Memoir of a marionette

Rui Jin

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Memoir of a Marionette

By Rui Jin

Submitted in partial fulfillment of the requirements for the Degree of Master of Fine Arts in the School of Film and Animation Rochester Institute of Technology Rochester, New York November 2008

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Abstract: Memoir of a Marionette

This paper is a companion to my thesis film, *Memoir of a Marionette*.

My film intends to draw public awareness to the quick disappearing of traditional performing arts due to the gap caused by fast advancement of technology. Film, TV, Internet and video games have diverted public interests from old performing arts. It discusses modernity vs. antiquity. How can we progress without sacrificing all we have inherited from our ancestors.

In the film, this idea is demonstrated by two trembling hands trying to reach each other – one from the marionette and the other from the old performer. They all have the same dream: laughter and cheers from children. But before the hands join together, the old performer dies and the marionette is also de-stringed; the link between the performing arts and the performer is broken. Later, when the grandson of the old performer comes to collect his belongings, the marionette is found; but the child, unaware of its value, quickly loses interests and dumps it into a box.

Unfortunately such metaphor is daily facts in a fast developing country like China, where I came from. As technology and communication advance, the world is becoming more and more like a small village, we are becoming more and more like each other; but, how can we still maintain our individual identity while being a global villager?

Preserving our cultural heritage is one of the answers.
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_____________________________________

Date: _________________________________
I. Acknowledgements

I am very grateful for life that gives me an opportunity to fulfill my childhood dream of becoming an animator.

I was born and raised in a very chaotic era. China in 1960s was undergoing a violent political turmoil; propaganda, including animation films, was deployed for the purpose of brainwashing the population. The themes were trite, yet the art behind politics deeply inspired me as a young child. Despite of limited access, I still watched repeatedly the films on and on. It was from that time, I have determined to pursuit my life long dream of this charming motion art.

Art education in my country had very limited resources for the talented minds during that period, and it was even once considered a “risk thing”, for artists were often involved in free expression of their ideas and easily step on the redline marked by the authorities; and the country had only a handful of art schools that taught motion art. For these reasons, I missed the chance to fulfill my dream.

Thanks to the reform policies, China opened its door and rejoined the rest of the world, and this made it possible for me, after all these years of dreaming, finally come to America to realize it.

I am also very grateful for my advisor: Professor Johnny Robinson, who, in my prolonged thesis production, has always been standing by to offer advices and helps, without him, I would never have achieved what I have today.

I’d like to express my gratefulness to my parents, tormented by ailing old age, have never uttered a single word of disencouragement during my study years abroad. It is their support encouraged me to move on.

Last but not the least, I am grateful for my wife, Jia Li, who endured the torture of three year separated marriage and financial burden to support my study. No word is adequate to express my feeling for her. It was she who gave me final push to start during my hesitant moments to make this decision. Without her, nothing is possible for me to achieve what I have achieved today.
II. Pre-Production

A. Production and Graphic Style – my film intends to convey a semi-realistic and semi-fiction story, though the marionette coming to life is obviously fiction, the rest part of the story tells an unpromising truth: as time changes, so does people’s taste, and some of the century old performing arts are dying out as the artists themselves age and die, and little has been done to preserve those treasures. As a tour guide in a fast developing country like China, I have witnessed too many of these treasures disappearing before my eyes and no one seemed to care about it. That is why I finally chose this topic for my thesis film.

I knew the challenge even before I began my pre-production: animation is not very suitable for realistic and tragic themes; at least most people naturally take animation topics as joyful and legendary. I spent the whole summer researching and trying to decide what style suitable for my graphic design, and eventually I chose something in between.

B. Character Design – based on the theme, I designed my three characters separately in two different styles: the marionette I intended to make it cartoonish while the old man and his grandson, semi-realistic.

Marionette - Through intensive research online and watch reference videos in library, I finally decided to let the marionette have a typical clown face and outfit. Below are some reference photos I got from various websites.
Old Man – realistic scale and proportion.

Boy – realistic scale and proportion.

