Application of String Music Source in Musical Instrument Digital Interface Production

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Abstract—**Musical Instrument Digital Interface (MIDI) is the use of a sequencer and some composition software for music production. It is a basic communication protocol between music devices and conforms to the international industry standard. MIDI is a combination of electronic technology and music. After more than 20 years of development, MIDI has achieved remarkable achievements. MIDI gradually permeates daily music cultural life. MIDI is no longer a simple music form or sound, but has an important role. In practice, as a digital audio source, MIDI is divided into orchestral and electric vocal music. Compared with electric vocal music, orchestral music has a complex structure, a large performance lineup and a stronger music performance. Orchestral music is used as background music in many movies, TV shows and large-scale musical and dance plays, which plays a significant role. This paper mainly discusses the application of orchestral sound source in MIDI production.**

Keywords—MIDI production; string music source; application skills

I. INTRODUCTION

String is important in MIDI production, and one of the most difficult to simulate. The production of string part should not only understand the traditional instrument method accurately and carefully, but also be familiar with the selection and control of sound source. One of the important decisive factors of simulation degree is the selection and control of audio source. With the continuous development of science and technology, the competition between audio source manufacturers is increasingly fierce. The volume of string music source is increasing, and the timbre is more simulated. But there is no string music source that can meet all the production needs. Strings are very complex and special. The use of multiple strings in aliasing can make full use of the advantages of different strings. In the actual production process, some large orchestral music sources are directly superposition and used, which is not in line with the actual number of performers, and the concert is excessively hypertrophic. According to the number of players, a small compilation of audio sources can be used to form a large compilation to improve the timbre and achieve the simulation effect. In addition, the author can choose more in the application compilation.

II. THE SELECTION OF STRING MUSIC SOURCE IN MIDI PRODUCTION

Timbre and performance technique are two problems to be considered when selecting string sources. Music needs to consider the degree of integration with other audio sources, whether there are multiple microphone samples, recording sound field and so on [1]. In terms of playing techniques, it is necessary to consider the richness of short-tone techniques, the controllability of string-rubbing, the fluency of legato techniques, the number of repeated homophonic samples, and the natural degree of dynamic transition and so on. The above details are the issues that need to be paid attention to and considered when applying multiple string music sources [2] [3]. For example, two string sources are selected, namely Spitfire Audio BML SABLE and AudioBro LA Scoring Strings 2, and each string source has its own characteristics. Spitfire Audio BML SABLE has four sound pickup sampling methods, including Decca tree, medium, near and far. The timbre is delicate and three-dimensional, belonging to the small string music source. But it is not natural to match the legato technique of dynamic control. The staffing system of Spitfire Audio BML SABLE is as follows: three for double bass, three for the cello, three for the viola, three for the second violin, and four for the first violin. AudioBro LA Scoring Strings 2 has meticulous grouping, dynamic control and natural and smooth legato techniques. However, the timbre lacks spatial sense and has dry effect. AudioBro LA Scoring Strings 2 contains samples of many players. As for double bass, one chief, one second chief, two for Group A, two for Group B, four for Group C, and eight for ensemble. As for cello group, there is one first chief, one second chief, three for Group A, three for Group B, four for Group C, and ten for ensemble. As for viola group, there is one first chief, one second chief, three for Group A, three for Group B, six for Group C, and twelve for ensemble. As for second violin group, there are four for Group A, four for Group B, eight for Group C, and sixteen for ensemble. As for first violin group, there is one first chief, one second chief, four for Group A, four for Group B, eight for Group C, and sixteen for ensemble. With Spitfire Audio BML SABLE and AudioBro LA Scoring Strings 2, one can combine strings of different configurations, including double or single. These two kinds of string music sources all have the comprehensive performance technique, and should avoid playing at the same time.

