Mr. Acephalous: The procedure of the individual stop-motion animation

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Mr. Acephalous:
The procedure of the individual stop-motion animation

by

Xin Liu

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF FINE ARTS

Major: Integrated Visual Arts

Program of Study Committee:
Chuck Richards, Major Professor
Anson Call
Alex Braidwood

Iowa State University
Ames, Iowa
2016
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ABSTRACT

Using the individual stop-motion animation *Mr. Acephalous* as a sample, this paper explores the change and restructuring of the commercial animation design and production process to create an individual stop-motion animation. Usually, commercial stop-motion animation involves a mature team, adequate funding, an enhanced production system, high-quality craftsmanship, and large-scale production space. However, in the individual stop-motion animation production explored in this paper, the animators are independent, usually students or film enthusiasts, who are not working with the manufacturing conditions of typical commercial animation. Utilizing the basis of commercial stop-motion animation, the author combined the process and experience of stop-motion to animate the film. This involved integrating the production process and production case used in commercial animation for a student in an individual, stop-motion animation. The paper studies the application of commercial design and production methods in a personal, stop-motion animation to accomplish a reasonable planning and production process. The filmmakers’ creation process and production of content are recorded in detail, beginning with the creation of the project’s concept to actual production. At the same time, this work deeply discusses the project’s academic and ideological development.
CHAPTER 1. INTRODUCTION

Background

The birth of animation made on screen, takes on a new expression of art and life. The unique, artistic charm of animation enables people to have an enormous enthusiasm for its creation. From the emergence of early, traditional hand-drawn and stop-motion animation to today’s styles produced by computer technology, animation has been integrated into everyone’s virtual and physical life space. In addition to extensive application in the field of business, animation also extends into education and academic fields, motivating more participation in the animation industry and the study of animation production.

As one of the many animation forms, stop-motion animation has a long history, with stop-motion technology use tracing back to 1898 (Albert E. Smith and J. Stuart Blackton’s ‘Vitagraph’s The Humpty Dumpty Circus’ in 1898). The production form of stop-motion animation is different than other kinds of animation; with the production team being the priority in stop-motion animation. Stop-motion animation requires the cooperation of many people, labor-intensive equipment and specific site arrangement, causing most outstanding stop-motion animations to be commercial films developed by major animation studios or animation companies. The traditional stop-motion animation market was greatly impacted by 2D and 3D digital animation, and with the gradual maturation of animation art and digital technology, stop-motion animation has suffered serious changes. Yet, due to the production characteristics of stop-motion animation, it still retains much of the traditional production process. For this reason, stop-motion animation has continually occupied a place in the animation market.

With the popularity of digital devices, the production difficulty of creating animation is gradually diminishing, simplifying the manual labor needed for the animation process. Although the influence of digital devices makes animation production less complicated, completing a high-quality stop-motion film is still quite challenging. However, it could be said the stop-motion animation production process is easier. Producing stop-motion animation includes
an irreplaceable process involving the use of physical models, a feature that cannot be replaced by use of any digital methods. Specifically, as an independent animator, a student, and a film enthusiast, the model making is always limited by countless objective factors: the production process, production equipment, production sites, material utilization, and funding. Again, because the film’s planning, production and completion is the product of teamwork, animation needs to draw on the knowledge of team members from different fields who can cooperate and coordinate with each other. In the mature animation process, assembly line production is the preferred method. Animation is divided into different stages and content segments for production and then completed by different animators. Therefore, this process requires a tacit understanding and cooperation between each animator.

Through the production of an individual stop-motion animation called *Mr. Acephalous*, this paper explores the differences in the production process of commercial and individual stop-motion animation. It attempts to determine and analyze the similarities of the methods in the production process, and supplements, modifies and removes the production methods not suitable for individual stop-motion animation. A set of production processes suitable for individual stop-motion animation are planned and executed. The main research direction of this article discusses how independent animators can systematically produce a stop-motion animation and employ common means to make a high-quality stop-motion animation.

**Purpose**

The purposes of this study are as follows. Through the basis of the production process of commercial stop-motion animation, discussion and validation of the production process of the stop-motion animation *Mr. Acephalous*, this study establishes a set of production pipelines and methods suitable for individual stop-motion animation. The purpose of this study is to reassess the production process of traditional commercial stop-motion animation and develop alternative methods more suitable for individual stop-motion animation production. These new approaches were implemented during the production of the stop-motion animation *Mr. Acephalous*. 
Research Questions

1. In the pre-production process of stop-motion animation, how can an animator expand the original ideas into story content, animation text script, and storyboard script?

2. Under the restrictions of the shooting area and shooting space, how can an animator plan the space of production and shooting?

3. In the character and scene model production, how can an animator choose materials to complete model production, while under limited conditions?

4. How can blue screen technology be used to assist model shooting and influence the post-production?
CHAPTER 2. PRODUCTION PIPELINE OF ANIMATION

Usually, the animation production consists of three sections: pre-production, production, and post-production. Each section includes the corresponding production tasks and production order illustrated in Table 2.1. Usually, the production pipeline is similar in the different kinds of animation, with the exception of the specific production methods and techniques.

Table 2.1. The animation production pipeline.

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CHAPTER 3. PRE-PRODUCTION

Procedures of Pre-production

The pre-production of stop-motion animation is the same for each animation style. This section includes the following steps in the pre-production phase: creating a story, writing the script, drawing the storyboard, and planning sound and music.

Story

Inspiration and target

The creation of a story usually comes from an original concept. The generation and inspiration of a concept involves many types of approaches. This concept is likely to be what an animator sees and hears, a beautiful dream, or even any ways and means. Working with the animator's concept, the creator must determine the animation target as commercial animation or individual animation. The target will determine the animation production planning. The Mr. Acephalous was an individual animation.

Selecting keywords

Initially, the animator must ensure the sources or inspired fragments of the story are selected and the contents are recorded. Animators may use text, images, voice and video to record their inspiration and establish keywords. First, these keywords must be in text form for easy expansion of the story and written script. Second, keywords must be selected from the text content. The extracted content includes time, location, characters, and character or scene features.

Expansion of original concept

First, selected keywords are analyzed and recorded through answers provided by the animator. Second, the obtained content is integrated and extracted once again and, on the basis of
the original concept; the extension of the story is completed for the first time. A second extension and arrangement of the content is then conducted. Finally, the content of the story is discussed with numerous people to ask for questions and suggestions. Before the story is modified and arranged one last time. After completing this process, the rationality and integrity of the story are reviewed once again.

Text script

Timeline

According to the story, time developmental sequence, and space developmental sequence, the content is decomposed into brief statements or paragraphs. A serial number is given to this text according to the time or space developmental sequence.

Literal expression

Abstract words, adjectives, and movement describing vocabulary in the story are extracted. The animator concretely expresses them or replaces the same content.

Refining words

All verbal content in the story is replaced, and the most intuitive, representative, and simplest expression forms are used. Then the content of the text script is checked and arranged.

Storyboard

Drawing storyboard

Drawing the storyboard for this animation was a process based on the text script of the animation, and accomplished according to the story content, camera design, camera movement, shot switching mode, camera time, shooting scale, sound effects, etc. The drawing process commonly uses tools of different colors (drawing tools for Mr. Acephalous, were black, red, and blue pencils) to draw and mark the content in the corresponding area of the storyboard paper.
Animatic and final storyboard

In the making of *Mr. Acephalous*, a scanner was used to scan the content of the first draft of the storyboard into the computer. The creator used Adobe Photoshop to select the frames’ content and assign a serial number to each frame. Later, a video project file (Video size is 1280 x720, Preset = HDV/HDTV at 720 p, 29.97) was created in Adobe Premiere and the static storyboard was transformed into a dynamic one. In addition, each picture was processed and the animatic completed (saved in QuickTime format using the h. 264 codec) according to the content marked by the storyboard. The animatic establishes the length and time line of the film. The content is modified and adjusted before synchronized with the static storyboard to complete the final storyboard.

Music and sound

Background music

Considering the entire style of the film, including the thought expression, plot content, and emotional state, the finished music was chosen and original music produced. The process for selecting the finished music included: (a) determining the functional purpose and performance goal; (b) determining the style and type; (c) looking for the source of music samples, such as networks; (d) determining the number of selected music samples (20-30 original samples); and (e) determining the target music according to the selection criteria. The content of selection criteria contained the music melody, rhythm, emotion, lyrics content (if applicable), and time duration. The above content should be suitable for the plot content, and conform to the plot and character emotions.

