

Effective Application of MIDI Music in Animation Works

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Abstract—Music can help render the atmosphere and characterize the characters in animation works. This paper starts from the teaching practice in MIDI (musical instrument digital interface) music production, mainly analyzes the application and production process of music in animation works, and summarizes the problems to be noted in teaching of animation music, to provide a reference for music producers in China's animation industry.

Keywords—MIDI music; animation works; music production

I. INTRODUCTION

Animation work is a branch of modern film and television works, forming a comprehensive expression of multiple professional arts. With the rapid development of multimedia technology, animation art has ushered in new development opportunities. Animation works and modern film and television works are the perfect combination of picture and sound. The sound includes speeches of characters, sound and sound effects, and can effectively highlight the storyline and perfectly get music and pictures integrated. Animation is a comprehensive art of audio-visual combination. Through simultaneous visual and auditory feelings, it forms an artistic work of audio-visual integration. Music plays a crucial role in shaping characters and promoting the advancement of plot. The production and synthesis of animation music is gradually transformed into computer music production which gets command and recording integrated and greatly reduces the production cost of animation music. Hence, it is necessary to introduce the MIDI music production method of computer music into music teaching to better achieve the combination of sound and picture. This paper mainly discusses the music forms, music composition and other contents in animation works.

II. BRIEF INTRODUCTION OF MIDI MUSIC PRODUCTION TECHNOLOGY

A. Principle of MIDI Production

MIDI is a music digital interface and a port protocol for communication between different electronic devices. It can be understood as a digital music format. If the creation of electronic music is regarded as an event sequence programming, the software and hardware used after finishing the creation is the sequencer which can be installed on a PC. The sequencer is a music processor that can record and store

MIDI messages, but cannot directly produce sound. The computer information from MIDI instrument includes instrument selection, playing strength and other instruction information to generate music. The pitches, tones, and intensity of the notes in the file can be modified later.

External MIDI instrument is connected to computer; the sequencer software generates MIDI file by editing the MIDI information. The MIDI programming process is the production process; MIDI system is for composition, and sending the digital information to the audio card synthesis chip after finishing the editing.

B. Application of MIDI Production Technology in Animation Movies

Digital audio technology has entered the field of film from the use of sampling synthesizers. Currently, most animation production companies in the world use manual drawing method. A 30 min animation program requires 300 people to draw for half a year. For example, the scene of "Abao is dreaming" in the movie "Kung Fu Panda" adopts the form of 2D hand-drawn animation. The only 2min scene was completed by more than 10 painters together for more than 3 months [1].

Due to the high production cost, few animation companies may hire well-known composers. The animation sounds are created in MIDI method by MIDI sequencer.

The MIDI function assisted music creation makes it available to play animation images in real time. In animation music creation, the creator should understand the basic music knowledge, and can provide a general idea for music creation when opening the video window play screen on the sequencer and capturing the feeling on the screen at the first time, and can enjoy the film just like normal audiences.

Using MIDI sequencer can shorten the creation cycle, and quickly implement music score printing and other operations. Using MIDI effector in the creation can get a natural musical feeling. One person can complete all the works of composition. The generated MIDI file then will undergo a series of modifications such as coordination between the voice parts, and speed adjustment.

At the time of creation, the creator can acquire creative ideas through direct playing of the music, and record a variety of music information through MIDI data, and then

select appropriate sounds from a plurality of sound source libraries to obtain timely playback effects and obtain beautiful music. The expected results of the creation can be heard in time; in need of playing magnificent sound effects, the creator can just use MIDI to get sequencer timely connected to electronic performance synthesizer and other sound sources.

III. APPLICATION OF MUSIC IN ANIMATION WORKS

A. *The Role of Animation Music*

Music in animation works is essentially consistent with that in film and television works, and mainly plays a role of rendering the plot atmosphere. When music sounds in a fixed plot, the audience can feel a story content beyond the music. For example, in the cartoon "Mulan", when the symphonic music sounds, Mulan's complex psychological activities are expressed; followed by playing of sousaphone, Mulan's psychological change process is well reflected.

Music can directly reflect the inner world of the character and show the emotion of the character. Music can be a lyrical or passionate struggle. Music can effectively supplement the insufficient vision in animation movie. Music and pictures stay in the audience's mind for different times. The sound is often more memorable and more easily spread in the social environment. Animation music is very helpful for promoting the animation itself. For instance, when hearing the song "365 Days Missing You", people may recall the storyline of "The Lotus Lamp" and may naturally associate with excellent domestic cartoons.

B. *Composition of Music in Animation Works*

Music in animation works includes songs such as theme songs that can express certain story content, and pure music such as theme music that can render the atmosphere. Theme song is a high generalization of the animation story. The theme song at the end of a film is mostly the summary and upgrading of the story. Theme song has a close relationship with the story, and plays a role of characterizing the character's personality and highlights the atmosphere of the story. Excellent animation works must have excellent theme songs, harmonious and unified with the theme music to sublimate the works.