III. MATCHING OF STRING VOLUME IN MIDI PRODUCTION

Different sound sources may cause the volume mismatch. Therefore, in the process of MIDI production with multiple string sources, volume matching is required. For example, the same four violins are played by the same artist with the same strength and technique, but the playback volume will vary depending on the sound source [4] [5]. Volume matching requires proper calculation. For example, in the AudioBro LA Scoring Strings 2 series, second violin group A, one chief from second violin group, and three from the second violin of Spitfire Audio BML SABLE were selected to form the second violin group which has eight members. At this time, volume matching was needed. Decibels are introduced to describe volume. Decibels are commonly referred to as dB, a measure of sound intensity. The number proportion of two identical units is superimposed according to the logarithm law to obtain the value of dB. Assuming that A is the value of dB when N violins are played at the same time, the values of dB that need to be superimposed are L1 and L2. The calculation formula is as follows:

$$L = 10 \bullet \lg \left(10^{\frac{L1}{10}} + 0^{\frac{L2}{10}} + \cdots \right)$$

. Three persons in the second violin group of Spitfire Audio BML SABLE, together with second violin group A and one chief from the same group of AudioBro LA Scoring Strings 2 will play the same pitch and adopt the same strength and playing technique to obtain the relationship of the corresponding volume. The volume of the three persons in the second violin group of Spitfire Audio BML SABLE was 1.23db lower than that in second violin group A of AudioBro LA Scoring Strings 2. The volume of one chief from second violin group A of AudioBro LA Scoring Strings 2 is 6dB lower than that of second violin group A of AudioBro LA Scoring Strings 2. In practice, it is difficult to determine whether the performance strength of different sound sources is consistent due to different production of sound sources. Therefore, people often take the maximum dynamic to trigger all sound sources. String sources with different heads and bows cause delayed matching [6] [7] [8]. The delay varies with the sound source. The right amount of relative delay will increase ENS envelope sensation of the sound source. Delay matching needs to be adjusted according to the author's hearing.

IV. MODULATION OF STRING SOUND FIELD IN MIDI PRODUCTION

The sound field always exists in the recording process of sound source, but the degree is different. Therefore, it is necessary to unify the sound field between different sound sources. In MIDI production, it is necessary to consider stereo width, reverberation, panner, and be familiar with the sound field characteristics of the sound source. For example, combine four persons from the first violin group of Spitfire Audio BML SABLE with four people from the first violin group B of AudioBro LA Scoring Strings 2. In terms of reverberation, the first violin group of Spitfire Audio BML SABLE is more backward and deeper. AudioBro LA Scoring Strings 2 is more forward and the sound is dryer. In

terms of acoustic image, the first violin group B of AudioBro LA Scoring Strings 2 is relatively narrow, while the first violin group B of Spitfire Audio BML SABLE is left, which can supplement the sound field. In terms of stereo width, the first violin group of Spitfire Audio BML SABLE and the first violin group B of AudioBro LA Scoring Strings 2 can make adjustments based on the existing conditions. Different sound sources are made in different tracks to achieve the purpose of enhancing strengths and avoiding weaknesses [9] [10] [11]. Some legato techniques of Spitfire Audio BML SABLE may be unnatural, so AudioBro LA Scoring Strings 2 can be used for mixing. In legato, AudioBro LA Scoring Strings 2 can be highlighted. There is no marcato technique in AudioBro LA Scoring Strings 2, so it can only imitate dynamic enveloping prolonged sound. It's possible to mix it with Spitfire Audio BML SABLE and highlight Spitfire Audio BML SABLE slightly when marcato techniques are needed to increase the strength or volume. Spitfire Audio BML SABLE has excellent sound field and tone, which can also make up for the defects of AudioBro LA Scoring Strings 2.

V. APPLICATION OF MIDI SOUND SOURCES AND STRING TECHNIQUE

A. Application of MIDI Sound Sources

MIDI sound sources do not have strict requirements on computer performance during data transmission, and its transmission storage is relatively low. In data transmission, the amount of data in the computer, MIDI audio source storage and transport are relatively small. A one-minute MIDI music file takes only 2KB. One-minute stereo digital audio files need only 10 megabytes of storage space. In practice, the application of MIDI sound source is relatively simple, and is not demanding on equipment and field. The MIDI sound source and MIDI sequencer required for music transmission can reduce the cost of orchestration and composition. As a music director, people can use the computer or keyboard in studio to input different parts of the MIDI sequencer on the recorder, so that they can record in any space. The design of MIDI program is as follows: according to the required speed, rhythm, and relevant measures and indicators, based on MIDI instruction control, it is converted into MIDI control language. Specific time point, intensity or timbre specified in performance, are also considered. MIDI can be used to simulate electroacoustic music and the music of related instruments. To some extent, MIDI audio source technology effectively improves the work efficiency and reduces the cost of music creation, which has important practical value.

