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Creating Animation for a Video Game Opening -
The War of Water

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November 2011
# MFA Thesis Committee Approvals

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<thead>
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<th>Name</th>
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<tbody>
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</tbody>
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Signature of [Role]                Date

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P. 2
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Abstract

The project creates 3D animation for a video game opening. The main idea of this animation is to ask people to save the water. The designer created the characters, the story, and the animation. The main stage is set in 2116 AD. The world has no clean water, and the main character, Taimei, is a twenty-year-old girl, who is going to find a new source of water for all of humanity. On the other hand, the R.O.C. Robot Army is doing everything they can to stop her. This game will adapt Japanese cartoon style with Toon Shader and Toon Outlines in Three-dimensional; the duration of the animation will be one and a half minutes long.
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  Sketches  
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  Character 2 - ROC-100  
  Character 3 - ROC-200  
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  Environment 1 - Lab  
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Storyboard  
Rigging  
Animation  
Framing  
Rendering  
Typography  
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I. Introduction

Problem Statement

The research problem of this thesis is how to design a 3D game opening for. Therefore, the researcher will create a story for this game. Most of the game opening focus is on how entertaining the game is. For the purpose of this research the goal is to create a game opening with a meaningful concept. The main idea of this animation is to save the source of water. As stated in the book, Design for the other 90% (Smith, 2007),

“The majority of the world’s designers focus all their efforts on developing products and services exclusively for the richest 10% of the world’s customers. Nothing less than a revolution in design is needed to reach the other 90%,” claims Dr. Paul Polak (2007, p. 19).

Consequently, as a computer graphics designer, I believe we should put some meaningful ideas into our works, such as health, peace, education, and saving of the water. In this project, the researcher will focus on the concept of saving the water.

Target Audience

The target audience of this game will be people over the age of ten, who enjoy playing video games and watching television.
II. Survey of the Literature

Research for this thesis involved an examination of different books, articles and websites that were written on the subject of 3D animation, Character Design, and Saving of Water.

The book Design for the Other 90% (Smith, 2007) described many concepts about water saving in the field of industrial design, but not in video game opening. This gave me an inspiration to create a game opening for saving of water. We should place more environmental protection concepts into the video games.

The books, Cinema Anime: Critical Engagements with Japanese Animation (Brown, 2006), The Game Production Handbook (Chandler, 2009), The Art of Game Characters (Hartas, 2005), and The Art of the Video Game (Jenisch, 2008) give me a lot of idea in 3D animation in game, On the other hand, the books, Advanced Maya Texturing and Lighting (Lanier, 2007), Maya character creation: modeling and animation controls (Maraffi, 2004), and Maya 8: the complete reference (Meade, 2008) give me technical knowledge in Maya and Motion Graphics. All of which are incorporated into this thesis.
There are three parts to my thesis project, Water Saving, Character Design, and 3D Animation in Video Games. Water Saving is the main idea of The War of Water. I designed three characters for the Character Design part, which include Taimei, ROC-100, and ROC-200. I created a one and a half minute Video Game Opening for The War of Water (figure 3.1).
The progress of work has four stages from the winter of 2009 to the spring of 2010, as shown in figure 3.2.

I created this project with five different types of software: Adobe After Effects, Adobe Illustrator, Adobe Photoshop, Autodesk Maya and Autodesk Mudbox. I used Adobe After Effects for compositing and some special effects, such as the Dynamic Lines, Adobe Illustrator for the texture and modeling, such as the sky, Adobe Photoshop for the storyboard and some of the textures, Autodesk Maya for Modeling, Rigging and Animation, and Autodesk Mudbox for normal maps of Taimei’s body (figure 3.3).

1. Autodesk Maya
2. Autodesk Mudbox
3. Adobe After Effects
4. Adobe Photoshop
5. Adobe Illustrator
Some of my sketches for the project, such as the prototypes of Taimei and ROC-100 can be seen in the above illustration. I created the characters from the influence of Japanese animation, such as Dragon Ball Z, Naruto and Gundam (figure 3.4).
**Character 1**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Race</th>
<th>Height</th>
<th>Weight</th>
<th>Weapon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taimei</td>
<td>23</td>
<td>Asian</td>
<td>160 cm</td>
<td>45 kg</td>
<td>Sword</td>
</tr>
</tbody>
</table>

**Description:** Taimei is the main character in the game. The game is set in the 22nd century where she tries to reach the last remaining water source for mankind. The creation of Taimei’s character is heavily influenced and inspired by the inspiration for Taimei is from Japanese Animation *Naruto* and *Dragon Ball Z*.