The process of producing original music is: (a) determine the functional purpose and performance goal; (b) determine the style, type, and time; (c) to ensure that the standard for the creation (e.g., melody, rhythm, emotions, and lyrical content) is in line with the plot content, plot, and character emotions; (d) to use the corresponding software to conduct the music production, or communicating and coordinating with members of the music production to create the music.
Sound

Sound includes movement sound effects, emotion sound effects, ambient sound, dialogue, and voiceover. According to the sound content marked in the storyboard script, the following two steps must be accomplished in combination with each other, so as to complete the content production. First, sound effect packages are selected and bought, and media files, (such as action sound effects, emotion sound effects, and ambient sounds) are rerecorded. Secondly, entities, material objects, and live-action recordings are completed for the needed sound content by using voice recording equipment or simulating sound content and recording.

Results

Birth of a story

Goals before creation

The creation of a story usually comes from a simple concept. This concept is likely to be what an animator sees and hears, a beautiful dream, or even ways or methods. Of course, the production of concepts may involve a variety of paths. If I, as the animator, need to regard the concepts as the starting point of creation, I must deeply analyze the conceptual information and make the creation goal clear for this work. For example, the goal of a commercial film is to gain more business value and profit, while the purpose of an individual film of a student is to show his/her own ideas, interests, and the skills and knowledge he/she learned from the project. The goal of creating the film Mr. Acephalous was to present the animator’s art concepts, as well as the learning outcomes, during the postgraduate period.

Extension of story concepts

This stage involved utilizing texts to extend the original ideas and accomplish a complete story. The original idea for creating the Mr. Acephalous came from the animator’s dream. In the dream, a lonely boy with a pumpkin head was standing in the doorway of a circus. This concept was unable to support development of a complete story, so the animator needed to
consider how to add reasonable information to support and assist the original concept. And, the extended content of idea must have a clear development order of the story.

To gain reasonable information the animator analyzed why he had an odd dream through a series of questions. These questions look for background reasons for the formation of the dream through restricted content. Take the concept of “loneliness;” why would the animator feel lonely? “Pumpkin head boy;” why would he generate this image? Why is it not a “watermelon head” or “girl”? What is the character played by the “circus” in the animator’s experience? It can be seen that the essence of these problems is about the background information of the animator, and at the same time, reflects the importance of personal style.

The information was analyzed through the animator’s self-examination. Consider the question, ‘why would the animator feel lonely?’ The answer is related to his childhood and family environment. In childhood, the animator’s parents divorced and he and his father constantly moved or were fostered in homes of distant relatives. He even suffered mental and physical abuse while living with a few stepmothers. These factors led to the animator producing a strong inferiority complex and a desire to protect him, rejecting the outside world and being afraid of making contact with others. The next question to consider is, ‘why would the animator produce the image of pumpkin head boy?’ This is the animator’s self-image. In his eyes he is different from normal people and, believes he is extremely odd in the eyes of others. They perceive him as a freak. The pumpkin head looks strange and horrible incorporating the animator’s love for Halloween. Alternately, it represents the joy of children at Halloween. Arguably, the “pumpkin head boy” is the animator’s virtual image in the spiritual world. Finally, the interpretation of the “circus” is analyzed. The circus is a lively place that brings people happiness. For the animator, the circus is a symbol of his loneliness and yearning for the outside world. Analyzed results of “a lonely pumpkin head boy standing in the doorway of a circus” reveal the dream symbolizes the animator’s own self-portraiture.

Through research and analysis of the dream, the extended foundation illustrates “the pumpkin head boy” as the core element and first character of the story; “Loneliness” and the
“circus” are extension elements and a main line of development. Combined with the previous results of these keywords, the story contains additional creative elements and information.

Once the story concept was extended the animator started exploring the story. A story must have the following elements: Who, Where, When, What, Why and How. Who refers to the character, Where is the location, and What contains the subject. Why and How ask questions about the storyline. For example, in Mr. Acephalous the story takes place during Halloween (When). The “pumpkin head boy” is the leading character (Who), and the story explains Where he is, Where he came from, Why he lost his head, and How he got the pumpkin and mannequin heads. The animator drew forth the second character, the “little girl,” and addressed similar questions to explore the story. How did she meet the boy? What is the relationship between the two? What happened to them or between them? Through these questions, I found new problems by starting from the background information of the first leading character. I realized this story had huge creative space and began to imagine the story, fill in content, and record and arrange it. Combined with the development route of the story, time order, space order, plot causality, I clarified the character relationships and their reactions to situations. I adjusted and modified the information until I had a complete, smooth narrative story. In the extension of story concepts, the animators made a map of relationships between each keyword for simple story extension (Figure 3.1. Relationship map).
Finally, I was able to share the story with others and allow them to forward questions about the story to examine its rationality and integrity. For animation films, as long as the story has a fluent narrative and clear relationship, the animator can play our imagination to its largest extent.

The story of *Mr. Acephalous*:

**Mr. Acephalous**

*In a cemetery at night, everywhere is quiet. An owl occasionally cries in the woods. There is a fine tombstone in the depths of the cemetery, with a shadow leaning against it. When a breeze blows, the shadow slightly shakes.*

*The little girl suddenly wakes up with a start, realizing it was just a dream. She was a little afraid, shook her head and turned to look at the alarm clock at her bedside; it was half past eleven. The little girl coughed, sighed, took her medicine, and returned to sleep. The moonlight shone on the calendar stopped at the day of Halloween.*

*The next day when the little girl woke up, it was already dusk; she felt much more comfortable and her mood had improved. The little girl looked at the*
medicine on the table, and threw all the medicine into the trashcan. Then, the little girl put on her Halloween costume and mask and prepared to play outside.

When the little girl went out, she walked to the neighbor’s door, knocked, and shouted, “trick or treat!” A woman came to the door and said to the little girl, “Dear, yesterday was Halloween,” and closed the door. The little girl arrived at another neighbor’s door, knocked, and shouted, “trick or treat!” There was no sound behind the door. The little girl waited, knocked on the door again, and shouted, “trick or treat!” There was still no sound. Before the little girl knocked on the door again, a dog barked from inside. The little girl stepped back, and suddenly the dog rushed out. The little girl panicked, threw her small basket at the dog, picked up a pumpkin lamp and escaped. When the little girl calmed down, she found herself in the cemetery. The little girl was a bit afraid. When she turned to leave, she discovered a ticket for the circus under her feet. As she bent to pick up the ticket, a gust of wind blew it into the cemetery.

The little girl slowly opened the cemetery gate and entered the grounds. She walked towards the path in the cemetery, relying on the pumpkin lamp to search for the ticket. At a fork in the cemetery, the little girl looked at a road sign. By virtue of the light of the pumpkin lamp, she read “Mr. Acephalous.” The sign made the little girl feel familiar, and she shined the pumpkin lamp-light near the sign. She indistinctly saw something in the depths of a grave, and, driven by curiosity, the little girl walked towards it.

The little girl came to the edge of the grave and found the area enclosed by a short fence. She went up and saw the circus ticket just outside the fence. She picked up the ticket; curiously shone her lamp on the grave surroundings, and surprisingly saw a man lying in front of the grave. She approached and saw a body without head. Incredibly shocked, she fell to the ground. Staring at the headless body, the little girl recalled the circus she had attended. There was a little puppet boy in front of the circus (the pumpkin head mascot) exactly matching a souvenir in her room. Summoning her courage, the little girl climbed up the headless body. She looked at it carefully and found there was a puppet joint on its neck. At this moment, the little girl was confident the body was the pumpkin head boy whom she saw in the circus.

The little girl pitied the puppet, so she picked up pumpkin lamp and connected it to the puppet. When she was done, the little girl sat on the ground and turned to look at the new puppet. Unbelievably, the pumpkin head turned back, his eyes lit up, and the pumpkin head boy came alive. The little girl frighteningly looked at the little boy as the boy was looking back at her. The little boy looked at the little girl’s face and touched his own face. He turned his body, clearly seeing his face in the water beside him. Again, touching his face, the little boy stared at the little girl’s face, still her Halloween mask. Suddenly the little boy stretched out his hand, and pointed at the little girl shouting, “Monster!” The little boy
stood up and ran with a panic, leaving the little girl sitting in front of the tombstone.