And below are the three low poly figures modeled in Maya:
The Marionette

The Old Man

The Boy
C. Scene Design – the whole story takes place at one corner of a shabby house - the fireplace. I modeled all props, such as rocking chair, photo frames, boxes, tables and chairs, and put them in different layers with different lights that go with them according to the story. By turning on and off the layers, the right props appear on the same spot for different scenes of the film. Basically, it is divided into night scene – when the old guy died; and day scene, when his family came to collect what was left, and his grandson found the puppet.
III. Production

The Production of my film began in September 2006, the whole procedure including modeling, rigging, texturing, animating, lighting and rendering, applications for production are Adobe Photoshop, Maya, and Adobe After Effects.

A. Modeling – modeling three characters took me over a month to finish, including the time for UV mapping; the marionette was relatively easier since it was cartoonish, but the other two realistic humans took much longer time and I had several failures before final completion. The challenging parts were modeling old guy’s ear and UV map the boy’s curly hair, it was a painstaking procedure and required intensive details. I used polygons for sculpturing out all characters, polygon models are better for adding UV texturing in Photoshop, and easier for rigging and smooth binding.

For the room, the furniture and props I utilized various modeling methods, NURBS models are better for those stationary props because they automatically assign textures, and save tons of working hours. After I finished modeling and texturing them, I locked all their properties except visibility, and this also freed huge amount of computer memory resources for rendering process.

The only room part I used poly instead of NURBS was the fireplace, because I needed to paint irregularly charred blacks on the firewall, and this is better achieve by importing its UV maps into Photoshop for desired brushes.

B. Rigging – I used very basic rigging method for all my three characters. Though I knew Maya already has integrated Setup Machine Plug-ins when I began my production, I still chose the conventional way. Old way takes longer to rig and is a little harder to control when animating, but it is more reliable and better for one to fully understand human anatomy. I created one controller for almost every body part of the characters, particularly for the marionette, since he had the most action. Besides for all body parts, I have created a series of controllers to make his clown hat sway around when he danced on the stage.

After binding skeleton with body geometry, I also spent weeks twisting my characters to the extremes of various positions to ensue that weight painting was working properly. For some parts of the old man’s robe, I also created a set of lattice to help the deformation when tried to stand and reach out his arm.

C. Texturing – assign correct texture to the correct part of a poly model is a very painstaking job. First, one needs to work out a very accurate and neat UV map of the model, and import them into Photoshop for various brush touches. UV map should be made carefully to unfold everything. Ear and curly hair are bit more complicated for UV mapping. And one should be very careful as to where to put the dividing line of an UV map so they look seamless when assigned to the body, the key is to have the line hidden behind so they cannot been seen.
Deep Paint 3D is a nice software that makes the job easier, however, I chose to stay with old way again in order to learn the principles.

**D. Animating** – convincing animation gives soul to a film. In my prolonged production period, I have encountered three challenges during the animating process.

Challenge One: marionette dancing sequence. In my film, there is a 19 second dancing sequence, that is, when the sleeping marionette dreams of dancing on stage accompanied by a quick tempo, joyful music. We know it is not easy to synchronize motion with musical beat. I tried and failed many times during the initial weeks of animating this sequence, the motion turned out to be mismatched with the beat.

Finally, I found a piece of folk dance video which pretty much matched my original music tempo, I exported an AE image sequence of the video and imported them into Maya as reference for my animation; it turned out to work much better, the only problem was that the video was shot at a 45 degree angle, and I have to adjust the position frequently to prevent the marionette from going astray. It was an extremely time consuming process, I key-framed every part of the marionette body position every two frames, those 19 second dance took me altogether six weeks to complete.

Challenge Two: Flickering light and trembling body. In my scene, there is fire burning in the fireplace. For the fire itself, I used Maya Fluids System to simulate it, I attached the Fluids System to a sphere and put then in the center of the fireplace, it again took many hours to adjust the inputs of Fluids until it looks like fire burning; and then I applied a point light to simulate fire light.

At the beginning, I tried to key frame the flickering of the light; soon I realized it was NOT a smart idea. Not only because key framed light flickering does not look real, but also it was too strenuous to achieve the effect. So I switched to Maya Mel, it was a programming language to create and control randomness of light intensity change, and soon I figured out that it can be applied to position change as well, so I put the intensity inputs and position coordinates of the point light under the control the Mel, it created an expectedly real look of flickering fire.

Likewise, the same programming can create and control the trembling of body parts – when the old performer struggling up and trying to reach out for his marionette, the trembling hand toward the camera was controlled by Mel.

