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Research on the Diversified Application and Innovative Exploration of Computer Music Technology in Music Creation Practice

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Abstract: *In recent years, composers have continuously explored new creative themes and performance forms, and the development of computer music technology has brought new breakthroughs to composers' musical thinking. Computer technology can digitize sound and enrich the expressive power of works.This article explores the application of computer technology in music creation.The article first explains the connotation and advantages of computer music technology, and then analyzes its application strategies in music creation, as well as innovative paths in the new context, in order to provide a reference for future music creation practices.*

Keywords: *computer music technology; Music creation; Application and Innovation*

1. Introduction

Computer music technology originated in the 1960s, when composers used computers to create programs that could generate musical factors such as pitch, timbre, and rhythm, and then assisted composers in music composition. With the continuous development of music technology, the emergence of synthesis technology, digital interface technology, and various music software has made computer music technology play an important role in music creation. With the development of music creation, both creative concepts and methods should keep up with the times in order to produce higher quality music works that meet the aesthetic needs of the masses in the new era. Therefore, this study investigates the practical applications of computer technology in music creation.

2. Overview of Computer Music Technology

In a broad sense, computer music includes all music related work and activities carried out using computers or digital circuits centered around computers; Narrowly speaking, computer music only includes computer music works. In short, computer music is a type of music that combines the digital interface system or digital audio system of musical instruments through production, synthesis, and recording based on computer technology. Throughout the development of computer music, it can be roughly divided into three periods: the electronic era, the synthesizer era, and the computer era. The core technology of this system includes two aspects: first, the digital interface technology of musical instruments. The digital signal recorded in the instrument digital interface file can control the tone, rhythm, intensity, etc. of the sound source, and transmit the digital signal to the corresponding electronic device through the device interface, and convert the sound into the corresponding sound through the sound circuit. Another type is digital audio technology that directly processes sound through a computer. For example, after converting the digital interface signal of an instrument into a digital audio signal, the music can be down mixed, synthesized, or added with echoes in the later stage. It is also possible to record human voices, instrument sounds, and various natural sounds.

3. The advantages of computer music technology in music creation

3.1 Operability

The creative techniques of computer music are drawn from traditional creative methods, but their creative concepts are very different. In traditional music composition, composers first create melodies, followed by arranging and arranging harmonies. For example, when composing, composers must express

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all sound effects in their own minds; After the full score is completed, specialized personnel need to be arranged for rehearsal. During the rehearsal, the composer needs to communicate with the members and conductor of the orchestra and record only after achieving satisfactory results, which involves many uncertain factors. In sharp contrast, the use of computer-generated music allows creators to independently perform tasks such as creating, conducting, playing, and recording. In this way, the creator can adjust the intensity, length, speed of notes, etc. of the music according to themselves wishes, to ensure that the music is exactly the same as what they wants, that is, the perfect combination of composition and playing.

3.2 Visual and auditory properties

Take piano composition as an example. In traditional music composition, creators only perceive the sound of music by playing the piano. Even a composer proficient in piano would find it difficult to imitate a large orchestra. Sometimes, composers feel great while playing, but they may have various flaws when accompanied by an orchestra. In contrast, composing music based on computer music technology can provide creators with more intuitive and comprehensive sound effects. During the creative process, creators can listen to music at any time, and if there are any unsatisfactory aspects, they can make modifications and optimizations, and then continue to make modifications, ultimately obtaining a song that the creator considers to be "perfect". When creating film and television music, composers also need to ensure that the speed, volume, and other aspects of the music are coordinated with the video footage, storyline, and other elements to achieve synchronization of sound and image. This creative approach not only provides better audio-visual effects, but also facilitates music creation.

3.3 The Diversity of Music Colors

For traditional composition, the choice of instruments is very limited. For example, when creating a symphony, one can generally only choose brass, woodwind, and some common vocal instruments such as string instruments, percussion instruments, and ethnic instruments. This limits the creator's inspiration and affects the creative effect of the music, which is not conducive to the richness and variation of music colors. In contrast, music creation based on computer music technology not only allows for the use of traditional instruments, but also allows for flexible selection of electronic instruments, synthesizers, and other new timbres such as electronic timbres and synthetic timbres. In addition, some composers with rich creative experience and skills can also create the sound they want on the computer according to their preferences, which can enrich the color of the music. Like wind, rain, water, insect chirping, bird chirping, and so on. It can be said that the application of computer music technology has broken through the traditional concept of sound in music creation and has epoch-making significance in music creation.

