

Trends in Informatization of Electronic Music Composition Data in the Context of Distance Education

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Abstract

INTRODUCTION: With the development of information technology in education, many educational institutions and companies have flocked to the emerging online education market. MOOC is a new method of e-learning that has changed the world and significantly impacted the educational community.

OBJECTIVES: This paper aims to present typical features for developing an online music education platform using MOOC music, AI-based music learning software, and interactive real-time music learning.

METHODS: This paper discusses different models of music teaching methods and pedagogy and summarizes the advantages and disadvantages of such models.

RESULTS: Online music education is an internet technology that fully uses the Internet right to organize good music education.

CONCLUSION: Based on the characteristics and content of music education, this paper presents possible suggestions for the sustainable and healthy development of new data and information models for music education on the Internet in the future.

Keywords: SPOC distance education, electronic music, data informatics, music education

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1. Introduction

With the rapid development of science and technology and changes in social lifestyles, education and learning methods are facing severe challenges and opportunities. By breaking the current state of memorization and mechanization, students make learning a central part of their studies. Regarding educational resources, they have moved from offline training using blackboards as the primary learning method to a combination of online and offline instruction (Bynoth, 2021). With the development of information technology in education, many educational institutions and companies have flocked to the emerging online education market, which began to ferment in China in 2012. MOOC is a new approach to e-learning that has changed the world and significantly impacted the

education community. However, the authors argue that the development of online and offline teaching technologies and their benefits can contribute to the development of online teaching and learning (Song, 2021). Currently, there are many issues and challenges in the development of e-teachers, such as lack of standardization, professionalization and systematization, lack of proper monitoring system, gaps in the source and quality of e-teachers, and the need to explore and expand prospects (Yao et al., 2021).

This paper uses MOOC music, AI-based music learning software, and interactive real-time music learning. Typical features of online music education platforms are developed. This paper discusses different models of music teaching methods and pedagogy and summarizes the advantages and disadvantages of such models. Finally,

online music education is an Internet technology that fully uses the Internet right to organize good music education. Based on the characteristics and contents of music education, this paper presents possible suggestions for the sustainable and healthy development of a new data and information model of Internet music education in the future.

This paper optimizes the representation of musical features in MIDI automatic synthesis and designs an automatic synthesis model with good experimental results. However, some limitations must be explored and improved due to time constraints and excessive interdisciplinary interference with automatic composition: automatic composition only deals with the song's theme, while soft music also requires chords. More complete music can be created using appropriate chords from the theme (Tuncer & Karata, 2022). This article provides an example of a MIDI melody file with a constant length. During the sampling process, the long notes are divided into several short notes, resulting in the order of the selected notes in the MIDI file being different from the order of the actual notes. Further research may consider how to send each comment in its entirety in order to make the created material more realistic. Due to the limited performance of servers and other devices, this paper's data is small, so there is still enough room to optimize the automatic combination model.

The remainder of this paper, firstly, introduces the relevant theories; secondly, builds its model based on the theories and basic methods to clarify the research logic of this paper; finally, develops the trend of informatization of electronic music composition data through experiments to test the relevant aspects of this paper's research.

2. Related Work

Music and mathematics are two very different fields, but they are inseparable. They can be understood as the logical act of music. The word "algorithm" comes from the weekly compilation of calculations in mainland China. It was initially an algorithm in English but later developed into "algorithm," an Arabic numerical algorithm. Algorithmic music uses an algorithmic approach to creating music. The modern algorithmic approach to creating music can be described as creating music by introducing appropriate computer programs and appropriate human intervention in the computer. This quartet was composed by Professor Schiller and Isaacson in 5. The International Computer Music University in Champaign, Illinois, organized the first international conference on computer music, and the Greek composer Senakis founded Algorithmic Music.