Generally, most of the heroes in animation and movie are male protagonists. Therefore, in this story, I chose a female as the protagonist for my story. The design idea to give masked Taimei a mask was inspired by the Japanese *Naruto* character Naruto Hatake Kakashi. To make her appear more futuristic, I made her right hand as a mechanical hand to make her more powerful. The goggles on her face are digital with the functions of data transmission and wind protection. For the clothing, I chose selected a limited color palate; therefore, I chose brown leather for the vest and the pants, and purple for the purple boots. On the other hand, I made Normal Map for her in her skin and her outfit. Additionally, I made Normal Map for her in her skin and her outfit. In the future world, I designed the car is no longer the main means of transport; therefore, I chose the fly board as his flight instruments, which looks like a snowboard (figures 3.5, 3.6 and 3.7).
Figure 3.6
Front of Taimei

Figure 3.7
Back of Taimei
<table>
<thead>
<tr>
<th>Name</th>
<th>ROC-100</th>
<th>Race</th>
<th>Robots</th>
<th>Weapon</th>
<th>Knife</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>209.1 cm</td>
<td>Weight</td>
<td>310.22 kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description:** ROC-100 is the general of the R.O.C. Army. The inspiration for ROC-100 is from the Japanese Animation *Gundam*. I used metallic colors for the ROC-100 with such as gold, bronze and silver. The Rocket booster and the wings in the back are for flight. In As for the weaponry, I made a huge knife for ROC-100. I also created a logo of “water” in Chinese character for the ROC Army. I put the logo in the front of its soldiers' chests. The head, the arms and the wrists can all rotate three hundred and sixty degrees (*figure 3.8*, *figure 3.9*, and *figure 3.10*).
Figure 3.9
Front of ROC-100

Figure 3.10
Back of ROC-100
Character 3

<table>
<thead>
<tr>
<th>Name</th>
<th>ROC-200</th>
<th>Race</th>
<th>Robots</th>
<th>Weapon</th>
<th>Sword</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>197.5 cm</td>
<td>Weight</td>
<td>242.15 kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Description:** ROC-200 is the soldier of the R.O.C. Army. The inspiration for ROC-100 derives from Michael Wazowski, a character in *Monsters Inc*, produced by Pixar Animation. I made a big eye for ROC-100 as its body and the same arm design as ROC-200. The lower body is a unicycle. It also has a rocket booster in the back, but it doesn't have ability to fly. **As for the weaponry,** I also **designed** a huge sword for ROC-200. I used metallic colors for the ROC-200, **such as** with gold, brass and silver. The arms and the wrists can **also** rotate three hundred and sixty degrees (figure 3.11, figure 3.12, and figure 3.13).

**Figure 3.11**
**Color Scheme of ROC-200**

- Brown
- Yellow
- Black
- White
- Blue
Figure 3.12
Front of ROC-200

Figure 3.12
Back of ROC-200
Name: Water Research Laboratory 1315

This is the home of Taimei, her headquarter. The laboratory 1315 has many unique designs. In the future world; water is a precious resource. In the future I designed, people might need large amounts of water at home. So I made a water tower with the fire logo in the Laboratory 1315. Because Taimei has been conducting a lot of research on water in the laboratory on this subject, therefore, I made computers, desks, and a giant screen for this purpose. Additionally, because there's a possibility that Taimei may become injured during her battles, therefore, I designed surgical lights and surgical beds for her. While she is resting at home, during the rest period, she won’t need her sword and flying board with her, so I made the shelves for the sword and the flying board to put them aside (figure 3.13, figure 3.14, and figure 3.15).
Figure 3.14
Laboratory View 1

Figure 3.15
Laboratory View 2
**Environment 2**

**Name**  The Last Dam

The Last Dam is controlled by The R.O.C. Army, and it’s had a lot of detail settings. I created a huge lake, two caves, the streets, the trees, the rocks, the streetlamps and a large dam in environment 2. I intentionally created the lake in the shape of Taiwan. I put a water logo on the pillars of the dam. This is a huge scene, I had made many details, such as streetlamp and trees, but I didn’t have any close shot in the final animation (Figure 3.16, Figure 3.17, and Figure 3.18).