While running away, the little boy's memory slowly recovered. He remembered he was pumpkin puppet who held a ballot box at the entrance of the circus. Every day, people put tickets for the circus into his ballot box, and that ballot box was the most precious thing he owned. At the beginning, people were very interested in the circus, and when the show ended, people radiated with happy smiles on their faces. But, as time passed, people were tired of the circus. Now, every time the show ended, people's faces showed unhappiness or anger. Eventually, no one came to the circus to watch the show, the circus declined, and only the little boy was left still holding the ballot box at the entrance.

After feeling the sun and moon shine down on him day after day, the circus' things all disappeared, and the little boy's head and ballot box weathered. Only his body was standing in the same place. Eventually, the little boy's body fell to the ground; the land was transformed into a cemetery and the body was left alone by a tombstone.

When the little boy stopped running, he found himself downtown. He approached a lit window and carefully looked at his face. At that moment, he finally understood he was a monster. Upset, the little boy saw an unusually beautiful head on the mannequin in the window. He liked and wanted the head, which looked like a real person's. But the window was shut and the door was locked.

Casually walking down the street, the little boy came upon a mannequin's limbs in a dustbin. He began to look through the rubbish for a head. In the bottom of the trash can he found a head matching the one from the window. The little boy was overjoyed. Now he could become a normal person. He removed his pumpkin head and put on the new head. Walking in front of the window, the little boy looked at his brand new self, smiled at the inverted image, and danced happily.

Later, the little boy came to the square located in the edge of downtown. In the middle of the square was a fountain. The little boy walked around the fountain and carefully watched the bright world; he was immersed in the joy of a new life. When he looked back, he found the little girl standing behind him. Originally, the little girl followed after him and brought the thrown away pumpkin head. The little girl was still wearing a mask, frightening the little boy. When he began to draw back, the little girl removed the mask and revealed her beautiful face. The little boy was confounded for a while, finally realizing the little girl was a normal person rather than a monster. He adjusted his clothes, went up to the little girl and gently bowed to invite the girl to dance with him.

The little girl stepped back and shouted, “Monster!” Surprised, the boy felt very confused and frustrated. He sat down on the church steps and lowered his head. Soon after, the little girl slowly went up to him and handed the pumpkin
head to the little boy saying, “here you are, this is yours.” The little boy subconsciously took the pumpkin head with two hands and stared at it, not knowing what to do. He remembered himself in both the pumpkin head and the model head, and these pictures were constantly repeating in his brain. Suddenly, he stood up, lifted the pumpkin head up to his eyes, and said to the pumpkin head, “No, that is not mine anymore.” The little boy returned the pumpkin head to the little girl, took a final look at her, and walked away.

Transformation from story to script

Timeline

Script writing is based on the development of the story and in strict accordance with development order. The timeline must be controlled and the story content rewritten into short fragments.

For example, the beginning of Mr. Acephalous includes the script text “In a cemetery at night, everywhere is quiet, an owl occasionally cries in the woods. Beside the gravestone, there is a pile of leaves. When a breeze blows, a hand comes out of the leaves.” This portion of text is rewritten into a text script in accordance with the time line: “001: Title - Mr. Acephalous,” “002: In a cemetery at night, everywhere is quiet, an owl occasionally cries in the woods,” and “003: Beside the gravestone, there are a pile of leaves. When a breeze blows, a hand comes out of the leaves.” Numbered codes are the initial serial numbers of the film frames, and the animator can clearly understand the frames’ sequence corresponding to the development of the story. The content behind the serial number is the story content needed to be expressed within the frames’ time. Using this method, the animator arranges the story for the first time and lays a solid foundation for the next modification.

Writing the text script

The text script of animation is different than text script used when shooting films, and the form is decided by the production nature of the animation itself. The content of animation films is completely imagined, designed, and produced. In other words, all content of animation films is
created by the imagination of the animator. This means the plot needs to be totally and objectively described in an animation text script to assist the storyboard script. The animation text script is the storyboard script of the animations. Different vocabularies used to convey the story cannot be directly used in the animation script, so this content needs to be deleted or figuratively expressed. For example, in the phrase “he was walking in the street with an exhausted body,” when shooting the film, and actors can act by virtue of their acting skills and understanding of the plot. This approach does not work in animation. The key is how does one behave as if they were “walking in the street with an exhausted body.” In an animation text script, this content needs to be described and expressed by specifically worded language, to achieve the performance content of the frames. The text can be rewritten as, “he lowers his head with a bow, puts his coat on his back, and walks slowly in the street.” We can see the use of certain action design features and a detailed description of the actions have helped reach the expression of “walking in the street with an exhausted body” in the original content. At the same time, a description design for the characters’ action in the story is also made. The animator makes the second modification to the story content as follows: “001: Title - Mr. Acephalous;” “002: the cemetery at night, there is insects’ sound everywhere, and there is occasionally some cry of an owl in a distance;” and “003: Beside the gravestone, there are a pile of leaves. When a breeze blows, a hand comes out of the leaves.”

**Text refining**

In this phase, the previously modified text content is finally edited and refined to ensure the content of the text script simply expresses the story. The texts were simplified as follows: “001: Title - Mr. Acephalous;” “002: at night, in a cemetery; insects’ light sound; occasionally, the cry of an owl comes in the distance;” and “003: on the ground beside the gravestone, there are scattered leaves, when the breeze blows, a hand comes out of the leaves.” The current text content clearly describes the composition of the frames and sound in the plot. Before the creation of the storyboard script of frames, the best text script content needs to be achieved.
Drawing of storyboard

The animation production of a storyboard script is an important link. It allows transformation of the text script content into frames with audio and visual images. The main task of the animator is to design the frames’ content according to the script text content, configure audio information, and grasp the rhythm and style of the film. The text script creates a foundation for the animation production, but cannot be directly used for the production of animated films. This means animators need to draw the storyboard script according to the text script content and the general concepts of the story.

Preparation before the drawing

A storyboard script sufficiently embodies the animator’s creative thought and creative style, but animation with different styles has restrictions or advantages in terms of design. Due to limitations of the production method, it is difficult with 2D animation to use panning to express the content of frames (character and scene experience a 2D plane effect, due to the frames’ perspective. The panning is more difficult, so the follow shot is more often used or more cameras are switched during the performance). The setting process of stop-motion film is close to the shooting of real film, but the restrictions of space dimensions of scene models and production equipment, the shot scheduling in the wide range and the camera movement range also have restrictions. In 3D animation, the space limitation of camera movement is very small, and there is no perspective problems or limitation of setting equipment. Thus, in 3D animation, the degree of freedom of the camera movement is the highest, even exceeding the movement possible in real film.

The application of the storyboard must also be smooth and natural. The transition (connecting and switching) between storyboards must be clear. Usually, there is no switching mode marked in the connection of storyboards and only the serial numbers change a storyboard. The connection is a direct switching method. If a special transition is needed, it must be clearly marked in the storyboard script. The most important consideration is the picture content should
be concise, easy to understand, and very intuitive. The purpose of the storyboard is to express the animator’s basic intention and image content. It does not require too much detail, as too many details can affect the overall understanding of the animator. Finally, the storyboard, dialogue, and sound effects need to be clearly marked for easy to production in the future.

**Drawing storyboard**

The content of a general storyboard script includes: shot number, scene, shooting scale, effects, character movement, camera movement, picture content, sound, time, shown in Figure 3.2.

Before drawing, the animator needs to know the content and use of the storyboard form. At the same time, the animator can adjust the content of the storyboard according to the production requirements and film content. In *Mr. Acephalous*, the film has no dialogue content and a character design and scene design were not conducted. The process of drawing the content, picture content, camera positions, visual angles, camera movement styles, camera switching styles, shot times, shooting scales, character movements, and sound effects were designed and produced according to the script content. Therefore, the storyboard paper was adjusted as follows. (See Figure 3.3.)
**Figure 3.2.** Storyboard form.
The content and timeline of the text script combined with the requirements for design content (picture content, camera positions, visual angles, camera movement styles, camera switching styles, shot times, shooting scales, character movements, sound effects), fill in the corresponding area of the storyboard paper, and three-dimensional space design for each paragraph of words.

Here, the following points need to be considered. First, different colors were used for drawing different contents (Figure 3.4.). For example, black was used to draw the basic information in the picture, such as the location, shooting scale of the character, and scene in the
shot. Blue was used for the character’s action and movement styles. Red represents the ways in which cameras were positioned and moved. Second, in view of the character actions and camera movements, the corresponding colors needed for use to create a text label in the area of “Action.” The purpose for completing this was to control the shot and character movement times. Third, the design of characters and scenes had not yet been conducted. In the drawing process, a text label can be made for the characters and preliminary sketch image used according to the content of the story.