Genetic algorithms, artificial neural networks, deep learning and verification learning are widely recognized in automated documentation. With the development of computer technology, these techniques are often widely used in automatic composition. However, automated compositions have existed for centuries, and automated

compositions cannot adequately reflect the complex relationships in the spatio-temporal dimension of real musical works. More and more researchers and innovative technology companies need to continue their research to make breakthroughs in this field and provide music fans with the best musical compositions and new modes of music composition. According to previously published data, most automated composition research uses MIDI-extracted attributes directly to represent musical features, such as pitch and length. It uses them directly as training data for learning and composing (Asif & Mckechnie, 2021). The representation of musical features needs to be sufficiently considered in the semantic context of the notes. In this paper, we use semantic contextual information based on word vector models to construct feature annotation vectors and select bidirectional recurrent networks based on the annotation vectors to provide a new perspective for automatic synthesis (Tan et al., 2021).

3. Research Methodology

3.1 MOOC model building

This study collected data on all art programs in Chinese university MOOC platforms through the national MOOC platform. It used Excel statistical software to determine MOOC art's positive and negative forms in China. It also conducted an in-depth study on MOOC art teaching. Course content analysis, evaluation, teacher-student interaction, and course feedback were conducted. These courses provide the characteristics and values of MOOC art education. The individual MOOC cases were divided into the Art and Design MOOC, Music MOOC, Drama MOOC, Dance MOOC, and Arts MOOC groups (Anand et al., 2021). The representative sample was selected based on the number of candidates, course reviews, discussion activities, and other indicators.

This paper asks teachers and students about the MOOC learning process, their perceptions of the MOOC learning model, and their experiences and perceptions of usability, satisfaction, and learning outcomes.

$$FC_{SA_{i,p,t}} = \beta_0 + \beta_1 \ln dex_{P_{p,t}} + \beta_2 X_{i,p,t} + \mu + \omega_p \quad (1)$$

Equation (1) is the formula that elaborates the efficiency of computing the MOOC and enhances the reliability by enhancing the interference of random variables.

$$MOOC_{i,p,t} = \gamma_0 + \gamma_1 \ln dex_{P_{p,t}} + \gamma_3 X_{i,p,t} + \varepsilon_i \quad (2)$$

Equation (2) further calculates the actual efficiency level of the MOOC.

$$Risk_{MOOC} = \delta_0 + \delta_1 \ln dex_{P_{p,t}} + \delta_2 M_{p,t} + \varphi_t \quad (3)$$

Equation (3) measures the academic risk value of the MOOC compared to traditional courses.

$$MOOC_{i,p,t} = \alpha_0 + \alpha_1 \ln dex_{P_{p,t}} + \alpha_2 CSR_{i,p,t} + \varphi_t + \omega_t \quad (4)$$

Model (4) is constructed distance education and electronic music composition relationship; the existence of a correlation between the two indicates a trend of informatization.

$$MOOC_{patent} = \theta_0 + \theta_1 \ln dex_{-P_{p,t}} + \theta_2 Risk + \theta_3 + \rho_4 \quad (5)$$

$$Gie_{it} = \alpha_0 + \alpha_1 \ln MOOC_{it} + \beta \ln Z_{it} + \varepsilon_{it} \quad (6)$$

Equation (6) illustrates the computational logic of the neural network to produce further data by confrontation.

$$GAN_{it} = MAX(0, Gie_{it}^*) \quad (7)$$

Equation (7) emphasizes the stability and rounding effect of the GAN network.

At present, the research on MOOC in Chinese arts continues. Based on the concept of communicative learning, this study examines the advantages and disadvantages of open art courses. It compares online and offline art mediation to promote different models of art mediation. Finally, he examines the development of online art courses in China and demonstrates the art education system on a Chinese MOOC platform.

As a form of e-learning, MOOC is essential to facilitate the transformation and modernization of Chinese art education networks. This study investigates the current state of Chinese art using quantitative research and case studies. It concludes that the pedagogical and construction models for the development of Chinese art are suitable for promoting the reform of Chinese art and provide a benchmark for art teachers to develop excellent Chinese art.

3.2 Research ideas and problem analysis

Teachers and students support school organization and planning to meet teachers' and students' work and learning resource needs, promote the optimization of music teaching continuously, and develop learning resources suitable for school teaching. However, rural teachers who sing ethnic songs can create different materials and music learning resources in different learning environments, depending on the infrastructure. Music school resources are not the most important, but independent schools, schools, and learning resources differ from other schools. Resources for music schools provide unlimited motivation for sustainable school development, a prerequisite for individual school development. By constantly responding to the needs of music schools, the resources that are only suitable for teachers and students are the resources for actual school development. School music resources further deepen the vital role of music in school education (Zhao & Li, 2021).