Interlude song is an important part of the animation work. It appears in a specific time period according to the storyline to express the emotions of the characters. In case where narration cannot be used for the explanation, it is available to use music to express the content and use interlude song to support the story content.

Theme music is similar to the theme song. But theme music is pure music, and may appear in a work for many times, leaving a deep impression on the audience. In order to serve the story plot, sometimes it is needed to make reasonable adjustment on the strength of the music. Theme music may make the audience resonate with the work, so that when the theme music is heard, the audience will think of the story content.

Scene music usually does not express a lot of thoughts and emotions. An excellent animation work may have several pieces of scene music. Background music is a relatively fixed sound that is emitted at a specific place, and must be consistent with the sound in real life, so that audience can have a feeling of presence at the scene.

C. *Production of MIDI Animation Music*

Animation is a comprehensive art combined audio effect with visual effect, and is an audio-visual integrated art work with perfect combination of sounds and pictures. Music plays an important role in character shaping. The production of animation music is gradually transformed into computer music production, which greatly reduces the cost of music production. The introduction of computer music MIDI music production techniques into animation music creation can better achieve the combination of sounds and pictures.

MIDI is the application of computer multimedia technology in music. The MIDI system includes synthesizers, audio source MIDI cables and other devices. It can turn the sound information of keyboard instruments into digital information and stored onto computer. MIDI system is a composing and playing system that can transmit digital information to the synthesized chip of the audio card, and generate analog audio signal, then sound through the speaker. The application of MIDI technology makes the creation process simpler and makes creator available to acquire inspiration by direct instrument playing.

MIDI music production can start with the appreciation of excellent works, and master the basic MIDI music production methods by simulating the music segments in excellent works. MIDI production techniques can be combined with audio processing technology to combine the production of animated soundtracks and music editing together. Taking the animation movie "Frozen" as an example, the production steps are as follows: first, learn about the MIDI device, use V's plug-in soft sound source for soundtrack skills, and know about the importance of soft sound source in MIDI production, demonstrate how the cubase software uses digital audio processing technology to create special effects, and further understand the development of the animation movie and the sound effect production process. On the basis of the game background music, MIDI music and sound effect are produced and MIDI music and sound effects are produced, and the application of MIDI music production in the animation soundtrack is completed.

The orchestration combines several instruments to form a melody. There is harmonic music, or music with no obvious melody lines, and those with strong rhythm. Selecting different instruments for the animated soundtrack will produce different emotional colors. In order to make the way with characteristics, Chinese animation must break the thinking mode of imitation. In aspect of music orchestration for animation works, it is possible to select local musical instrument of China. Many Chinese musical instruments such as erhu, Sanxian, and zheng cannot be imitated by Western musical instruments in terms of the tone. China has

made some animation music of the national characteristics, such as the drama music in "The Monkey King", and the Southern folk music in "The Cowherd's Flute".

Using the sound source Vs plug-in of MIDI software can imitate a lot of sound effects to dub an animation work. Simulated sound refers to the sound produced similar to that in real life by collecting sound in real life via sampler and getting the sound processed and collected via some software. This way can greatly improve the efficiency of animation dubbing.

IV. PRODUCTION OF ANIMATION MUSIC

A. *Music Skills in Animation Works*

Plot music is a melody sent by animation characters. It can highlight the inner feelings of the characters, and can show the story plot, such as the illusory characters singing; plot music can give audience a real feeling. Painting music is not necessarily related to the characters in the animation, is not involved in the development of the story plot, and has nothing to do with rendering the atmosphere of the plot. Painting music is a separately produced music that is blended with the plot through post production.

Sound and picture synchronization is an audio-visual feeling for highlighting the story content based on the needs of the animation plot. In a sad plot, the emotion is expressed in sad melodies, and the plot and music are mixed in the same atmosphere.

Sound and picture asynchronization is not common in animation works. This method is difficult to use. It mainly highlights the content of the story by using music different from the atmosphere of the plot. Appropriate appearance of this asynchronization can bring strong visual impact to audience [2].

Music switching refers to the music played when switching to different angle of vision in in different scenes. When switching the angle of vision, a smooth transition can be realized by music in order to avoid audience from seeing the over strange switching effect. Music switching is a means to make up for visual loopholes.

Sound effect is added to support the plot expression. The story plot served by appropriate sound effect can create a real scene, and produce a strong effect of auditory impact.

B. *Music Production in Animation Works*

The music production of animation works needs a careful preparation. The creator must first understand the context of the storyline, analyze the psychology of the characters, and determine the theme song and the main music style through an analysis on the content. Secondly, the creator should explore the characteristics of the animation work, and make appropriate music in combination with the characteristics of the animation work. Animation work should not abandon the national cultural elements. Only if an animation work is integrated into the national culture can it be available to meet the aesthetic needs of the audience.