<table>
<thead>
<tr>
<th>No.</th>
<th>Picture</th>
<th>Action</th>
<th>Other</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>005</td>
<td><img src="image1" alt="Picture" /></td>
<td>Look at window</td>
<td></td>
<td></td>
</tr>
<tr>
<td>006</td>
<td><img src="image2" alt="Picture" /></td>
<td>Shadow in the window</td>
<td>Touch the face</td>
<td></td>
</tr>
<tr>
<td>007</td>
<td><img src="image3" alt="Picture" /></td>
<td>Touch the face</td>
<td>Put down hands</td>
<td>Close window again</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Touch the window</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Look at the inside of window</td>
</tr>
<tr>
<td>008</td>
<td><img src="image4" alt="Picture" /></td>
<td>First - Recon</td>
<td></td>
<td>Touch up</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Close up</td>
</tr>
<tr>
<td>009</td>
<td><img src="image5" alt="Picture" /></td>
<td>Turn right</td>
<td></td>
<td>Walk in the road</td>
</tr>
</tbody>
</table>

*Figure 3.4. Mr. Acephalous - Storyboard.*
In *Mr. Acephalous*, the little boy’s pumpkin head can be an image expression in the preliminary sketch. The scene content only needs a drawing of the preliminary sketch according to the text script information. It must clearly embody the relationship between the character and the scene in the picture. Fourth, the sound elements needed in the picture must contain a text label in the storyboard paper, and in *Mr. Acephalous*, this part of the content is labeled as “Other.” Fifth, the shot time must be calculated. The time at this stage is not entirely accurate, so it needs to be labeled with an approximate time. Empty lens time can be roughly estimated, however if there is character movement in the picture, the animator calculates the time through simulation performance. Similarly, camera movement time also can be finished through simulation, and the precise time of each shot will be done in the “Animatic” stage.

**Animatic and final storyboard**

Animatic was an important means to inspecting the animation’s overall time control and shot rhythm. Animatic, also called the dynamic storyboard, uses the corresponding computer software to make the static storyboard into a dynamic storyboard. It processes each frame in accordance with the camera switching mode, action, and shot time; the obtained dynamic short film is the animatic. Filmmakers thoroughly inspect and adjust the animation’s overall rhythm, character action time, camera movement time and switching mode through the animatic. In order to achieve a reasonable and satisfactory effect, the relevant modified content is amended and verified again in the static storyboard. Next, the animator will make the final storyboard of this animation, which is not only the result of the preliminary work, but also will be the foundational basis of the future animation production.

**Listen to the animation**

The animation world is virtual, although stop-motion animation production elements may be dolls or physical models. However, the virtual nature of the production does not lead to a lack of sound, though the sound is unlike film and television live action. For example, movies and
television series incorporate live recordings, and the sound is naturally produced in the shooting scene. Animation films have very strict and accurate requirements for sound elements in films. Audio-visual experience, background music and sound are indispensable to the animation films. Therefore, the sound elements are the auditory soul in an animation.

Selection music

The music of animation not only creates an atmosphere for a film, but also highlights the theme of films. Music enriches the characters, drives the narrative climax, and promotes the development of the plot. As one of the most important parts of animation, music enhances the artistic expression of animation works and deepens their theme. It is the same as general film music, and it can be used as the underlay, foil, and drive of the plot when the animation films’ music and frames are shown together.

An independent animation animator usually does not have the ability to produce and complete original music. In the animated film Mr. Acephalous, the animator adopted two means to complete its background music content. The first step was to find music suitable for the animation style. Mr. Acephalous contained no dialogue sound in the story design, and the language communication between characters was limited. The animator used subtitles to express the dialogue between protagonists, which is a feature similar to early silent films. The animation also needed background music to generate a strong drive of the plot. The entry point of selected background music requires consideration of music styles and lyrics, because this is the contact between music and animation. The music content was intentionally based on the story and follows as close to the plot as possible, rather than simply selecting a similar style of music to fill in the blanks on the animation.

For example, in the climax of Mr. Acephalous, the leading character was very happy after obtaining a new head. He danced in the downtown streets to show his excitement and pleasure. To strengthen the dramatic of story from the animation’s audio elements, the animator selected Feeling Good (cover version) by Muse as the background music. This song was from the music
drama, The Roar of The Greasepaint - *The Smell of The Crowd*, whose protagonist was Cy Grant, a character created by British singer and songwriter Anthony Newley Leslie Bricuss.

The title of the song, *Feeling Good*, attracted the animator. It allowed the animator to think of the character’s inner emotional outbursts after his rebirth. The second positive aspect of the song was the lyrics. The lyrics were very suitable for the plot content, promoting the storyline and character’s emotion, and acting as a special voiceover. In particular the lyrics, “*It’s a new dawn, It’s a new day, It’s a new life, For me And I’m feeling good*” was extremely suitable for the character’s emotion at the time of his rebirth.

The final alluring feature was the melody of the song. Background research revealed many famous singers sang this song. The animator collected various versions of different styles, such as Broadway, opera, blues, soul, popular, and rock. After comparing and listening to the versions several times, the animator decided to use the cover version by Muse. The Broadway, opera, blues and soul versions made the animator feel too melancholy, and the melody was too flat. The animator experienced a feeling of nirvana with Muse’s rock version. This version had relatively fast beats with a strong contrast of melody between the song’s beginning and end.

The second step in the production of sound was aimed at animation content. Of course, this makes the creation goal of the music very clear. Creation can be made very direct and take the plot as the theme of the music. This step makes music, frames, plot and other aspects integrate nicely. The animator did not have the ability to create original music for this animation, so he collaborated with a music producer. Aspects of the animation, such as music representing the plot of Acephalous' transformed head were created. The purpose of this music was to render the atmosphere of the plot. The beginning of this piece of music had a soft melody, and gradually increasing beat corresponding with the switching of shots in the film. The melody change in the music heightened the atmosphere with the movement change of the character, and mirrored the nervousness and excitement of his mood.
**Sound**

The sound mentioned in this section excludes the music. This part of sound is often generated according to the film’s plot, scene, and character movement. Generally speaking, it includes the following aspects: effect sound, ambient sound, dialogue and voiceover. In the animated film, *Mr. Acephalous*, the setting of the script is the diagram and voiceover without sound nature. To make the film produce a stronger feeling in the sound effects, the effect sound and ambient sound were recorded in the form of real-life environments and in a singing manner. For example, the ambient sound of the cemetery scene and the town scene in the film were recorded in the actual environments (woods and town streets) according to the design of the scene and by selecting appropriate times and places for recording. Still, there are many effect sounds remaining. Two recording strategies were adopted: one involved adopting actual recordings, and the other included downloading effect sounds from the Internet.

The biggest difference between dialogue and voiceover is the sound’s requirements for characters. Voiceover needs to properly control the time, tone, and speed according to the script’s requirements. Dialogue focuses on the combination of sound and frames. Different voices have different mouth shapes (mouth movements), and this part of the content is completed in the phase of the animation’s shooting script and action design. In the early period of film design, the animator utilized video equipment to prerecord facial movements according to the content of the dialogue and through combining the script’s requirements for establishing tone and speed. This step not only provides the diagram time and mouth movements, but also offers facial movements’ materials and helps design character action. When designing early dialogue actions, the animator repeatedly simulates character context and movement performance, and combines this with the design rule of the mouth shape in animation movement rules, and determines the final mouth shape time of frames. Finally, the animator cannot only use the prerecorded sound material as a dialogue, but also undertake a second recording according to the previous relevant requirements.
CHAPTER 4. PRODUCTION

Procedures of Production

Work in this stage of production involves: character design and production, scene design and production, and shooting and post-processing. Before these processes can take place, the size of production space needs to be measured, and the size of the scene model and shooting space needs to be calculated. The following formulas were used to calculate the computing target for the maximum production space.

The formulas are:

\[
\text{Scene model (long/wide)} = \text{Production space (long/wide)} - \text{Tripod (width) x 4}
\]

\[
\text{Scene model (high)} = \text{Production space (high)} - \text{Model Bracket (high)}
\]

(Figure 4.1.)
Character design and production

Character design

Before the character design phase of stop-motion animation, the animator must strictly grasp the content of the story and conduct the design work by understanding the creation background and character background. The animator extracts keywords describing the character from the content and text of the script, including specific image features and aspects of the character’s personality. The animator uses these keywords to create a character sketch (Figure 4.2. Figure 4.3. Figure 4.4.).