Question 1: Examine and analyze the current situation. Through fieldwork, observations, and interviews, this paper presents the current status and challenges of the music curriculum, music teachers, music education infrastructure, and the use of music materials.

Question 2: Further research on the model. In other words, what typical e-school models have been studied in rural music teaching?

Question 3: What is the place of electronic music in the world? What are the trends in China? Empirical analysis of the development of computerized electronic music production data in the context of distance learning.

Question 4: Empirical type analysis of the empirical analysis of the development of computerization of electronic music creation data in the context of distance learning.

3.3 Distance learning theory

Wang Chen proposed a SPOC learning model based on phonics teaching theory according to the characteristics of Chinese phonics teaching. He argues that vocal courses developed in this way have significantly improved students' understanding of vocal theory and practice and have continued to promote the development of vocal education in China (Xing, 2021). Cheng Yan, a student at Gugu Normal College in Shanxi Province, provided a comprehensive analysis of the benefits of using the SPOC learning approach in teaching at Gugu Normal College and offered specific suggestions and measures to develop education at Gugu Normal College in China. Liang Ying and Chen Xiaoyu designed and analyzed the activities of a school music theory and practice course using the SPOC learning model and presented the achievements and experiences of the SPOC learning model in a music education program from four perspectives: before, after and after school. Shahin analyzed the meaning and characteristics of SPOC and the current situation of traditional piano improvisation courses and developed a SPOC-based piano improvisation model regarding teaching content, teaching methods and classroom evaluation (Sha et al., 2021).

Meanwhile, various algorithms such as Markov chains, artificial neural network systems, genetic algorithms, and music analysis models were collected. In this experimental era, with the rapid development and spread of information technology, various algorithmic music and software platforms based on different technologies emerged. Although only half a century has passed since seven years, the continuous development and practice of algorithmic music based on music composition theory and information technology has gradually opened up a new field. Composers have conducted a series of experiments in this new and open field, offering more opportunities for developing and expressing musical art.

Each tone part comes from the composer's hyper-collision of arithmetic operations. The same algorithm is used for all five parts, but each has different vital parameters. From the composer's point of view, the relationship between the five parts of the work changes several times. From a vertical perspective, the work is divided into three layers. The first level is electronic music based on super buffer music technology. It includes rules for generating

sounds, generating rhythms, selecting random parameters, designing synthesizers and designing libraries of tools, as well as rules for acquiring sound electronic music through a startup program. The second layer consisted of five audio clips recorded by the composer at different locations in a Pennsylvania nature preserve. The five recorded sound clips were configured into five electronic sound clips generated by a computer platform that generated background sound fields and natural ambient noise for the five electronic music clips generated through algorithmic synthesis. On the third floor, real instruments were played. To maintain the dynamic balance of sound, the orchestra consists of two to eight instruments that can be fine-tuned primarily by the strings. The performers must have good musical and improvisational skills. In 1987, American composer David Cope publicly presented the results of an intelligent experimental music system at the annual Computer Music Conference, where computer music was gradually integrated into traditional music. 1989 saw the first attempt by Todd and his partner to use recurrent neural networks (RNNs) in music. The quality of the music produced by RNNs was not significant due to the limitations of the RNN structure, which could only produce a series of music in a short period. In 2002, Doug Ecker improved this approach by replacing RNN neurons with long-memory and short-term memory neurons. Doug used this structure to improvise a blues song based on a short recording.

The LSTM network was first used for the automatic synthesis of folded fields. Hee-Cheng Tsao et al. suggested pitch melody replace the original information for automatic composition. Audio elements extract data from adjacent audio intervals to better describe sound change curves and are innovative in decoding music. Florian Colombo et al. added the effect of pitch length on pitch to the automatic synthesis of GRU. They show that the current height is closely related to the next moment's height. For this purpose, an automatic synthesis model is proposed to implement the intersection of distance and node length. In addition to using regression neural networks, good image convection neural networks (CNN) and newly developed adversarial networks (GAN) are used for automatic music production. Mohammad Akbari and others used UAE-GAN networks for automatic composition and proposed new ideas for automatic composition, picking up high-quality hidden notes, forming GAN networks and composing music.