MIDI audio source technology supports many information contents, including sequence, beat, track structure, song and so on. Standard files for MIDI sound source technologies cover different related events such as time information, as well as MIDI blocks. The MIDI sound source technology and its associated information can be used to store track names and associated descriptive information together. High-efficiency MIDI can decompose the 8-bit binary data block of MIDI audio source technology into 7-bit

data, which can be passed to binary files, translated into relevant text files, or converted into other relevant ASCII modes.

There are many strings in the market, some of which are in the form of symphonic synthesis, some of which are packaged as the sound source independently. This paper mainly proposes several kinds of strings with classical meanings. Hollywood strings serve as an important change in the field of music composition and an epoch-making symbol. For the first time, Hollywood strings allowed players to control the position of their fingers, giving them more control over the tone and performance. Strings perfectly blend conventional and unconventional techniques, interval techniques, such as bow changing, portamento, legato, etc., and are free to adjust the size of trill. All string groups are sampled in a wide range. The Edirol HQ Orchestral is familiar to those who are in the introductory stage of orchestration. The Edirol HQ Orchestral has excellent timbre and a miniature orchestral source. It is small in size. Compared with the large-scale solid sampling audio source, the fidelity of strings is not enough, but it is easy to use, simple to operate, and good for new arrangers. The timbre of Cinematic Strings is exquisite, full and powerful, and basically covers all the mainstream performance skills. Cinematic Strings are a group of super audio source. It is designed for movie music, TV and video games. People can choose the right sound source to make strings according to needs.

MIDI sound sources are widely used in practice. MIDI audio source has two modes: software and hardware, which are the basic components of MIDI production. Currently, MIDI audio source software is widely applied. Currently, orchestral MIDI audio sources are developing rapidly, such as DimensionStrings MIDI multi-dimensional strings and Hollywood MIDI audio source series, with good performance and relatively high technical standards [12] [13] [14] [15]. If there are some advanced MIDI audio source software in the computer, MIDI audio source can be used to arrange programs, create music, coordinate various sound parts, adjust music, and control reverberation. MIDI audio source is used to perform the instrument, and music data communication media is formed according to its standards. MIDI audio source function is used to assist music creation. MIDI audio source can connect electronic drum machine, electronic synthesizer, correlation sequencer, etc. It can also store and process keystroke data and simulate different sound effects. The application of MIDI audio source can enhance the performance and improve the performance effect of music. MIDI audio source technology is the intersection of music and computer, which has a profound influence. Electroacoustic MIDI sound source is mainly bass MIDI sound source, drum MIDI sound source, guitar MIDI sound source, etc., which is the basic sound source software of electroacoustic band. Synthetic MIDI audio source, also known as synthetic tone, uses FM technology to play a variety of musical Instruments. At present, there are few MIDI audio sources in folk music, which are mainly influenced by the development factors of folk music. EthnoWorld 5 MIDI audio source samples many folk instruments around the world, and there are much different and rich music content.

B. String Techniques in MIDI Music Production

Strings used in popular music are mainly ornamented notes, bottoming and solo. Cello or violin is mostly used in string solo. The two instruments have distinctive timbre. They are usually used in prelude and interlude to express a specific emotion, such as sadness. Strings ornamented notes are often used at the end of music. String music is expounded in one sentence, which forms a series in the voice and promotes the progress of music. The most commonly used is the bottoming of strings. This paper introduces several new methods which are different from the traditional arrangement. The first is pizzicato. Many people use pizzicato for strings bottoming with only one track. Many people think that the string pizzicato written with 1 track has no texture, and the sound is boring and not authentic enough. The main reason is the lack of tone overlay. String pizzicato usually superimposes two or more sources. For example, a Viennese string, superimposed with a film string, is a relatively simple form. People can also use the gold or platinum edition. Be careful not to add platinum edition alone, but to add reverb to the output of the final string channel. According to the sound part, divide the two overlapping tracks and assign them to each violin, so as to realize the simultaneous playing of the separate tracks and the overall superposition of the two, and carry out the pizzicato of strings. The pizzicato effect will be more real and the ENS envelope sensation will be more gorgeous. Secondly, on the whole, the arrangement of strings requires dense at the top, scanty at the bottom, and no empty at the middle. But in some arrangements, the tone of cello is mixed, while that of violin is floating. In order to prevent the violin sound from drifting, people should add an octave in the arrangement of music, and overlay the violin melody for performance while grasp the region of articulation at the same time. The violin is a high-pitched instrument, which can be superimposed to optimize the high-pitched performance of a single line. When arranging with cello and double bass, the sound is blurred, so the bass texture can be modified. Cello and double bass mainly control the direction of melody and are responsible for the bass part. Long tone is enough, and thick and cloudy bass areas do not need ornamented notes. Third, avoid fights at the same frequency. The most important function of string group in pop music is bottoming. Therefore, it's needed to avoid overlaying and overfilling in the process of arranging music. In the popular music, bass is one of the four big pieces, responsible for the bass section. Cello or double bass can only be one or the other. If both are added, the thickness of the bass will be increased and affect the tone. For example, in the arrangement of The Longest Movie, the string group only employs double bass, viola, violin one and violin two, and the cello part is replaced by bass.