<table>
<thead>
<tr>
<th>Figure 3.16</th>
<th>Color Scheme Of The Last Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Color Scheme" /></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Figure 3.17</th>
<th>Dam View 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2" alt="Dam View 1" /></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Figure 3.18</th>
<th>Dam View 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Dam View 2" /></td>
<td></td>
</tr>
</tbody>
</table>
I used tables to illustrate the storyboard of the animation (Table 3.1 and Table 3.2). You will get a basic understanding of the story. Although the storyboard is not detailed enough, I made those images by Sketchbook, a drawing app on iPad, which could make a hand drawing style storyboard effortlessly.

<table>
<thead>
<tr>
<th>Table 3.1</th>
<th>Storyboard 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taimei opens her eyes</td>
<td></td>
</tr>
<tr>
<td>Taimei sets up in Water Research Laboratory 1315, and is looking around.</td>
<td></td>
</tr>
<tr>
<td>She’s taking up her Dragon Sword on the table.</td>
<td></td>
</tr>
<tr>
<td>She’s taking her Fly Board.</td>
<td></td>
</tr>
<tr>
<td>She is going out from the Water Research Laboratory 1315</td>
<td></td>
</tr>
<tr>
<td>Table 3.2</td>
<td>Storyboard 2</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td><img src="image" alt="Storyboard" /></td>
<td><strong>Taimei is flying away.</strong> She is going to find the source of water for the other survivors.</td>
</tr>
<tr>
<td><img src="image" alt="Storyboard" /></td>
<td><strong>Bird's-eye view of the Last Dam</strong></td>
</tr>
<tr>
<td><img src="image" alt="Storyboard" /></td>
<td><strong>ROC-100 and ROC-200s show up.</strong></td>
</tr>
<tr>
<td><img src="image" alt="Storyboard" /></td>
<td><strong>Taimei is fighting with ROC-100.</strong> There will be going to have several different fighting shots in the animation.</td>
</tr>
<tr>
<td><img src="image" alt="Storyboard" /></td>
<td><strong>Close shot of ROC-100 and Taimei.</strong></td>
</tr>
</tbody>
</table>
Rigging
Taimei’s rig system

I used “The Setup Machine” for Taimei’s rig system. The Setup Machine automatically creates all the controllers we need, such as the IK/FK hand controllers, the foot controllers, and the body controllers. I also made the eyes controller for Taimei (figure 3.19 and figure 3.20). Therefore, I can animate the eyes easily.

The Setup Machine did basic “Paint Weight” for the character, but I still had to do some adjustments on her head, neck and feet. In addition, I made eye controllers for her. When you create the character’s eye sockets for any character, you have to make sure all the vertex of the eyelids is attached to the eyeball. The eyeball must be in a form of pure sphere, or it will create problem when you rotate the eyeballs.

Figure 3.19
Taimei’s Rig View 1

Figure 3.20
Taimei’s Rig View 2
Additionally, I would like to further explain the ROC-100's rig system. The Setup Machine did not work out correctly on a Non-life body, like a robot. Therefore, I create the individual rig systems for ROC-100 (figure 3.21); including the eye controllers, the IK hand controllers, the FK hand controllers, the body controllers, and the foot controllers. I made up three skeletons of the arm for IK, FK and the original. I then made the link for them by using connection editor. I also made the IK/FK switches for both hands (figure 3.22).
For the hand parts of ROC-100 and ROC-200, I created a switch for the separation of the fingers (figure 3.23 and figure 3.24). Additionally, I made another attribute for IK/FK switch of the hand. It increases the efficiency while we create the animation.
For ROC-200, I created an individual rig system; included are the eye controllers, the IK hand controllers, the FK hand controllers, the body controllers, and the tire controller. On the tire controller, I created an expression to make it rotate while the ROC-200 is moving forward and backward. I didn’t bind the knife with the body, and I made the knife parent to the joint of the wrist. Then set freeze transformation on knife to zero. Therefore, the knife can follow the hand’s movement correctly, as shown in (figure 3.25 and figure 3.26).