4. Experimental results

4.1 Experimental design results

4.1.1 Phase design

Wang Chen proposes a SPOC learning model based on the characteristics of Chinese phonetic teaching and phonetic theory. He argues that vocal courses developed in this way have significantly improved students' understanding of vocal theory and practice and have continued to promote the development of vocal education

in China. Cheng Yan, a student at Gugu Normal College in Shanxi Province, provided a comprehensive analysis of the benefits of using the SPOC learning approach in teaching at Gugu Normal College and offered specific suggestions and measures to develop education at Gugu Normal College in China. Liang Ying and Chen Xiaoyu designed and analyzed the activities of a school music theory and practice course using the SPOC learning model and presented the achievements and experiences of the SPOC learning model in a music education program from four perspectives: before, after and after school. Shahin analyzed the meaning and characteristics of SPOC and the current situation of traditional piano improvisation courses and developed an SPOC-based piano improvisation model regarding teaching content, teaching methods and classroom evaluation.

Finally, the Author considers that the main content of SPOC consists of two parts: online learning and offline discussion. In the first part, students must complete some online teaching assignments, such as watching videos, online chatting and troubleshooting. The second part is the process of teacher-student interaction. During the communication process, teachers can answer questions that students may encounter in the e-learning process, and students can learn what they have learned and the value of their knowledge through personal contact with their teachers and classmates. This article presents modern foreign classical SPOC learning.

Foreign applications of distance learning theory

Harvard University's School of Advanced Design graduates are required to take the SPOC or Architectural Imagination Course. It is expected that the course will be open to more students in the future. In short, SPOC courses are top-rated among Harvard students. The Software Engineering degree is a prestigious professional program at UC Berkeley. It is offered by Professor Fox in SPOC mode on the edX platform. The main feature of this course is the automatic assessment system. The system receives the results immediately after the assignment is completed and allows students to do the assignment multiple times to get a higher score. Due to the effectiveness of SPOC instruction, students can test their abilities during the course. Therefore, applying the SPOC model in teaching can effectively improve the quality of student learning and ensure that the learning model produces good results. The SPOC learning model at UC Berkeley has attracted more and more students to give higher grades to the instructor at the end of the course. Because of the unique impact of SPOC teaching, Professor Fox has introduced this new way of learning to other universities, inviting professors from other universities to watch UC Berkeley's MOOC videos and use the appropriate MOOC technology in their classes to manage learners' progress through an automated assessment system.

"Basic Biology" is an honors degree program at the University of Massachusetts in Boston. Professor White has long taught this course to students through lectures and labs, and in the fall of 2013, Professor White began a

SPOC lab, Introduction to Biology. Professor White has set several learning objectives for this course. For example, they give students enough time to have a teaching assistant help them with class assignments and plan other learning experiences to promote student initiative. To achieve the goals of the SPOC program, Professor White also organized the post-study content. Educational reform helps improve students' creative and problem-solving skills. In assessing the courses, White developed several problem modules and ten classroom tests on the edX platform. The first course consisted of 30 individual modules. The learning tasks for each module include video lectures and self-administered tests. Students must spend at least 10 hours per week after class. Then, during the post-class self-study, complex and incomprehensible problems must be brought to the forefront and become the subject of the following class exchange.

Boston University in Massachusetts, this new learning model simplifies the structure of the original course and increases efficiency. The source's vibration frequency determines the phase height, which is usually measured in Hertz. The higher the frequency, the higher the sound. In the sound system, treble and bass can be divided into different pitches, which can be divided into primary and changing pitches. Piano sound has seven basic levels, namely seven white keys: C, D, E, F, G, A and B. For example, variable level D1 is the height change of D color and variable level DB is the height change of D color. The upper symbol indicates an increase in half-tone, and the lower symbol, A, indicates a decrease in half-tone; adding the symbol B means adding the whole sound, while adding another symbol, BB, means decreasing the whole sound.