3.4 Diversity of Music Styles

Applying computer music technology to music creation can create different types of music styles, such as the modern feel of popular music, the technological feel of electronic music, and the solemnity of symphonic music. This type of music work created based on computer music technology can reflect its distinct and diverse music styles, both in terms of art and sound effects. For composers, as long as they have creative inspiration, they can use computer music technology to create the desired music style according to their imagination, truly achieving the goal of "what you think is what you get". It is precisely because computer music software can create music works with different styles that this technology is often applied in the production of movie music.

3.5 Simplicity of spectrum making

In previous music compositions, writing a score not only required a lot of time, but also because countless scores contained a large number of notes, an accidental mistake could result in incorrect notes. At this time, the creator needs to constantly erase and modify them, which can cause some fleeting music creation inspirations to dissipate in the process, seriously affecting the creator's creative efficiency and quality. The production of music scores based on computer music can not only alleviate the burden on creators, but also allow them to fully immerse themselves in music, improving creative efficiency and quality. For example, when you use computer music software to compose music, your score can be played simultaneously with you, allowing your composer to also hear the corresponding sound effects. With the help of computers, composers can fine tune their scores according to their preferences, greatly simplifying the process of composing.

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4. The Application Direction of Computer Music Technology in Music Creation

4.1 Application in modern music works

The current understanding of modern music works can be mainly divided into two aspects: first, some popular music in the current era, and second, broad modern music concepts targeting the classical music system. In the development of modern music, the entire music system has incorporated many new contents and elements, making modern music creation more flexible and forming a diversified music system. In this context, the content that needs to be paid attention to in the process of creating modern music works will become more diverse, which brings great difficulties to the music production process. But if computer music technology is used, tools such as synthesizer software and sound generator software can be integrated into the production process of modern music works, significantly expanding musicians' creative ideas and providing more interpretations for modern music works.

4.2 Application in film, television and music works

The film and television art itself has many elements of human integration, which not only contains the essence of many arts, but also constantly innovates and evolves over the years of development. The music used in film and television artworks needs to maintain a good fit with the work itself, while also fulfilling important functions such as lyricism, drama, and atmosphere setting. In the traditional music creation system, a large amount of resources are required. But with the use of computer music technology, the cost of creating film and television music works can be significantly reduced. Only a senior musician is needed to complete multiple stages such as music composition, performance, and orchestration, significantly shortening the time for music creation. At the same time, it can also achieve the integration of diverse music systems.

4.3 Application in electronic music works

Electronic music is mainly a type of music produced and processed using electronic devices, which has many connections with computer music technology, but also has certain differences. From the perspective of development process, electronic music can serve as a precursor to computer music technology, which is one of the main products of the digital development of electronic music. The use of various computer music technologies in the process of creating electronic music works can make the sound of electronic music more distinctive, and has a very broad application prospect in future development.

5. The Application and Innovation of Computer Music Technology in Music Creation

5.1 Using computerized notation software for music composition

Music score creation is a specialized skill that musicians must master, and in the past, music scores were mostly manually copied by composers. During this process, errors such as note errors, rhythm and beat errors, strength terminology, and speed terminology may occur. This is a very troublesome matter for musicians and those who study sheet music, so how to make the production and preservation of sheet music easier has become an urgent problem that needs to be solved. With the rapid development of computer technology, the method of sheet music notation has shifted from manual handwriting to computerized notation, especially in recent years with the popularity of various computerized notation software, which has gradually become mainstream. Sibelius is a fully functional, widely used, and best human-computer interaction computer music software. This system realizes intelligent recording of music scores, as well as scanning and recognition of music scores. In addition, due to its easy operation and ease of use for beginners, this system has also been widely used in music schools. This article takes Sibelius as an example to explain how to use computer music score software to complete the production of music.

There are many shortcuts in Sibelius notation software, and if you can accurately remember and proficiently use them, it can greatly improve the efficiency of composition. For example, when creating traditional manual scores, composers spend a lot of time writing connecting notes, rest stops, coda, bar lines, and so on. With this software, various symbols can be added to music scores, which is a very effective method. Especially for certain large-scale music pieces, the application of notation software will be more convenient and efficient. Moreover, Sibelius notation software is compatible with traditional

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electronic devices, as long as the digital interface of the instrument is connected to devices such as electronic pianos, the composer's inspiration can be converted into music through a keyboard. Unlike previous composers who played in front of the piano before stopping to record, the use of notation software makes composition easier and more efficient. For those who lack music theory knowledge and creative experience, with the assistance of notation software, they can automatically combine different pitch values, divide rhythms, and assign voice parts based on their understanding of music. The Sibelius notation software greatly reduces the difficulty of composition and is also a great choice for beginners. When composing or inputting music, the Sibelius notation system will synchronize the recorded score with the score for playback, allowing composers to edit while writing, greatly improving the efficiency of composition and the quality of the music. In addition, this software also has a free music library that allows composers to combine according to their own needs to achieve better performance effects. The Sibelius notation system can be modified online, avoiding the drawbacks of previous composers constantly modifying on paper, while also reflecting the advantages of paper conservation and environmental protection.

