.time.com/time/world/article/0,8599,1873900,00.html
6. Date of Access: 9/20/10
7. Intended Audience: Magazine reader
8. Objective View on my Research Topic: The history and detail of the zodiac
9. Coverage: The general idea of Chinese Zodiac
10. Evaluation: Since the information is from a TIME magazine, it should be a general idea that most of the people might be interest in. For general audiences, going too deep on the history or Astrology might scare people away, especially for young generations. This source helps me to decide how far or deep should I show to the audiences about the Chinese Zodiac.

20 Character Design Tips
1. Author: John Burgerman
2. Date of Publication: UNKNOWN
3. Publisher: computerarts.com.u
4. Title of Journal: Computer Arts
5. Web site: http://www.computerarts.co.uk/in_depth/features/20_character_design_tips
6. Date of Access: 9/20/10
7. Intended Audience: Character designer or anyone who is interested in
8. Objective View on my Research Topic: The tips of character design
9. Coverage: There are some rules to think and follow while designing character
10. Evaluation: This information helps me to know the steps of designing characters and check if my design follows the audience’s expectations.

How Nicolas Marlet mastered art of ‘Kung Fu’
1. Author: PETER DEBRUGE
2. Date of Publication: WED., MAY 28, 2008, 11:50AM PT
3. Publisher: variety.co
4. Title of Journal: variety.co
6. Date of Access: 9/20/10
7. Intended Audience: News readers
8. Objective View on my Research Topic: How did Nicolas Marlet design the characters in “Kung Fu Panda”
9. Coverage: The author mentioned about the character designing process. From the basic shape to facial expressions. He even mentioned about some tips like, “If you just have a straight neck and then put a head on it, the character will looks like a people in a costume.”
10. Evaluation: The process of a character design is always helpful, especially when it is a character from a real animation movie, which had already being loved by large number of audiences. Kung Fu Panda is a popular Animation Movie related to Chinese culture, which gives me some hints of how to design a Chinese Character about what are the stereotypes of Chinese people and how to show these stereotypes on the animals.

Character Design of Chinese zodiac
1. Author: LING, YA-YA
2. Date of Publication: 09/05/2008
3. Publisher: OOOPIC
4. Title of Journal: OOOPIC
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6. 9/20/10
7. Game Designers
8. Objective View on my Research Topic: The author did a similar topic as what I want to do, but with different purpose.
9. Coverage: The author had already re-designed the twelve animals as combatants.
10. Evaluation: The author gives me an idea that the personification of animals is a good direction of character design.

Chinese zodiac design
1. Author: LinkTerra
2. Date of Publication: November 17, 2006
3. Publisher: deviantart.com
4. Title of Journal: deviantart
6. Date of Access: 9/20/10
7. Intended Audience: artists
8. Objective View on my Research Topic: The author designed the Zodiac in a cute way, which is the direction that I want to go.
9. Coverage: The author had already made the characters very cute
10. Evaluation: This source gave me a comment sense of how people think a character is cute. However, it also give me an example that how characters lose their personalities.

Chinese zodiac illustration
1. Author: Charlene Chua
2. Date of Publication: unknown
3. Publisher: Charlene Chua
4. Title of Journal: Charlene Chua illustration
6. Date of Access: 9/20/10
7. Intended Audience: Blog viewer
8. Objective View on my Research Topic: The author designed the character in a way that more like traditional Chinese style.
9. Coverage: The author did a great job on color using and traditionally character design.
10. Evaluation: I think the color and the shape of the picture is very graceful, which I will think about it during design my characters.

The year of tiger
1. Author: Duke Yin
2. Date of Publication: unknown
3. Publisher: dukeart
4. Title of Journal: dukeart
6. Date of Access: 9/20/10
7. Intended Audience: Artwork viewer
8. Objective View on my Research Topic: The author also designed one of the Chinese zodiac- Tiger.
9. Coverage: The design of the character pretty much show the personality of the tiger.
10. Evaluation: I like the style of this piece of work personally. It's not only makes the animal looks strong, cute or graceful. The tiger makes me think that maybe there's a back-story behind the picture, which is exactly the way that I want to go.

Zodiac-The Race Begins
1. Author: Zhao Jing Chen
2. Date of Publication: January 26, 2006
3. Publisher: Singapore’s Cubix Pictures
4. Title of Journal: Zodiac: The Race Begins
Methodological Design

Target Audience

| Age: 7-12 | Gender: Male and female 
| Education level: Elementary school 
| Motivation level: Toy player |
| Children who were born in the western culture and know little about ancient Chinese stories. |

| Age: 10-16 | Gender: Male and Female 
| Education level: Elementary school to senior high school 
| Motivation level: Game player |
| Teenagers who play games a lot but know little about Chinese culture. |

| Age: Adults | Gender: Male and Female 
| Education level: Varied 
| Parents or grandparents who come from different culture and want to introduce the story of Chinese Zodiac to their children or grandchildren. |

I will separate this project into three steps: motion Poster, turntable and still images. I will sketch twelve characters and I will select four characters of those to make it 3D with MAYA. Then, I will use Mudbox or Zbrush to create the details on the characters.