VI. CONCLUSION

In a word, professional music production is a systematic and comprehensive project. Many music producers actively

explore new production technologies to improve the quality of music. In order to improve the performance, sound field and timbre of music, multiple strings can be used for aliasing. The production of MIDI strings requires an understanding of strings and string bands, proficiency in software skills and relevant professional knowledge, and accurate grasp of each production link, so as to improve the sound effect.

REFERENCES

[1] Wang Yifeng. Comparison and Selection of Several Mainstream String Music Samples in Music Production — Based on KONTAKT Platform [J]. Modern Music. 2018(1):129-130. (in Chinese)

[2] Li Zezhao. On the Production of String Music Parts in MIDI Orchestral Production [J]. Northern Music. 2017, 37(18): 48-49. (in Chinese)

[3] Ding Xiaojun. On the Development of Sampling Sound Source of MIDI Orchestral Music from the Perspective of "Humanization" [J]. Music Work. 2018, 324(08): 177-179. (in Chinese)

[4] Ren Hongjun, Li Bin. The Use of MIDI Controller in Music Production — Taking the Theme Music of the Pirates of the Caribbean as an Example [J]. Art Education. 2019, 344(04): 81-82. (in Chinese)

[5] Zhang Zhongcan. The Use of MIDI Control Information in Music Production [J]. Journal of Wanxi University. 2018, 34(06): 154-158. (in Chinese)

[6] Cao Zhengjue. Using Automation Technology to Mix MIDI Music Production [J]. Music Space. 2015(18):100-100. (in Chinese)

[7] Li Zhi, Tan Bocai. The Application of MIDI Music Production System in the Teaching of Music in Normal Universities — and the Research of Music Microteaching [J]. Northern Music, 2014(10): 89-90. (in Chinese)

[8] Wang Chunming. Application of Controller in MIDI Music Production [J]. Journal of Hotan Teachers College. 2006, 26(5): 188-189. (in Chinese)

[9] Fu Tao. On the Use of String Groups and Common Instruments in MIDI Arranger of Pop Songs [J]. Songs Bimonthly, 2007(6):8-9. (in Chinese)

[10] Chen Yajie. A Brief Discussion on the Influence of Digital Audio Reverb Technology on the Production of Orchestral Music — Taking the Work "Pastoral" as an Example [J]. Prose Hundred. 2016(4):26-26. (in Chinese)

[11] Song Xiangyang. The Use of Timpani Timbre in MIDI Arrangements [J]. Northern Music, 2016, 36(12): 183-183. (in Chinese)

[12] SHI Fengkai. Research on Orchestration Technique of Simulated Orchestral Writing in Digital Sound Synthesis Environment [J]. Music Work. 2015(9):137-139. (in Chinese)

[13] Zeng Lin. Discussion on MIDI's Influence on the Traditional Music form and its Manifestation [J]. Stage. 2010, No.267(8):110-111. (in Chinese)

[14] Zhang Zhongcan. The Use of MIDI Control Information in Music Production [J]. Journal of Wanxi University. 2018, 34(06): 154-158. (in Chinese)

[15] Tian Fei. On the Application of MIDI Technology in Traditional Opera Music Production [J]. Art Science & Technology, 2013, 26(5): 372-373. (in Chinese)