In the rig system control of ROC-200, I made a controller for the tire. The tire must rotate, while the body is moving forward or backward. Therefore, I made an expression in Maya as follow:

\[
\text{joint14.rotateY} = \text{ROC}_200\_\text{Ctrlr}.\text{translateZ} \times \frac{360}{147.58};
\]

The “joint14” is the joint for the tire; the “rotateY” is the rotation of the tire in the direction in y-axis; “the ROC_200_Ctrlr” is the main controller of ROC-200’s body; the “translateZ” is the position of ROC-200 in the direction of Z-axis, and the number 147.58 is the perimeter of the tire. While ROC-200 moved forward in the value of one, the tire will be rotated 360/147.58 degrees.
Figure 3.25
ROC-200’s
Rig View 1

Figure 3.26
ROC-200’s
Rig View 2
<table>
<thead>
<tr>
<th><strong>Animation</strong></th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question</strong></td>
<td><strong>Snapshot</strong></td>
</tr>
<tr>
<td>How to animate the eyes of a character?</td>
<td>I used blend shape in eyelids, eyebrows and eyelashes. It made the eyes open and close properly.</td>
</tr>
<tr>
<td>How to animate the camera?</td>
<td>I use a variety of shots in the animation, such as close shot, mid shot, long shot and bird’s eye shot.</td>
</tr>
<tr>
<td>How to create the numbers on the water tower?</td>
<td>I animate the numbers in After Effects. I adjust the jump speed of the numbers in composting.</td>
</tr>
<tr>
<td>What we to pay attention in this scene?</td>
<td>Glass objects just need a little ambient occlusion. Therefore, I rendered the bottle separately.</td>
</tr>
<tr>
<td>How to deal with the glow effects in Maya?</td>
<td>I created an individual direct light for objects with Glow effects. Sometimes we have to animate the light angle.</td>
</tr>
<tr>
<td>How to animate the sword with the hand?</td>
<td>I made the sword parent to the hand’s controller. Not to joint of the hand.</td>
</tr>
</tbody>
</table>

I explain the animation process in “Questions and Answers”.
<table>
<thead>
<tr>
<th>Question</th>
<th>Snapshot</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What should we pay attention to when using “Reference” in Maya?</td>
<td>Two reference objects cannot be parented, so I imported the board, and then parented to the Taimei’s body.</td>
<td></td>
</tr>
<tr>
<td>How to make a beautiful screen structure?</td>
<td>I tried to make every frame like a real picture.</td>
<td></td>
</tr>
<tr>
<td>What kind of scale should we use when making a 3D animation in Maya?</td>
<td>Don’t use the real scale, and make them ten or hundred times smaller.</td>
<td></td>
</tr>
<tr>
<td>Did you use Graph Editor to adjust the animation?</td>
<td>I have to adjust all the curves in Graph Editor to make the animation more dynamic, even the camera movement.</td>
<td></td>
</tr>
<tr>
<td>What should we pay attention to when we use “Toon Outlines” in Maya?</td>
<td>Don’t assign “Toon Outlines” on the objects cover by goggles or any Transparent objects.</td>
<td></td>
</tr>
<tr>
<td>Any special light effect in this project?</td>
<td>I use backlight to give the animation more tension.</td>
<td></td>
</tr>
</tbody>
</table>
Framing

In camera framing, I try to use different shots through the animation. I start from an Extreme Close Up on the face of Taimei, while use an extreme wide Shot for the dam. On the camera movement, I zoomed, panned and tilted the camera through the animation. I think the best movement in this project is when the camera follow the Taimei’s back when she walked out the Lab. I also try to make the animation follow the rule of thirds. The rule of thirds is a "rule of thumb" or guideline which applies to the process of composing visual images such as paintings, photographs, movies, and animations. The guideline proposes that an image should be imagined as divided into nine equal parts by two equally-spaced horizontal lines and two equally-spaced vertical lines, and that important compositional elements should be placed along these lines or their intersections. Proponents of the technique claim that aligning a subject with these points creates more tension, energy and interest in the composition than simply centering the subject would.
In the rendering aspects, first of all, I created four different render styles: including Toon Shader, Ambient Occlusion, Toon Outline and Final Gathering (as shown in figure 3.27). I tried to combine four styles in different ways. At the end, I had two choices (as shown in figure 3.28), the combination of Toon Shader, Ambient Occlusion and Toon Outline, and the combination of Final Gathering and Ambient Occlusion. The former is a 2D cartoon-style, and the latter is a realistic style. I love the 2D cartoon-style more and I think it fits this project more as a game in Japanese style, more fit to this project. Therefore, I set the 2D cartoon-style as the rendering style as for this project. After that, I created six different render passes and they are: the Dynamic lines pass, the Outline pass, two Ambient Occlusion passes, the Beauty pass, and the Background pass. I used “Toon Shader” for the basic render style. I changed the color and the specular color setting in “Toon Shader” to match the 2D Japanese style I preferred. At the end, I render all the images out by the Render Farm. A render farm is high performance computer system, e.g. a computer cluster, built to render computer-generated imagery, typically for animation, film and television visual effects.
In addition, the Toon Outline cannot render in mental ray. Therefore, I have to make another individual high-poly file for the Outline pass. In this Outline file, I assigned a Use Background Shader for everything with outlines. I also made all objects in "Linearly" smooth. The "Linearly Smooth" will make the edge smooth either (figure 3.29).
Typography