For story telling purposes, I will make still images for some important scenes in the story of Chinese Zodiac and then tell the story by these posters and types on the side. To make the personalities more clear, I will make “Motion posters” which means I will animate the characters and let them do a little movement such as jumping.
or looking around. Then, I will make the animation looks like posters except that the characters in the posters moved. The animation will be around 10 to 15 seconds for each character. Finally, to show the details and wire-frame of characters, I will make a turntable for each character.

**Implementation Strategies**

- **Character Design of twelve animals**
  - Tool: Sketch Book, Photoshop

- **Select four characters and model in 3D**
  - Tool: Autodesk Maya

- **Shading and Creating details of the characters**
  - Tool: Maya, Mudbox or Zbrush

- **Motion Poster**
  - Tool: Autodesk Maya, Quicktime player

- **Still Image Poster**
  - Tool: Autodesk Maya

- **Turn Table**
  - Tool: Autodesk Maya

**Sketches And Examples**

*Rat*
Dissemination

The character will be used in three ways:

1. Game
2. Animation
3. Toy

I will combine the motion poster and the turntable to be one bigger movie clip than post it online. Then I will try to send this movie clip the game or toy companies and try to find anyone who is willing to use these characters.
Evaluation Plan
I will show different phases of my project to several people, which include animators, designers or target audience. The main point will be about what they think about the design of the characters in three periods of time, after I finish the sketch of all the Chinese Zodiac, after shading and after animated. For the first survey, I will show the sketch to designers then select four characters that meet the expectation of the audiences the most and then do the following design. After finish modeling and shading, there will be another survey which focuses on if audience accept the color on the characters or not. Finally, the third survey will be after the characters are animated. This survey will be shown to my target audience. The main purpose will focus on if the animation fit the characters’ personalities or not. To get the best result, which is the most acceptable to my target audiences, I will do the revisions of the character base on the survey results.

Pragmatic Considerations

Budget
1. Printing (Including Poster and Business Card) 100$
2. Books to learn Zbrush - ZBrush Character Creation-Advanced Digital Sculpting 45$
Total: 145 $

Time
Fall Quarter: 10 hours /week
Subtotal: 110 hours
Winter Quarter: 16 hours/week
Subtotal: 160 hours
Spring Quarter: 20 hours/week
Subtotal: 220 hours
Total: 490 hours
## APPENDIX: THESIS PROPOSAL

### Milestones

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 17</td>
<td>Proposal accepted</td>
</tr>
<tr>
<td>Dec. 16</td>
<td>First committee meeting</td>
</tr>
<tr>
<td>Jan. 14</td>
<td>Modeling done</td>
</tr>
<tr>
<td>Jan. 20</td>
<td>First survey</td>
</tr>
<tr>
<td>Feb. 4</td>
<td>Shading done</td>
</tr>
<tr>
<td>Feb. 10</td>
<td>Second survey</td>
</tr>
<tr>
<td>Feb. 18</td>
<td>Second committee meeting</td>
</tr>
<tr>
<td>Mar. 17</td>
<td>Rigging done</td>
</tr>
<tr>
<td>Mar. 24</td>
<td>Animation done</td>
</tr>
<tr>
<td>Mar. 25</td>
<td>Third committee meeting</td>
</tr>
<tr>
<td>Mar. 30</td>
<td>Third Survey</td>
</tr>
<tr>
<td>Apr. 14</td>
<td>Rendering done</td>
</tr>
<tr>
<td>Apr. 15</td>
<td>Forth committee meeting</td>
</tr>
<tr>
<td>May. 6</td>
<td>Revise done</td>
</tr>
<tr>
<td>May. 11</td>
<td>Thesis defense</td>
</tr>
<tr>
<td>May. 20</td>
<td>Thesis show</td>
</tr>
<tr>
<td>May. 21</td>
<td>Graduation</td>
</tr>
</tbody>
</table>
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Bibliography

- Shelly Wu. *Chinese Astrology*. Franklin lakes, NJ. 2005
- Chou Hsun, Chun-Ming Kuo. *Ancient Chinese Costume and Accessories*. Taiwan. 2002
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- David McNeill. *Gesture and Thought*. 2005
- Mike de La Flor, Bridgette Mongeon. *Digital Sculpting with Mudbox: Essential Tools and Techniques for Artists*. 2010