5.2 Intelligent generation of music clips using music software

Computer music technology also plays an important role in its intelligent generation of music. Taking the commonly used artificial intelligence virtual artist software as an example, this is an interactive software specifically designed for creating sound and media, which can assist users in constructing timbres and completing program design through connecting graphics, object execution algorithms, etc. In addition, the addition of various instrument components and electroacoustic modules allows users to directly use them to complete sound effects programs during creation. It is widely used in the creation of electronic music and popular music. Please note that the software automatically generates a completely random and predictable piece of music, therefore there is significant uncertainty and non repetition in its works. Of course, this also has limitations. Unlike traditional music creation methods, using this software to intelligently process music can make it more artistically unique. Designers need to set specific rules in the software in advance, such as the scale, timbre, rhythm, density, etc. in a certain cycle. After the design is completed, as long as the software is run, the computer can generate melodies, textures, and timbres freely within the framework. Due to its arbitrary composition, the music it creates has unique personality traits.

The workspace of artificial intelligence virtual artists includes multiple functional modules such as icons, information, deformations, and scrollbars. With this music software, composers can easily adjust the volume and tone, and every time they make an adjustment command, they will receive timely modifications, greatly improving the efficiency of creation. Of course, there are also certain limitations when using this software for music creation. For example, the generated music sequence has a certain degree of randomness, resulting in poor correlation between sounds, and many phrases and segments have certain deviations from people's listening habits. This requires composers to constantly learn and process their own life experiences in order to achieve better results. Especially in the use of Chinese folk music programs, due to the fact that the pentatonic scale is based on the law of pentatonic harmony, the pitch cannot be set according to the rule of the twelve tone temperament. In this situation, it is impossible to use computer music software to automatically generate songs with Chinese ethnic characteristics. It takes a long time to process these segments and achieve the desired sound effects[1].

5.3 Using post Music software to polish the works

The first draft of the music can be successfully completed by using the score making software, so as to ensure the authenticity of the music. In the practice of music arrangement software, composers can more easily arrange, arrange and digitally produce music. Many professional music creation software have strong editing ability, which can ensure that the re creation process of works can be carried out smoothly. Whether it is a single part creation or multi-part creation, it can combine virtual instruments with real music, and carry out good composition through computer music technology. At present, this production method is widely used, and many film and television works use this method to make music. Through the study of composition software, it is found that most composition software has good performance in the aspects of sound sequence, sound editing, multi track recording, video score and so on, and ranks in the forefront of the world. In the creation of digital music, creators can choose the most suitable creation method according to their actual needs, and also support data transmission special effect plug-ins and soft sound sources, making the sound quality of soft music also very good, which can truly meet the needs of beginners. Compared with other music production software, the biggest advantage of

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Apple music is that it has its own sound source, which is very convenient to use. From the perspective of percussion music, there are many percussion music rhythms in Apple's music applications, and creators can adjust their speed and intensity according to the style and mood of the music. Apple music can score music for musical instruments and sounds. Compared with the score making software, the advantage of the software is that it can load soft sound sources, so that the producer can choose the most suitable sound from a large number of sounds. In the works, electronic timbre and natural timbre can be used, which can ensure that the works are richer and better express their thoughts and emotions. In addition, the use of it can ensure that the processing of works is more detailed, and adjust the speed and intensity of sentences when necessary according to the actual needs. In addition, it can also be processed according to different musical parts to ensure compliance with performance habits. For example, in actual performance, a string bow can effectively deal with the strength of music. The lower bow shows weakening and the upper bow shows strengthening, so as to fully express the emotion of music.