Again, orchestration should be conducted on the melody; the animation music orchestration process should be suitable for the characteristics of the animation work. When making animation music orchestration, the composer should consider the characteristics of animation works.

At the same time, sound effects should be produced in the soundtrack of the animation work. If an animation work is shot abnormally, almost all the scenes need to be produced with applicable sound effects, and the sound effects of the animation work should highlight the authenticity. By real sound effect, it is possible to make up the visual feeling that false pictures may bring to the audience.

Finally, it is to do post-production of the animation work; the post-production is usually completed according to the personal feelings of the musician, and reflects the musician's understanding of the story and other content of the animation work. Animated music production requires for a lot of repetitive work, needs a united team to work together, and requires a team with members having rich knowledge of composition theory and clever innovative thinking.

V. PRODUCTION EXAMPLES OF ANIMATION MUSIC

A. *Theme Music of "Spirited Away"*

Any type of music creation generally includes many steps such as melody writing, rhythm application, and tone regulation. In animation film music creation, the music creation also includes those steps. The creation of animation music has unique characteristics, compared with other musical works.

The world of images conveyed by animation is not surely objective and true. There are usually many fictions in the storyline. Because of its special way of art expressing the objective world, the requirements for the sound part are higher than those for ordinary movies, such as the Japanese animation movie being granted the Golden Bear Award "Spirited Away". Through clever use of music, the imagined things in the work are accepted by the audience. Due to the "authenticity" requirement, feature movies are restricted in sound production; however, animation has few restrictions in sound production and thus has larger space for imagination.

The use of music synthesis technology in animation creation has improved the creation efficiency of animation movies. MIDI technology has been widely used in the creation of animation movie music, which makes music creation easier; meanwhile, electronic synthesizer technology produces tones; the convenient technology provides support for existence of virtual things [3].

B. *Production of the Theme Music of "Spirited Away"*

MIDI technology is used to simulate the theme music of the animation movie "Spirited Away". This indicates that MIDI can quickly produce the same tone as piano. "Spirited Away" is an Oscar-winning masterpiece created by Hayao Miyazaki. The story tells an experience that Chihiro and his parents broke in the world where ghosts and spirits rest; they experienced an adventure of friendship and seeking for

spirituality and finally returned to the world of human beings. Joe Hisaishi is responsible for the music creation of the work; in the theme, he uses delicate keys to try to figure out the emotional world of Chihiro. The picture below is the little climax of the music; the sound of the music is simulated by using the MIDI's sequence function (see "Fig. 1").



Fig. 1. Piano fragment in the theme music of "Spirited Away".

The simulation steps are as follows: first create a new MIDI track, and then select the tone of piano. In this research, Classic Piano is selected as its tone is warm and clean. This music adopts the scale of F: open the reel shutter window and write notes, get the piano segment audio of the theme song. This piece of music needs to be modified in post-production stage (see "Fig. 2").

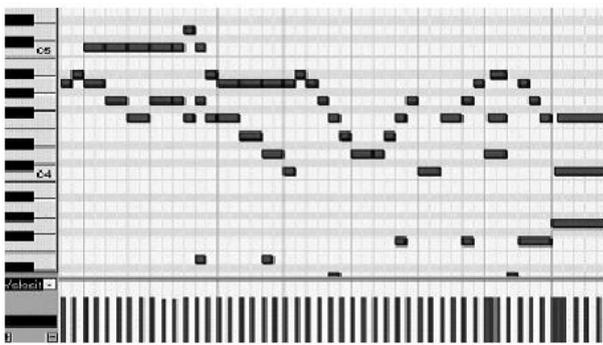


Fig. 2. Note writing diagram in the roller shutter.

In post-production, the melody is separately modified in emotional expressions such as volume. The overall volume is changed to 99, and a slight adjustment is made on the intensity and expression. The following steps are conducted on the added sound source plug-in: adjust the parameters of Reverber to 89, change the value of Comp to 49, reduce the value of the threshold, and reduce the smashing detonation frequency sound [4]. (see "Fig. 3")



Fig. 3. Adjustment of parameters in the audio plug-in.

Further, the following steps are conducted: get the audio of the simulation test on the piano piece of the theme song of "Spirited Away", and cut out the same paragraph of the original music. The first audio uses good sound source, but has strong electronic taste; the second audio is has similar authenticity feeling with the third audio.

By using an advanced MIDI software library, it is possible to easily complete the creation of music, programming, and the setting of rhythm speed. The application of MIDI technology reduces the creation cost of music, shortens the working time in studio, and makes the realistic production effect. Due to the openness in creation of animation sound, it becomes very necessary for the creator to enhance the sound to important position at the beginning, express music through synthetic sounds, constantly improve new sound requirements, master the sound production technology, and get the sound produced used in the animation movie in a rational way.

VI. CONCLUSION

The animation music industry has a bright future. China's animation film and TV industry must make in-depth research on the composition and highlight the national characteristics, in order to create more excellent animation works and promote the rapid development of animation industry in China.

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