Figure 4.2. The body sketch of Acephalous.
Figure 4.3. Pumpkin head.

Figure 4.4. The body sketch of the little girl.
The created content attempts to incorporate different image characteristics and style features, and chooses a part of the sketch as the finalized design for the first draft. The selection criteria include the following requirements: a clear overall style for the image, the design content fits with the film’s style and is suitable for the animation’s story background, and the appearance of characters successfully embody their characteristics. If the film has multiple main characters, the first draft must include the character contour map (Figure 4.5.).

Figure 4.5. Character contour map.

The third step was based on the first draft, the second draft of the completed sketch was modified again and contrasted. The character color was designed, and the animator attempted different color matching according to information provided from the keywords. In addition to the individual colors of the character, the animator conducted a contrast design between each character (Figure 4.6.). Finally, the animator determined the color of the characters, depicted as the character’s design concept graph. The fourth step involved facial design (Figure 4.7.). The regular expressions of characters appearing in Mr. Acephalous (normal, happy, angry, sorrowful) and special expressions (laughing, crying, extremely angry, etc.) were separately designed. The most characteristic expressions were selected. In the fifth stage, the front views of the characters were drawn according to the character sketches in combination with the story’s content. The
characters’ clothing, accessories, and other details were also designed at this stage. For example, Figure 4.8 shows the front view of Acephalous, while Figure 4.9 shows the front view of the girl in the animation. In this stage, all the details need to be separately drawn in a large-scale pattern to facilitate the production of the character model. Lastly, checking the content of the final draft, the character design map was completed.

**Figure 4.6.** Color design.

**Figure 4.7.** Face design (Pumpkin head).
Figure 4.8. Acephalous – Front.
Figure 4.9. Girl.
Character production

The production of stop-motion animation characters often includes the selection and application of a variety of materials. In individual stop-motion animation, the process involves relatively simple materials commonly used in real life to complete the production content. The production process of the character models involved the following steps. (The materials used for the character models were purchased from Amazon, Wal-Mart, Lowe’s, Hobby Lobby, and Jo-Ann Fabrics and Crafts. The production materials and tools are shown in Table 4.1).

Table 4.1. Character Materials and Tools List.

<table>
<thead>
<tr>
<th>Character Materials &amp; Tools List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials</strong></td>
</tr>
<tr>
<td>Brass Tubes (Square)</td>
</tr>
<tr>
<td>Nut (Square)</td>
</tr>
<tr>
<td>Fast Steel</td>
</tr>
<tr>
<td>Super Lightweight Modeling Clay</td>
</tr>
<tr>
<td>Acrylic (Based on character design)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Initially, the proportions of the croquis were drawn based on the character sketches and the actual measurements (Figures 4.10.a & 4.10.b). The draft sketches of the skeleton were designed, based on the proportion of the croquis (Figure 4.11) and the appropriate materials were
selected. Due to the small size of the body of Mr. Acephalous, skeleton materials’ thickness, elasticity, plasticity, and durability were primarily considered to avoid situations where the materials were unable to support the skeleton, difficulty of joint movements, and fractures. The final technical sketches were completed per the actual measurements (Figure 4.12). The production plan used to create Mr. Acephalous and the little girl was formulated according to the finalized technical drawings and the materials. For this specific project, several materials such as round and square copper tubes, steel wires, square nuts, and fast steel were used to complete the metallic skeletons of the boy and the girl (Figure 4.13.). Once the metallic skeletons were completed, the durability of the skeletons was tested and adjusted (Figures 4.14.a & 4.14.b). The metallic skeletons were placed in different poses used in the animation for testing. The cotton, sponge, medical tape, and string added volume and “muscles” to the puppets bodies. The bodies’ movements were tested again (Figure 4.15). For the costume design, the animator collaborated with a Ph.D. student in apparel design to adjust the original designs and emphasize the characters’ personalities and enhance the visual quality of the animation. The apparel design student drew the final illustrations of the costumes (Figures 4.16 & 4.17). The materials of the costumes were chosen and bought at a local fabric store. The apparel design student and the animator made all garments and accessories.

Figure 4.10.a. The proportions of the croquis with skeleton.
Figure 4.10.b. The proportions of the croquis with skeleton.

Figure 4.11. The draft sketches of the skeleton.
Figure 4.11. (continued)
Figure 4.12. Acephalous – final technical sketches.
Figure 4.13. Acephalous & Girl – final metallic skeleton.
Figure 4.14.a. Acephalous - Adjust skeleton.
Figure 4.14.b. Acephalous - Adjust skeleton.
Figure 4.15. Acephalous – “muscles” for skeleton.
Figure 4.16. The costume of the Acephalous.
The production of the heads employed two methods: 3D printing technology and a mold-making technique (Figure 4.18). To create different moods of Mr. Acephalous, the head models were separated into the front face and the back head. Eight front faces with different expressions were created. Only one back head was created to match the front faces. The total ten pieces of the models, including the backup piece, were printed. Orange acrylic pigment was used to paint the printed heads.
Figure 4.18. Acephalous – Head model of 3D printer.

The head of the little girl required use of the mold-making technique. The super lightweight modeling clay was molded in a silicon mold and air-dried for 24 hours (Figure 4.19). The head was painted using acrylic pigments. Once completed, the heads, bodies, and the costumes were assembled and adjusted (Figure 4.20).

Figure 4.19. Girl – Head model.
Scene design and production

Scene design

Before creating the scene design in stop-motion animation, the animator used the description of the script and storyboard for the production of the scenes. The overall scene design and production were completed, and details are portrayed for local scenes. First, the scene plan and partial view of scenes were drawn (scene sketch). Second, details for scenes were added into the sketch. This process used photos from real environments and online pictures as seen in the cemetery scene of Mr. Acephaloue, in which the animator consulted Figure 4.21. Third, the animator divided up areas for scene plans on the basis of the scene layout, which led to easier modeling and shooting.
Figure 4.21. Cemetery photos.
Scene production

The production process is outlined in the following paragraphs. (The materials used by scene models all come from Amazon, Wal-Mart, Lowe’s, Hobby Lobby, Jo-Ann Fabrics and Crafts. Production materials are shown in Table 4.2.)

Table 4.2. Scene Materials and Tools List.

<table>
<thead>
<tr>
<th>Scene Materials &amp; Tools List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials</strong></td>
</tr>
<tr>
<td>Foam board</td>
</tr>
<tr>
<td>Spray paint</td>
</tr>
<tr>
<td>(Moss Mat)</td>
</tr>
<tr>
<td>River Rock</td>
</tr>
<tr>
<td>Stone</td>
</tr>
<tr>
<td>Iron wire</td>
</tr>
</tbody>
</table>

The animator used tables to build the scene bracket, according to the scene model’s size. Three pieces of 2-inch foam boards were utilized for creating the sub-regional structure’s scene-base on the table and reinforcing the base all around. According to the scale of the scene plan, the layout of the substances was drawn on the scene-base. Then, the animator used a foam board to build the height of the scene. An exact-o knife and T-shaped ruler were used to trim the models (Figure 4.22. Foundation of the cemetery scene.)
The animator then made the local building and decorations according to the design sketch. This process strictly controls the design size of the model, made of each model’s components. The assembled model’s components are colored successively, such as cemetery door, fences, and tombstones (Figures 4.23 and 4.24). Next the animator laid the grass, road, plants, and other foliage (Figure 4.25). The local buildings and scene decorations were assembled (Figure 4.26). Based on the overall effects of the scene, details were added to the key scene (Figure 4.27).

Figure 4.23. Cemetery door.
Figure 4.24. Tombstone.
Figure 4.25. Grass, road, and plants
Figure 4.26. Details of the scene model.
Figure 4.27. Final model of scene.
Shooting

At this stage, the animator needed to readjust the shooting site and content according to the scene size, scene content requirements, and production; this included consideration of the location of the blue screen placement, photographic equipment placement and motion space, camera crew’s activity space, and light control. The equipment and materials used at this stage are shown in Table 4.3.

Table 4.3. Shooting List.

<table>
<thead>
<tr>
<th>Shooting List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital camera:</td>
</tr>
<tr>
<td>Nikon D750 FX-format Digital SLR</td>
</tr>
<tr>
<td>Camera w/ 24-120mm f/4G ED VR Auto</td>
</tr>
<tr>
<td>Focus-S NIKKOR Lens</td>
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In consideration of the location of the scene model, measurements were conducted to determine whether the field space could complete the resettlement and construction of photographic equipment and auxiliary facilities. If there was an error, it was adjusted timely and reorganized. After completing the adjustment, auxiliary facilities needed to be constructed and the shooting equipment arranged, adjusted, and checked again, so as to make sure that there was no error.