Challenge Three: the Strings! – This is the most frustrating part of my animation, I did not figure out a very effective way until after I screened my thesis film this spring quarter. In my film, the marionette’s head and limbs are attached and controlled by five strings. My first attempt was to do it with Maya Hair System. Theoretically this is the best way to do it. Maya Hair System creates an instant simulation of elasticity and friction of the string, and it even has an effect upon the body part it drags. However, Hair System simulation is extremely resource exhaustive. It simply eats up all memory and processor.
potentials of any high-end workstation. I don’t remember how many times it has crushed the Boxx Workstation in 3D Lab; what was even worse, the proper inputs cannot be cached (at least, not as I know of), so each time, you have to do it all over again; and by doing so, all the saved key frames were lost. After four weeks of try-and-fail struggle, I eventually had to give up this experiment.

The second experiment I did was to draw the motion of strings separately in Adobe Flash and export the drawings out to After Effects to composite it together with Maya images. The way to do it is to first import Maya Playblasts of each shot into Adobe Flash, then apply a layer on the original sequence, and draw the strings every two or three frames, matching the positions of various body parts, when complete, export the drawings as image sequence. This method has, however, two problems very hard to solve: first, it is extremely difficult to match the correct position and scale of the strings in each shot, particularly for camera movements such as track in or out, even with the slightest mismatch at one frame, after 100 frames or so, the mismatch becomes obvious and when composited in AE, the strings twitch, even without any motion at all; second, because it is drawn separately, it is very hard to match the color and light changes when composited with Maya images, since I have light change constantly in almost all my shots, so the strings don’t look belonging to the scene.

This shot image shows the string looks not belonging to the scene though I tried all means to adjust color in Flash.
After the spring screening, I suddenly realized there is a simple old way, again very time consuming, but at least controllable. This may take many hours, if not many days to set up. What one has to do is to create either a poly or NURBS cylinder for each string, set the subdivisions to a very high value, like 75 to 100, and create a joint system (bones) inside, again with very tiny units, one unit for each subdivision of the cylinder, then sooth bind the geometry to the joint system; next create a series of circle as controllers, and parent each joint unit to a circle, and then select every five or ten circles, parent under themselves and again parent the group to another circle which is to be a major controller. In this way, we can establish main and sub controllers for major or subtle adjustments of each string. Before we are to control the string, we can lock and hide all the controller properties except the rotation axis.

The positive part of this method is its controllability and interactiveness of the string. Because the string is geometry inside the scene, one can assign texture to it, and it interacts with lighting in the scene; the downside of it is it takes very long time to set up and adjust the subtle changes during animation.

A low poly, preview quality rendering out of the string; one can easily see the geometry string receives and reflects light from the scene.

**E. Lighting** – right lighting gives right atmosphere to a film. In my film, there are three lighting themes: nighttime scene, stage scene and daytime scene.
The nighttime scene takes up half of the total film duration and is the major tone of this tragic story. I used several spot lights to simulate moonlight, ceiling lights and set the light tone to a blue and dim hue, my reason for doing it is to create a depressive atmosphere so it has a contrast to the bright, joyful dancing scene, and in the meantime, dark tone is to let audiences’ attention focus on the fire, which symbolizes the ailing old performer and the uncertain destiny of the old arts. I set decay values for all spot lights in the scene so they dim down when reach far corners of the house.

For the daytime scene I set up spot lights to simulate sunlight and set the light to a warm yellowish tone. Sunlight sheds on the window and casts shadows on the wall, an impatient boy with a marionette in hands, not knowing what to do with it; the meaning I wish to convey through this is that after the old artist’s death, life is going on as usual, few notice that there is something missing from our world, the old art is gone.

Throughout my film sequence, the light I spent most of my time was the point light that is set up inside the Fluid fire; this is the most meaningful light of all I applied in my scene. Point light is good for simulating light source that comes out from a specific point and radiates evenly to all directions. I used Maya Mel language to control the position and intensity change of the point light so it jumped around and flickered constantly, this is the best way to create burning fire. The value is the intensity was set between 10 and 40 in the Script Editor. The effect is quite convincing.

The shot image below shows the effect of flickering light from fire
F. Special Effects – throughout my production, I used very little complicated techniques. The only exception was the Maya Fluid System that was set up to simulate the fire. The fire has a symbolic meaning in my story – the uncertainty of the old performing art. As more and more traditional artists age and pass away but few young people willing to carry on the tradition, it is disappearing from our life. One day we may suddenly find out the huge gap between the past and the present, our life is not complete without tradition.