“Modern, No 20” font was chosen for the subtitles and the end tag. I made a metal board for the background of the subtitles to make the text more legible (figure 3.30). I did an adjustment on distance between the “W” and “a” to make it look balanced and appropriate on screen (figure 3.31).
I explained how I composed all the six passes together in Table 3.3. I use Adobe After Effects for compositing, I have six passes, including Background Beauty Pass, two Ambient Occlusion Pass in Multiply mode and in Color Born, Toon Outline Pass, and Dynamic Lines Pass. Finally, I created a 2D style animation with Toon Outline in 3D.

<table>
<thead>
<tr>
<th>Table 3.3 Final Composting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background Pass</strong></td>
</tr>
<tr>
<td><strong>Beauty Pass</strong></td>
</tr>
<tr>
<td><strong>Ambient Occlusion Pass</strong></td>
</tr>
<tr>
<td>in Multiply Mode</td>
</tr>
<tr>
<td><strong>Ambient Occlusion Pass</strong></td>
</tr>
<tr>
<td>in Color Born</td>
</tr>
<tr>
<td><strong>Toon Outline Pass</strong></td>
</tr>
<tr>
<td><strong>Dynamic Lines Pass</strong></td>
</tr>
<tr>
<td><strong>Final Image</strong></td>
</tr>
</tbody>
</table>
IV. Conclusion

To create a game opening alone is not as easy as one might think, especially in 3D animation. From story boarding, modeling, texturing, rigging, animating to compositing, we have to do every step very carefully. There are six conclusions as follows:

Advantage of 3D animation in 2D animation style
Sometimes, the 2D animation gives the audience more imagination, and it will save a lot time for rendering. On the other hand, the 3D animation in 2D style can have more variation in camera movement than the traditional 2D animation.

Do the character design or the animation
Sometimes I can’t focus on character design or the animation. It’s hard to choose but really one should just focuses on one thing. I should keep one aspect simple. Don’t be greedy! I don’t have enough time go deeper in character design.

Don’t just design based on your own preference
We should put some positive aspect in any design work. We are designers, we should design for others. In this project, I should have given more clearly concept for water saving.
Accurate Time Control
This is the most valuable part. We have to consider the time of every single step, and be as accurate as possible. We usually forget to count the time we spend on redo, computer crashes, and unsolvable problems. Therefore, we must make the time schedule more flexible.

Detailed Storyboard
I started to make my project without a detailed storyboard, and as a result, I kept adding and dropping objects in my project endlessly. For example, I created an extraordinarily delicate Lab scene, but I did not have any close shot in that scene so I wasted time. Consequently, we should have a detailed storyboard before we begin to develop the project.

Step by step
In the process of making this project, sometimes we wanted to skip or jump to the next step. For instance, before I am finished with all the models I needed for the project, I jumped to the animation part. This made my steps disorderly.

In conclusion, I believe that experience is necessary for a 3D designer. If we have enough experience, we can make the storyboard in a more detailed fashion and have more effective time management.
V. Bibliography

3D animation in games


VI. Appendix: Thesis Proposal

**Title**

Creating a Motion Graphics for a Video Game Demo Reel – Finding the Source of Water

**Abstract**

The research is going to create a motion graphics for a video game demo reel. The main idea is to ask people to save the water from the video. The researcher will design the characters, the story and the storyboard of the demo reel. The main stage is in 2212 AC in north part of China. The main character in this game is a 20 years Chinese girl, who is going to find the new source of the water for the rest of the human being in the world. The motion graphics will be 2 minutes long. The style of this game will be created as Japanese cartoon style.