Subsequently the scene lighting needed to be decorated according to the actual effect of the shooting site, adopting the artificial light source. Blackout cloth was used to cover the windows and avoid natural light.
Finally, a character model was placed in the scene, the placement was determined, and a digital camera was used, along with computer and stop-motion production software, (Dragonframe) to start shooting pictures.

Post-processing

Using Adobe Premiere and following the storyboard information for editing of the raw footage, the extra shot content was removed. Shots were then arranged in order according to shot number. Finally, the shot content and timeline were checked to determine if any errors occurred in the shots. In case of errors, the shots were immediately arranged, modified, and/or reshoot.

Results

About the model of characters

This stage mainly involved the designing and making of characters through the text information in the story. The core content of this phase has two parts. One involves accurately transforming the characters’ text information into image content and accurately showing characters’ basic attributes to the audience in terms of visual representation of the image content. The other includes transforming 2D visual information into a 3D model, which has a higher degree of image restoration and can accomplish any task movement requirements in the film content.

Character design

Character feature

In the early stage of character’s design, the animator’s design method involves selecting the most representational information about the character features from the script and treating them as the breakthrough point of the design. With the design of Mr. Acephalous, the animator selected two basic image vocabularies -- boy and pumpkin head -- from the script, and the
character of these two attributes could not be changed, as they were also basic characteristics. The animator gradually adds characters’ representational characteristics according to their personality and emotional expression (timidity, sensitiveness, loneliness) in the story. In real life, people who have these kinds of personality traits (timidity, sensitiveness, loneliness) usually belong to vulnerable groups. Thus, according to this content, the animator embodied this superficial pun by adding a thin body to Mr. Acephalous. Next, through depicting the little boy’s background (circus, mascot), the animator continued to enrich the character’s objective image. Finally, the animator summed up the image characteristics of the little boy: a thin, well-dressed, 12-year aged boy with a pumpkin head.

**Character sketches**

According to Mr. Acephalous’ character feature, the animator needed a drawing of the visual sketches of the character. The animator chose the pumpkin head as the breakthrough point of the sketch design. At first, the animator designed the pumpkin heads with different shapes, and combined the body features of character, as well as background information. The animator constantly changed, contrasted, and chose the most characteristic feature for the visual images. For example, the animator designed the pumpkin heads with different shapes and proportions, and picked the best one for the final draft of the head. In the process of selection, the animator matched different pumpkin heads with the body, contrasting the effects as a selection mode. The animator simultaneously designed two kinds of clothes with different styles: one was a tuxedo, which was more close to the feeling of a gentleman; the other was a costume similar to the clothing of a clown and closely resembled the circus environment. The animator chose the tuxedo style for Mr. Acephalous based on the animation style and story.

**Coloring**

Each character’s color attribute determines the fundamental tone of the character’s clothing, and, expresses the characters’ personalities. With Mr. Acephalous, the same entry point
of the pumpkin head was used. The animator did not hesitate choosing an orange color, which was also the color of the Halloween pumpkin heads. The animator used a dark color as the basic color for the clothes, which formed a contrast with the bright orange color of the head. The little girl in the animation inspired the color choice for her clothing. The animator chose to work with bright colors as a basic tone because the little girl was dressed in festive costumes in the story. The reason for the dark color used in the sketch of Mr. Acephalous was to form a contrast with the bright clothes of the little girl. In the color setting, the animator utilized the contrast method, and collocation and contrast of simple color lumps to determine the characters.

Costume details

The clothing of the characters involved the design of styles and the selection of costume color in the character sketch and color stage. This stage was mainly composed of the following parts. The first part was a manifestation of garment details. With the puppet as a small model in stop-motion animation, it is easy to ignore the details. In both the process of drawing models’ design drafts and producing the physical models, animators may possibly omit the details, because of the small objects’ proportion. However, the details should not be forgotten. When models appear on screen, the detail will not disappear, but rather all detail amplifies in the audience’s vision. This means characters’ clothing or models’ detailed features cannot be ignored, and require great work in design and production. The second part involved in costume details is drawing the final illustrations of the costumes. The difficulty of this part was not great, but care had to be taken. Considering the character sketch, the large-scale visual images were drawn. The clothing’s visual content was shown at a higher degree of reduction in accordance with the design style and color. At the same time, the clothing’s local details were enlarged separately, showing the clothing’s local detail features clearly; providing more manufacturing information for future model making. (see figure 4.28)
Figure 4.28. Sketch of costume details.
**Production of character**

**Model making and sketch**

Before making the characters, the animator must repeatedly study the character design draft, sort out a more appropriate production scheme, and draw the final technical sketches. The sketches must be drawn in strict accordance with character proportion, constantly verifying the production plan of character model, and eventually showing the production plan in the technical sketches. Unequal-proportion drawing of the model would limit the creation methods for the character skeletons and the materials selection. The characters’ shape had some special requirements for materials, such as the characters’ joints, which had greater requirements for flexibility of the materials. Finally, the character skeletons and methods were drawn in the final technical sketches. The animator marked the production methods and production of materials.

**Material and production of character model**

The character models’ making materials can come from anywhere, especially in the production process of individual stop-motion animation. There should be no limit to the selection range of materials. It is suggested animators explore a large amount of materials or semi-finished goods materials and even some finished product models and toys in different stores. The price of these materials is low and part of the materials can be modified for use, lowering the costs and reducing the workload.

The materials for the character models have three parts. The first part constitutes the skeleton material. In Barry JC Purves’ *Stop - Motion Animation: Frame by Frame Film - making with Puppets and Models* and Ken A. Priebe’s *The Advanced Art of Stop - Motion Animation*, different production materials and production methods are introduced; commonly used skeleton materials are aluminum wire, brass tubes, ball joints, and metal parts. In the character skeletons of *Mr. Acephalous*, the animator considered whether the materials in these books could be used in his model or if enough technology was incorporated to make relevant parts of the skeletons. The cost of materials was also considered. In this stage, the animator ruled
out ball joints and metal parts, because, although the former can be directly purchased, the price is very high and the size is inappropriate for the character skeletons in *Mr. Acephalous*. In addition, the metal parts require secondary processing, and the animator did not have the tools for that production method. Therefore, when selecting materials, the animator needed to find alternatives or use other methods to achieve the same function. For example, the skeleton of Mr. Acephalous had long, thin arms and legs. If the animator used a combination of spherical joints and metal parts, they would still be unsuitable for the requirements of the skeleton.

The animator used a combination of brass tubes (square and round) and woven steel wire to realize the skeletons, and used substitutes for spherical joints. The reasons for this choice were: a) these two kinds of materials are easy to buy at a low price and brass tubes can be bought in most model stores and Hobby Lobby. Also, this kind of woven steel wire is usually used for hanging metope adornments, such as oil paintings or picture frames, and can be bought at Wal-Mart. b) The basic material of skeletons needs to satisfy two requirements: being flexible and inflexible. For example, joints often require a material to move and bend, so there were certain requirements for the flexibility and strength of materials, and the skeleton joints could not be broken after bending or repeated deformation. In the book *The Advanced Art of Stop-Motion Animation*, animators used aluminum wires as the material for joints, as this material demonstrates a strong flexibility but can be strengthened by intertwining many aluminum wires together. However, this production method could not be achieved in the skeleton production of Mr. Acephalous, because the size of the character puppet was small and the skeleton was very thin. If the animator reduced the number of intertwining aluminum wires to satisfy the skeleton’s size, they would be easy to fracture after repeated bending. Thus, both the flexibility and intensity of this kind of woven steel wires were very suitable for the production plan of the skeleton. In addition, the inflexible parts were usually the dolls’ forearms, arms, legs, and torso, which are non-deformable parts of the real human body. The animator put the woven steel wires into the brass tubes to create the skeleton’s inflexible parts. This method was used to replace the metal parts suggested in the book.
The next step entailed filling the materials for the skeleton. The process in this part was simple, and involved using a sponge, cotton, medical adhesive tape, and other soft materials to simulate the muscles of a human body and attaching them on the skeleton, to make the puppet body appear more vivid and plump.