To create this fire, I first experimented on Maya Fire, but it turned out to be very unsatisfactory, because Effect Fire in Maya has very little control for speed or scale of the fire. After several unsuccessful attempts, I switched to Fluid System. I created a NURBS torus as the origin for Fluid to emit from and set its boundary axis to Y direction, and then adjusted the other values. It took a very long time to achieve the desired effect and the process requires a considerably huge computer resource. There are several values to be adjusted: Contents Method, Dynamic Simulation, Velocity, Turbulence, Temperature, and finally Fuel Scale, which controls the size of the flame. By key framing Fuel Scale, one can control how long the flame lasts and when to die out. Once get desired effect, it is wise to cache Fluid to save time and hard drive space.

Below is a screen print of the Fluid particle fire in my scene.
G. Rendering - I used Maya Software rendering method and produced in a Maya IFF image sequence. IFF is good for very high image quality while keeping the size small, but the downside of it is that one cannot do any change to individual image in Photoshop. Since I referenced my shots from a general scene, so the rendering is pretty simple, if I found anything wrong with individual shot, I just went back to the reference scene and change it, and then all the shots will be changed simultaneously.
IV. Post-Production – compared with pre-production and production, post-production is relatively short. Once rendering is done, I imported all images in After Effects and exported them out as Quicktime clips and did composition in Premiere Pro. All sound effects are from Sofa Sound Library and the music at the end of film was purchased from www.uniquetracks.com. This is a website sells royalty free music works. The piece I chose was The Sick Doll from Album for the Young by Tchaikovsky. The sad tune perfectly suits my story. Once composited, I exported the whole sequence into a Quicktime Mov file.

Below is the screen print of Premiere Pro editing
V. Conclusion

As I look back now, the thesis production has been the most unforgettable experience I have ever had in my life. Through the production not only have I learnt professional knowledge on film making, but cultivated my personality and elevated myself to a higher level. It’s been a learning process. From first script to the final editing, every step has been a rewarding learning procedure, and a self challenge.

I did not choose a Chinese culture oriented topic for my thesis, so for me, everything is new; I did not choose to do it in 2D, with which I am more comfortable; and I did not choose a comedy theme, as it is better for animation. The reason for this was that I wish to take this production as learning opportunity.

I watched lots of reference videos in ETC during the summer of 2006, anything related to marionette and old folk arts around the world. I took many notes and sketches from websites. At the end of the summer, I began to have very clear image of my film, shot by shot and all characters stood out in my mind. To further enhance my animation I even acted out the motion in some of major shots and had my wife take photographs of my action. I showed my storyboard drawing to many of my friends and even to strangers I met to make sure they all understand my story, and I made several reversion of drawing once I had any misperceptions.

![Acting out shot actions in my film](image)

I spent whole fall quarter modeling and rigging my characters, set up scene reference file and tested Fluids fire system.

The real challenge came during winter quarter when I started animating my shots. As I mentioned before, I encountered many technical problems with marionette strings and fluid fire. I turned to Maya technical reference book for solution and many of my classmates also offered their help, one by one, I solved those obstacles in my way.
I have to admit that sometimes I felt very frustrated during production and even had the thought of giving up, particularly when I had a minor depression period during Fall and Winter quarter of 2006. With encouragement from my wife, friends and especially from my advisor, Professor Johnny Robinson, I finally overcame the weakness and put myself together again, and eventually accomplished the task.

From this experience I learnt that in life, determination and persistence are the most important qualities for one to succeed.
VI. References

Books:

*Learning Maya 6 Character Rigging and Animating* by Bill Dwelly, Lee Graft

*Learning Maya 6 Modeling* by Bill Dwelly

*Facial Expressions: A Visual Reference for Artists* by Mark Simon

*Stop Staring: Facial Modeling and Animation Done Right* by Jason Osipa

*The Animator's Survival Kit* by Richard Williams

Website:

http://www.highend3d.com


[http://www.3d total.com/](http://www.3d total.com/)

Tool Box:

Photoshop, After Effects, Premiere Pro and Flash (Adobe)

Maya (Autodesk)
Appendix A  
Original Thesis Proposal

Working Title: Memoir of a Marionette  
Producer: Rui Jin  
Audience: General Public  
Budget: $1,230

Start Date: Fall 2006  
End Date: Spring 2007  
Running Time: 5 Min  
Release Format: DV

**Story:** A marionette recalls past performance with his master on stage but wakes up to find the old man already dead.

**Synopsis:** It is a windy winter night. In a small shabby house, an aged ailing puppeteer sitting on a rocking chair in front of the fireplace, coughing badly and breathing with great pains.