5.4 Using music workstation software for secondary creation

The so-called secondary creation refers to the use of equipment, digital interfaces, and other means to create a second work based on the original author's work. The most commonly used music workstation software nowadays, "Cool Bass", has been widely used for secondary creation due to its powerful arrangement ability. Kubei is a fully functional digital music audio processing software that integrates music creation, secondary creation, recording, and mixing. Despite the emergence of numerous music workstation software in the market in recent years, Coldbass still holds an absolute advantage in areas such as digital interface sequencing, audio editing and processing, video scoring, and surround sound processing for musical instruments. When using "Cool Bass" for the secondary creation of polyphonic music, a perfect combination of virtual and real instruments can be achieved. The Cool Bass music workstation software is used for creating film and television music as well as producing song accompaniments, and has achieved good results. Digital interface music creation is the strength of this software, which can well meet most of the needs of creators. In addition, this software is equipped with analog synthesizers, bass synthesizers, drum samplers, etc., which can also facilitate composition[2].

By using the Cool Bass software, instruments, vocals, etc. can be added to songs to achieve a secondary creation of the original song. Before arranging, first load the original instruments into the Cool Bass workstation, and then use the instrument digital interface keyboard to play the corresponding notes on the corresponding bars. After each arrangement is completed, the corresponding sound effects can be played. If there are any unsatisfactory aspects, they can be modified and played repeatedly until satisfactory results are created again. Using "cool bass" for secondary creation of music works can greatly simplify the operation process, while also lowering the threshold for music creation, allowing more composers and music enthusiasts to create existing music works according to their own ideas and creativity. In contrast, before the popularization of computer music technology, creators who wanted to adapt or create a classical music piece had to first type out a sheet of music on a piece of paper, write notes on the sheet, complete the arrangement, and finally have professional singers or bands sing and perform based on the new score. This is a time-consuming and expensive process, which also increases the difficulty of music creation. On the Cool Bass Music Workstation, creators only need one person to complete the entire creative process, and can also make modifications according to their preferences. The application of computer music technology has brought great convenience and vitality to music creation[3].

6. The Innovative Direction of Computer Music Technology in Music Creation

6.1 Reduce mechanical feel and enhance humanization

The precision of computer music is an outstanding advantage, but it is also a disadvantage. Many composers feel that the sound of computer-generated music is dull and the mechanical flavor is too strong, which cannot fully unleash the expressive power and affinity of the music. Of course, with the continuous updating and innovation of modern computer music technology and the emergence of various new high-end electronic devices, music works created by computer music software have also begun to radiate vitality. For creators, a computer is like a blank sheet of paper and a pen, so as long as the composer has a certain understanding of the digital interface technology and keyboard playing skills of the instrument, and then perfectly combines them with musical equipment, the dull effect of music can be minimized. Viewing computer music technology as an auxiliary means of music creation, but not overly relying on computer music, is an important factor in ensuring the vitality of music.

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6.2 Rich simulation of changes in timbre

Computer music technology combines sampling, synthesis, and simulation techniques on the basis of traditional musical instruments to create a timbre that is different from traditional instruments. With the continuous advancement of computer sound technology, some simulated sounds can maintain the same sound quality as traditional instruments. Current technology enables highly accurate sound quality simulation. However, if it is a professional composer, can imitate the simulated sound generated by the synthesizer very realistically. But if you listen carefully, you will find the differences, especially for very distinctive ethnic instruments such as the Jinghu pipa and sanxian, because their playing techniques are very complex and difficult to imitate. Therefore, the simulated timbre generated by computer music technology is relatively single and cannot be enriched by changing the playing techniques. The musical works produced in such an environment exhibit effects that are far from what the composer expects. Therefore, in the future development of computer music technology, how to maintain the realism of simulated timbre while using transformation techniques to make it richer in timbre changes is an urgent problem that needs to be solved.

6.3 Establish a complete theoretical system

Some countries with early development of computer music technology abroad have not only achieved fruitful research results in this field, but also gradually formed a relatively complete theoretical system of computer music. On the domestic front, although various computer music software have emerged continuously in recent years, and there is also a wealth of theoretical research on the application of computer music technology in music creation, overall there has not been a scientific and standardized theoretical system formed. Whether from the perspective of music teaching or music creation, it is necessary and urgent to build a complete theoretical system[4].

7. Conclusion

The widespread application of computer music technology in music creation is partly due to the fact that computer music technology can greatly simplify the process of music creation, reduce the difficulties of music creation, and enable creators to create satisfactory music works in a shorter time and with less effort; On the other hand, using computer music technology for creation has many unique advantages, such as the integration of creation, performance, and production, as well as the diversification of music colors and styles. When using computer music technology, creators should be very familiar with the basic functions and operating methods of various common music software, and then use computer music software to create a score based on their creative inspiration, and immediately play it to understand its sound effects. If the requirements cannot be met, modifications can be made repeatedly until the desired effect is achieved.

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