The last step was creating the clothing materials. The selection of clothing materials only required selecting and buying the corresponding cloth to make the clothes according to the characters’ clothing design requirements. Extra attention was required in deciding whether cloth with a decorative design was used, and the consideration of the ratio between the decorative cloth and model.

**Final technical sketches of skeletons**

The work in this stage required the animator’s extreme carefulness and precision, because the content of this part directly affected the production of the model. Modeled from the character sketches, the equal-proportion technical sketches of the skeletons were drawn. Here, the final technical sketches of the skeletons included character outline, skeleton shape, material distribution, size of materials, and assembly location. Due to the small size of the model, large-scale partial skeleton structure charts were drawn in order to accurately and clearly combine each part of skeleton.

**Model making**

After completing the necessary sketches, the animator determined the making materials and production means. Once the correct materials and tools were purchased production of the models could begin.

The production of the model’s head required careful attention. In the model making process, the animator used 3D printing technology to complete the model’s head. This approach’s advantages were: low production difficulty, consistent size and detailing, low production cost and fast production. 3D printing does not require complex, handicraft technology
needed in handwork or mold-making techniques. Usually, a traditional production mode needs excellent handiwork in traditional production. Secondly, 3D printing technology can ensure the size and details of each head are totally the same. Third, production cost is low. Compared with the materials purchased when using sculpture and mold-making techniques, the cost of 3D printing is cheap. Lastly, production speed is fast. After completing 3D printing, the material can immediately be colored, but the models of traditional production require significant time waiting for the materials to dry. The shortcomings of 3D printing technology are the animator must understand the use of 3D modeling software and, after completing the printing, the model’s surface is not completely smooth, and requires further processing through sanding and polishing.

About the model of scenes

Scene design and production processes were the same as character design and production processes. It required the animator to combine the script with the storyboard, refine the objective descriptive information in the text, transform the text information into visual images, and make the physical model. However, the difference between scene design and production processes and character design and production processes was the process of model production between the characters and scenes, which is mainly reflected in the range of materials and coloring of the model.

Scene design

Scene sketches

Similarly, this part of the content was the same as the character sketch design (Figure 4.29). The scene description information was extracted from the script, combined with the scene concept in the storyboard, and the scene sketch design was conducted. Scene sketches focused primarily on the design size and scale of the scene model. The scene scale mainly consisted of two parts: one is the size and scale of the scene itself, and the other is the scale between scenes and characters. In the shooting site planning stage, the animator already had the initial data of the
scene’s production size. Here, the animator needed to combine the actual size of the character model to conduct a second adjustment, and this adjustment needed to be accurate. According to the height of the character model, the animator converted the building’s height and size. For example, the height of the little boy character model is 6 inches, and in real life, the height of a boy who is about 12 years old is around 48 inches. The animator converted the building’s size according to the scale of the two data points (1:8).

The size and scale of the scene model was then considered. Due to the shooting location, the animator needed to control the size of the scene model within the space of the shooting location. Usually the animator cannot intuitively determine the actual effect of the model's size. Therefore, the animator used 3D software (Cinema 4D) to produce the 3D Sketch Model of the scenes (Figure 4.30.), to provide the most intuitive visual effects. The animator constantly adjusted the size of the 3D model, or the scale between the character and the scene, through the camera function in the 3D software. Finally, the animator obtained the actual production size of the scene model.

*Figure 4.29. Scenes sketch. (Downtown)*
Final sketches of the scene model

Using the scene sketch, the animator refined the scene’s visual effect. An equal-scale construction drawing was not required, but accurate labeling with the size of each model was needed. The data could also be combined with the former 3D Sketch Model, including the floor plan, labeling with the model’s overall size and the location and size of each building or landscape. For the side view, the animator mainly labeled the height of the scene model, and for the model’s local design sketch, the animator mainly ensured the data accuracy of the local scene content.
Production of scene

Material of scene model

The material range of the scene model selection was larger than the character model. The scene model had the ability to reduce the workload and production cost through purchasing semi-finished materials or a finished product model. For example, in the process of developing the scene model, the animator bought a lot of form boards and assembled shop models and mini decoration models. Form boards are not only low cost, but light weight, and have a smooth surface. They are very easy to glue, easy to make malleable, and perform cuts. Therefore, the animator frequently used the form boards to build the model’s basic structures and construct the landscape and buildings or models with a special shape. To reduce workload, the assembly was purchased of shop models and mini-decoration models or semi-finished product models, according to the scene’s effect and actual scale.

Production of scene model

The production of the scene model was very simple, but required the use of the right tools to manufacture the corresponding materials in strict accordance with the model data in the drawings. The following points need to be mentioned regarding the scene model production. The first consideration was the accuracy of the materials' size. Without accuracy each part of the model could not be successfully assembled in the assembly phase. Real materials needed to be used to create the scene model and improve the reality of the model was another consideration. For example, in the cemetery scene the animator used tree branches to create the woods and metallic materials for the metal gate of the cemetery. The use of these production methods and materials aimed to achieve a realistic effect of the animation. Thus, before making the model, the animator had to find a variety of materials to compare the actual effect of the scene. Finally, the model’s details were considered. The goal of scene model details was the same as those relevant to the development of the character model. The difference was as a large-size model, the specific local model could be made in the detail processing, and was based on the demand for a scene in
the story. Similar to the cemetery model, the animator created details for the cemetery gate, road signs, and Acephalous’ tombstone. Because these parts were very important in the story, they appear on the animation in a lot of frames, and had close-ups during shooting.

**Color and texture effect**

In a scene model, there are two inevitable key problems involving coloring and texture effects. These two components are closely linked together. Different coloring methods can achieve the same texture effect of a model and, at the same time, different objects’ own texture will affect the coloring effect. The decoration on the cemetery gate in the current work is a prime example. The decoration’s basic material was wood, but the animator needed a metal effect for decoration. The black acrylic color was used to hide the wood’s texture, and the metal effect was accomplished by coloring. The flagging in the cemetery was another key example. The base material that the animator used to make the flagging was form board (white and thin); this kind of material had a very smooth surface, and there was no texture/color of the surface of the stone. Therefore, the animator needed to solve the problem of the texture of the flagging, and then conduct the coloring. Through the use of crepe paper, acrylic gesso, and glue, the animator made a slate texture on the surface of the form board, and then completed the look of stone by coloring.

**Shooting of the stop-motion animation**

**Shooting space planning**

The animator planned the location of the scene model in the shooting space, but needed a reorganization of the shooting space. The goal of reorganization was to check the rationality of shooting space and included the final size of the scene model, models’ location, motion space of , location of the blue screen, and construction of other auxiliary facilities. Through simulated shooting or trial shooting, constant adjustments were made in the motion space between the facilities to avoid having the space appear as though there was a shortage.
**Lighting**

Lighting is the foundation of all image records, and different lighting effects can affect the emotion of a story. In the production of individual stop-motion animation, the producer may not have professional lighting equipment. In the film *Mr. Acephalous*, under the restriction of the shooting space and lighting, the animator reduced lighting requirements and used some easily controlled lighting. The light source usually includes two aspects: natural light and artificial light. When shooting in an interior space, natural light often comes through a window, greatly affecting shooting. The shooting space of *Mr. Acephalous* was an interior space with windows. Before shooting, the animator used blackout cloth to completely isolate the natural light. As time changed during the shooting, so did the position of the sun causing the light angle and strength of natural light to shift. For example, the time in the story changed over a few hours, but the shooting required a few days.

It was reasonable to use the artificial ceiling light of the room. In this method, the bulb could be changed to have a different brightness for the basic light of shooting. Local light can incorporate common artificial light as a supplement, such as the table lamps with bulbs of different brightness. This method is low cost, easy to control safe, and a practical choice for student film producers. It is also very easy to use filter paper to change the color of the light. To determine the location of the device, the lamps and mark location in the shooting space must be adjusted.

**Blue screen**

Compared with large scene models in commercial stop-motion animation, the scene of individual stop-motion animation has a smaller size required in cooperating with the blue screen in the storyboard of cemetery shooting. The animator concentrated the shooting angle on the right side of the scene, and the blue screen was arranged on the left side, so as to avoid an adjustment of the location of the blue screen brought by different shooting angles reducing the shooting workload. This step required extra attention on two points: first, it required keeping
space between the blue screen and the scene model, to avoid the reflecting light of the blue screen affecting the scene color. Second, the surface of the blue screen must be flat and smooth, or the color change on the surface of the blue screen should be reduced as much as possible.