A marionette lying on the mantle just above the fireplace, covered with dust and its color faded. On the wall there are photographs taken long time ago of the puppet and puppeteer performing on the stage, a reminder of the joyful old days.

Suddenly there is illusion cheers and applause in air, the marionette “goes” back on stage with his master. He dances in the center of lime light with the joyful music, and children’s laughter gets louder and louder. The marionette finishes his performance and bows to the cheering audience, and then it all disappears. He wakes up to find himself still lying on the mantle with the cracking fire burning down below him.

Still excited by his dream, the marionette struggles to raise his hand, but soon realizes he is powerless without his master’s help. He looks down and sees his master coughing terribly on the chair. He is very saddened but unable to do anything.

Meanwhile the puppeteer also “hears” illusion cheers and laughter while in his dream, he raises his hands in air and tries to grab the string to maneuver the marionette. The cheers suddenly stop; he wakes up and sees the marionette lying a few yards away from him. The old puppeteer tries to stand up and reaches out his trembling hand for the marionette. The marionette, rejuvenated by the approach of his master, slowly sits up and reaches his hands to meet the puppeteer. Just before the two touch each other, the puppeteer suddenly passes out and drops onto ground, and the marionette also falls back onto the mantle. The fire slowly dies out and the room fades into total darkness.

Some time later in the same house, a young kid – grandson of the puppeteer, walks to the mantle, takes the marionette and drops him onto the ground. The marionette wakes up and feels him being swayed up and down. As he tries to look around, he sees the room is empty except a few packing boxes. Just then there is car horn sounding outside, urging the boy to leave; and the boy looks down at the marionette, apparently lost interest, walks to the box and throws the marionette into it.
The marionette, lying in the dark box, totally lost for a while. Then the illusion cheers sound again; as he looks around, he sees the photo of him and the puppeteer performing together, with the last strength left in him, he raises his hand and reaches for his master.

There are some old performing arts dying out around the world, artists no longer have audience attending their show and they cannot find anyone willing to learn and carry on the artistry. It is very sad to see those arts that have been around for centuries fading away before out our eyes.

**Approach:** it will be a 3D animation in Maya.

**Timeline:**

**Spring Quarter 2005**

Week 1: Script Draft  
Week 2: Script Draft  
Week 3: Script Draft  
Week 4: Script Draft  
Week 5: Script Draft  
Week 6: Final Script  
Week 7: Thesis Proposal  
Week 8: Script Revising  
Week 9: Script Revising  
Week 10: Script Revising

**Summer Quarter 2005**

Research and Maya warm up

**Fall Quarter 2006**

Week 1: Storyboarding  
Week 2: Storyboarding  
Week 3: Animatic  
Week 4: Modeling  
Week 5: Modeling  
Week 6: Modeling  
Week 7: Modeling  
Week 8: Modeling  
Week 9: Rigging  
Week 10: Rigging

**Winter Quarter 2006**
Week 1: Texture/Lighting
Week 2: Texture/Lighting
Week 3: First Phase Animation
Week 4: First Phase Animation
Week 5: First Phase Animation
Week 6: First Phase Animation
Week 7: First Phase Animation
Week 8: First Phase Animation
Week 9: First Phase Animation
Week 10: First Phase Animation

Spring Quarter 2007

Week 1: Second Phase Animation
Week 2: Second Phase Animation
Week 3: Second Phase Animation
Week 4: Final Phase Animation
Week 5: Final Phase Animation
Week 6: Final Phase Animation
Week 7: Rendering
Week 8: Rendering
Week 9: Compositing
Week 10: Compositing
Exam Week: Screening

**Budget Estimation**

Pre-production period:

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Marionette reference (including dancers and musicians, most probably hiring some students for video reference shooting) cost: 250 $ 290

Production period:

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**Grand Total: $ 1,230**
Appendix B
Complete Storyboards
Appendix C
Color Prints