**Problem Statement**

The research problem of this thesis is how to create a motion graphics work for a video game demo reel. Therefore, the researcher will create a story for this game. Most of the demo reels is focus on how fun the game is. For the purpose of this research is to create a demo reel for meaningful concept. The main idea of this work is to saving the source of the water. In the book “Design for the other 90%” says that “The majority of the world’s designers focus all their efforts on developing products and services exclusively for the richest 10% of the world’s customers. There is nothing less than a revolution in design is needed to reach the other 90%”. Consequently, as a computer graphics designer, we should put some meaningful ideas into our works, such as health, peace, education and saving of the water. In this research project, the researcher is going to set the concept as saving for the source of water. The target audience of this game will people who older than 10 years old, who likes to play video game and watching TV.
Survey of Literature

3D animation in game

Cinematic Game Secrets for Creative Directors and Producers
by Rich Newman
Amsterdam; Boston: Focal Press/Elsevier, c2009

This book discusses the process of game development. It gives the researcher the structure of how to create a video game.

The Art of the Video Game
by Josh Jenisch

In “the Art of the Video Game,” a brief history of the video game and video game art work discussed by case is given. It gives the researcher some inspiration for the character design and the art style of the video game.
3-D Human Modeling and Animation

by Peter Ratner


The book starts you off with simple modeling, than prepares you for more advanced techniques for creating human characters. After a brief overview of human anatomy, you’ll delve into the basic principles of proportion and structure, along with the different body parts. Exploring human modeling, texturing, rigging, and lighting leads you to more advanced techniques for digital figure animation.

The Game Production Handbook

by Heather Maxwell Chandler

Hingham, Mass.: Infinity Science Press, c2009

This is the ultimate industry reference. It answers the questions new leads, managers, and producers have, and it gives the pros new insights and valuable tips to improve their existing processes. It includes cutting-edge advice from industry experts on managing teams, tracking production cycle from pre-production to post-production, and offers detailed practical advice on how to run a project. The focus throughout is on the nuts and bolts of managing development, including defining goals, creating a plan, managing, hiring, and motivating people effectively, and dealing with the inevitable bumps along the way. This is an indispensable training manual for the entire team!
Game Feel: A Game Designer’s Guide to Virtual Sensation
by Steve Swink
Amsterdam; Boston: Morgan Kaufmann Publishers/Elsevier, c2009

“Game Feel” exposes “feel” as a hidden language in game design that no one has fully articulated yet. The language could be compared to the building blocks of music (time signatures, chord progressions, verse) - no matter the instruments, style or time period - these building blocks come into play. Feel and sensation are similar building blocks where game design is concerned. They create the meta-sensation of involvement with a game.

Game Art Complete: All-in-One: Learn Maya, 3ds Max, zBrush, and Photoshop Winning Techniques
by Andrew Gahan
Amsterdam; Boston: Elsevier/Focal Press, c2009

A compilation of key chapters from the top Focal game art books available today - in the areas of Max, Maya, Photoshop, and ZBrush. The chapters provide the CG Artist with an excellent sampling of essential techniques that every 3D artist needs to create stunning game art.
**Game Architecture and Design**

*by Andrew Rollings*

Scottsdale, AZ: Coriolis, c2000

This book's real-world perspective on the video game business makes it a standout, and its dozens of case studies and anecdotes from the field, including behind-the-scenes details on some well-known recent titles, are particularly valuable. Besides notable successes, there are plenty of stories of what can go wrong. One of the most entertaining sections features interviews with game industry experts who universally argue against a formal software process while describing the many problems inherent in writing games. The text replies convincingly that long hours, missed deadlines, and mediocre software grow out of sloppy (or non-existent) design and management techniques and a hacker mentality for programmers.

**Motion Graphics: Film + TV**

*by Kathleen Ziegler, Nick Greco and Tamye Riggs*


Tour the work of some of the most extraordinary and esteemed designers working in film and television today! In Motion Graphics: Film & TV, 25 designers present powerful overviews of their work in spreads featuring sequences from the latest film titles, TV graphics, music videos, broadcast studios, and more. Design students and professionals will learn from detailed examinations of the work of industry leaders (and those from the hottest design studios) in a lavish full-color collection that showcases acclaimed graphic works from every corner of the world.
The Art of Maya: An Introduction to 3D Computer Graphics
by Autodesk, Inc., 2007
San Rafael, Calif.