**Shooting**

The animator used a digital camera to shoot *Mr. Acephalous*. At the same time, he used the computer and stop-motion animation software "Dragonframe" to assist the shooting. Of course, the tripod and the small camera track were indispensable. In the shooting process, the connection needed a USB cable between the camera and the computer. All the above equipment was used in a very compact working space. During shooting, the animator needed to constantly adjust the location of the camera, causing other equipment move with the camera. In addition to marking the location of the equipment during the shooting process, the animator used some auxiliary equipment for easy mobility. For example, the animator used a small cabinet with the pulley and placed this next to the camera. The computer was placed on the top of the cabinet for easy mobility. Paper tape was also used to quickly mark the position and height of the tripod and camera track.

In the shooting process, the character model continually changed poses and moved positions, and it presented a major question of how to accurately adjust the action and move the location. This question required analyzing each motion, and the assistance of some props and "Dragonframe." The first step involved character motion. Usually, the regular motions of characters could be finished by animation movement regulation, such as standing, walking, running, jumping, etc. In the *Animator’s Survival Kit* by Richard Williams, the author explains the characters’ basic movement regulation in detail. For the relatively complex motions, the animator could imitate motions and record that by camera, then repeatedly watch the motion changes and copy the motions to the character model. With the assistance of props, poses or substitution motions, effects are simplified. For instance, the human body would naturally form ups and downs when walking. The bending of knees and the change of the distance between two
feet cause this. When shooting, the animator needs to manifest the walking of the characters’ upper part. The animator added or reduced the thin cardboard at the bottom of the model to achieve the same effect of ups and downs, to reduce the working difficulty. Another example in the film *Mr. Acephalous* is when the little girl held a pumpkin lamp in her hands, but the character model could not bear the weight of the pumpkin lamp in hand. Therefore, the animator made a bracket for the pumpkin lamp, which could easily support and adjust the position of the pumpkin lamp. A third consideration involved software support. In the making of *Mr. Acephalous* the animator used "Dragonframe" to assist the shooting. The advantages of "Dragonframe" was the viewfinder of this software showed the action of the last frame with a translucent form for each shot of action. Thus, in the shooting process, the animator could intuitively and conveniently check the motion position and change this for each frame.

**Post-processing**

The post-processing stage involved conducting a rough process for the rushes after finishing the shooting. This part did not need to be handled with relation between each shot, but simply required adjusting and processing each frame’s content of the shot. When the animator shot the original shots, at the beginning and ending of each shot, the animator made a repetitive shot in the first and last frame of the camera frames. This step aimed to retain a buffer time for the editing stage and allowed rechecking of the frames, to avoid lost shooting and timely reshooting. After the completion of each frame, the animator needed to remove the redundant shot content. In the shooting process, the model sometimes was a stabilizing device brought into the camera shot and the animator needed to handle these frames. This was a job requiring patience and carefulness. Some shots adopted blue screen technology in the shooting process and were completed in the Final Compositing stage.
CHAPTER 5. POST-PRODUCTION

Procedures of Post-production

Animation editing

Video editing

The video editing software (Adobe Premiere) was used to elaborately process the raw footage strictly in accordance with the content of the storyboard. The process steps were as follows: (a) removing or reducing the content of extra shots and shot time; (b) adjusting the shot sequence and image size; (c) conducting a blue screen image matting and background synthesis; (d) making the transition effect added between shots; and (e) checking the picture content and timeline.

Sound editing

All audio materials were edited using the video editing software Adobe Premiere to precisely aligned with the marked information of the sound content in the storyboard script. The procedural steps were as follows: (a) processing the content of audio materials according to the needed sound elements; (b) reducing the time duration of audio elements according to the required time duration; (c) contrasting the shot content and checking the synchronicity of sound materials, especially the dialogue; and (d) checking the sound content and timeline.

Final compositing

This part of the job was divided into the following steps, and used different software in combination for completion: (a) Adobe After Effects was used to make animation titles and animation trailer; (b) Adobe After Effects was used to make the film’s special effects, such as mirror reflections, inverted image, local lighting, etc.; (c) film subtitling was produced; and (d) video, sound, titles, trailers, and subtitling were synthesized in Adobe Premiere according to the
content of the storyboard script. Next, the color of the whole film was amended and adjusted to fit the voice content and timeline. Finally, the film was previewed and all output checked.

**Results**

**Animation editing & final compositing**

This phase presents the last chance to process the film before completing the animation. In this stage, the animator needs to conduct a final finishing for frames content, film editing, sounds, effects, and subtitles.

**Animation editing**

Editing is a second creation for the film, and is a presentation of the whole audio-visual language. The film editing embodies the narrative function of shots and sound from the storyboard. In addition to the order of the shots by the storyboard, film editing also reflects the film’s different narrative styles according to overall editing and adjustment in the order of shots. In commercial films, editing needs close coordination with the director, cameraman, and editor, so as to reach the real concept of the director in its second creation. In an individual animation, the advantage is that the whole process, from concept to script, storyboard to animation editing are completed by the animator, so animation is more unified once edited.

Animation editing includes video and sound editing. The first step is video editing. After the storyboard is finished, the shot order and switching mode is determined. This makes a lot of animators fall into a blind spot; thinking animated films only require little to no editing. Due to the limitations in the production methods and production techniques, 2D and 3D animation rarely require a post-editing stage, because the animators artificially draw the frame content of 2D animation. Once this process is removed, restructuring or modifying and reworking is the waste of production costs. Usually, it is executed completely in accordance with the sub shots’ script, to try not to waste the frames. In 3D animation, the computer has replaced a part of the labor force, but a small number of edits according to the storyboard are still required.
The production, particularity of stop-motion animation, creates a certain similarity with the real shooting films in terms of shooting and editing. For example, in addition to the foundation on the storyboard, the shooting process of stop-motion animation requires an animator to make certain changes to the shooting content and shot scale according to the scene, lighting, and other on-site factors. Of course, this part of the change must be promptly, synchronously updated together with the script and storyboard, to avoid confusion and error in the editing process. In the post-processing stage, video materials have been roughly processed, so the video editing of this part mainly involves the fine processing of shots and the adjustment of camera language.

Sound editing largely includes finely processing the sound materials produced previously. At this stage, the animation has already been through video editing and received the frames’ content. Consequently, the sound part requires complete editing in accordance with the change of frames. Sound editing usually is conducted with addition and deletion work to the sound materials according to the timeline of frames’ content. Especially when there are dialogues in the animation, sound editing requires movement proofreading and timeline proofreading of characters’ mouth shapes and dialogue voices according to the content of frames.

**Final compositing**

In the final compositing stage, 90% of the animation has been completed. Here the animator will compile the video, sound, and background music. In the animation-editing phase, the animation completed the composition of frames and sound. In order to ensure the final effect of the animation, the animator checks the frames, sounds, and timeline, to avoid the frames bloopers, or the dislocation between the sounds and frames. The background music should be adjusted in terms of its location in the timeline, the emerging time and seceding time, and the sound volume in accordance with the requirements of the storyboard.

The picture effect should be considered in final composting. Pointing at the remaining blue screen shooting sections, an image is made and matting and background are composited for
this part. Then, the film color, tone, light, and shade are adjusted. In addition, any necessary special image effects in the video content are made in this stage.

The last work is the production and synthesis of creating the film title, tail leader, and subtitles in the animation. When these works are completed, the last comprehensive inspection for animation is done, and the final animation exported. Now, a stop-motion animation illustrating my own style is born.
CHAPTER 6. CONCLUSION

This article takes the individual stop-motion animation *Mr. Acephalous* as an experimental sample and explores the production process of individual stop-motion animation. It shows how to constantly experiment with and study the production process of individual stop-motion animation. I have also pointed to lessons an individual animator can draw from the mature production process and craftsmanship of commercial animation, and how to expand and replace the production process and craftsmanship according to individuals’ actual situations. Compared with a big-budget productions, team work, and the production cycle of commercial stop-motion animation, the production advantages of individual stop-motion animation production are its low costs, short production cycle, simple manufacturing process, easy-to-conduct manipulation of the whole content, and emphasis on the individual artistic thought of the animators. The production process of individual stop-motion animation is more suitable for students and individuals who study animation production. No matter the terms of the script’s content of the animation production, production process, or means of shooting, this outlined production process of an individual stop-motion animation provides a detailed creation plan and production method. If others use and learn from this production pipeline and my experimentation, it will decrease the animators’ production difficulty, provide a production base, increase the animators’ production plan selection, and offer comparative content for a new project.
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