This unique, full-color visual exploration of the theory of Maya is rich with diagrams and illustrations that demonstrate the critical concepts of 3D time and space, and helps explain the principles of 3D modeling, animation, dynamics and rendering. The book also includes a series of production notes detailing how skilled Maya artists have worked with the software to create production quality films, games, visualizations, and animations. The accompanying CD-ROM includes Maya Personal Learning Edition.

Maya 8: The Complete Reference
by Tom Meade

Create breathtaking content for film, TV, games, print media, and the Web using Autodesk Maya and the detailed information contained in this comprehensive resource. Maya experts and special effects gurus Tom Meade and Shinsaku Arima cover every step in the Maya production workflow using easy-to-follow tutorials, real-world examples, and insider tips and tricks.
In the book 3D game art says because many games require small image sizes, you will need to do all you can to achieve this goal. One method you can employ is to use as low a color depth as possible. This gives me an inspiration on my render style. Therefore, I choose Toon Shader as my render style.

**Prepare to Board! : Creating Story and Characters for Animated Features and Shorts**

*by Nancy Beiman*

Boston: Elsevier Focal Press, c2007

"Prepare to Board" covers most pre-production aspects of an animation project, but focuses mostly on storyboarding and character design. This book does a better job on both these subjects than most other books can manage on just one.

**Maya 2008 Character Modeling and Animation: Principles and Practices**

*by Tereza Flaxman*

Australia; Boston, Mass.: Thomson Course Technology, c2008

"Maya® 2008 Character Modeling and Animation: Principles and Practices" shows beginner to intermediate animation students and enthusiasts how to create professional-quality characters, explaining the full character animation process from pre-production to last full body and facial animation. Each chapter begins by exploring the "why" behind the techniques being presented, followed by step-by-step tutorials to apply your new knowledge. Following a series of hands-on projects you’ll learn how to model, rig, and animate, building a comprehensive skill-set as you move progressively through each chapter. You’ll learn to master Maya’s capabilities on both a technical and artistic level as you create incredible animated characters full of emotion and expression.
Maya Character Creation: Modeling and Animation

Controls

by Chris Maraffi

Indianapolis, Ind.: New Riders, c2004

In this book, the research knows the process of character design. There are 7 steps: 1. Learning the process for creating a character. 2. Conceptualizing a character and its model type. 3. Generating sketch art in preparation for modeling. 4. Modeling a character in Maya. 5. Mapping the UV texture coordinates, in preparation for texturing a character in Photoshop. 6. Creating textures and relief maps in Photoshop. 7. Applying a biped skeletal rig to your character mesh to prepare it for animation. 8. Creating animation sequences in Maya that will be called by game engine during game play.

Advanced Maya Texturing and Lighting, second edition

by Lee Lanier

Indianapolis, Ind.: Wiley Technology Pub., c2008

If you already understand the basics of Maya, the industry-leading 3D animation and effects software, you’ll be ready to move on to the new topics in this updated edition of Advanced Maya Texturing and Lighting. Detailed, easy-to-follow instructions will teach you the real-world production secrets that professional animators use to make amazing results. In the second edition, you will find extensive and updated coverage of the latest theories and trends in addition to an enclosed CD with exclusive content to help you sharpen your skills.
Of the world’s total population of 6.5 billion, 90%, have little or no access to most of the products and services many of us take for granted; in fact, nearly half do not have regular access to food, clean water, or shelter. Design for the other 90% explores more than thirty projects, which show the growing movement among designers, engineers, students and professors, architects, and social entrepreneurs to design low-cost solutions for this other 90%. Published with a major exhibition on view at the Smithsonian’s Cooper-Hewitt, National Design Museum, Design for the other 90% highlights a variety of design innovations that address the basic challenges of survival and progress faced by the world’s poor and marginalized.
The research is going to build up 3D characters and the environment in Maya. Then, export into After Effects to create a 2 minutes motion graphics demo reel. The main task for this game is to find the source of the water in 2212 AC. The main character is a 20 years old Chinese girl tries to find the clean source of the water for the rest of the human beings. In year 2212 AC, due to the water pollution, there is no enough clean water in north part of China. Therefore, she has to find out the clean source of the water for the human being. In the demo reel, there are going to show the background of the story, the character, the weapons, and some of the enemies in the game. The style of this game is going to be Japanese carton style in three-dimensional representation.

Sketches Example
| Marketing Plan | The game demo reel could put in the front for the opening of the video game, upload online in a promotion website of the game, or put on broadcast for a commercial work. |