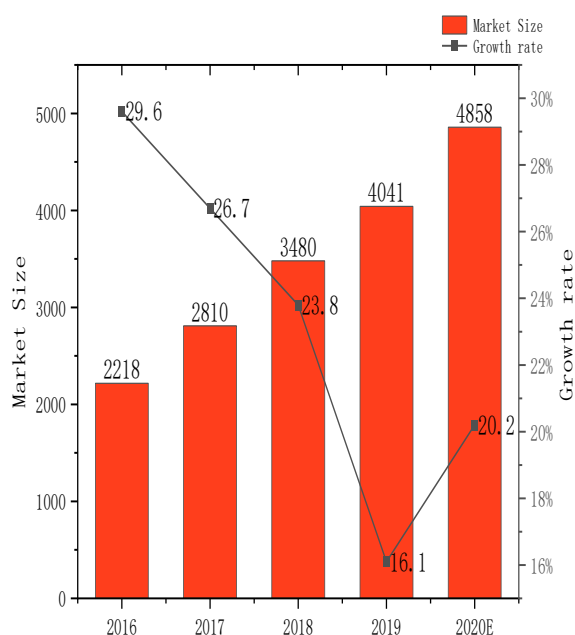


Figure 1 Degree of half-tone precision

The degree of half-tone precision is shown in Figure 1. Of course, when it is a half-tone, it corresponds to the whole tone. Half-tones can be divided into natural half-tones and variable half-tones. There is a difference between natural and variable shades in the same shade. A natural half-tone or an all-natural is a half-tone or a whole tone composed of two adjacent tones; therefore, a variable half-tone or a variable whole tone is a half-tone or a whole tone composed of two different levels of the same level.

A musical system typically uses 12 different intermediate rhythms to measure pitch accurately. This twelve-finger law was introduced in ancient Greece, but no scientific calculation existed. The first person in the world to use mathematics to calculate the exact pitch of each of the 12 average rhythmic notes was a great musician from the Ming Dynasty, Prince Zheng. The twelve-word rule divides the octave into twelve semitones (Gan & Sun, 2022). The minimum frequency of piano 12 is 1/2 of the maximum frequency, a ratio of two semitones. The middle-frequency C is 261.63 Hz.

The music consists of notes. The rhythm of music depends not only on the height of the notes but also on the height of the two notes. This change in height is known as the distance between two sounds and is called the pitch interval. True music. Sound is the most essential element of music. It is used in all kinds of music, and the sound is the basic unit of the chord (Leahy & Smith, 2021). There are two regions: one is the melodic region, and the other is the sound region. These two areas of sound are often called the "root" and the "crown." The root is low, and the crown is high.

4.1.2 Pitch and Tone Design

Depending on the length of the note, it is divided into 64, 32, 16, 8, 2, and whole notes. These terms do not refer to the absolute length of the note but to the relationship between the note and other notes. By default, if the entire tab length is used, half of the tab is half of the total length of the tab. In addition, a quarter is one-fourth of the note length. Accordingly, the length of other notes can be determined relative to the entire note.

Color refers to the aural property of a sound and can be easily distinguished from different sounds and instruments. The tone is also called timbre because different bass sounds, whether instruments or people, and all objects capable of producing sound, have many different bass frequencies in addition to producing sound, which determines the color of different sources, different instruments, and different sounds. The vibration of a sound source consists of a single tone and a different bass. The relative intensity and amount of background determine the unique colors. Timbre can directly touch people's emotions and immerse them in the music.

4.1.3 MIDI Music

The music data format used in this article is the digital format of MIDI music so this section will introduce MIDI techniques. This article begins with an introduction to the format of MIDI music files, as well as the concept and structure of MIDI. Since MIDI music files must be used in Python, this article introduces a Python-based MIDI library and discusses specific ways to use MIDI files in Python.

The MIDI header appears at the beginning of a MIDI music file and consists of 14 bytes. It can be divided into three parts: a 4-byte marker string, a 4-byte title data range, and a 6-byte title data range. 4-byte marker strings have a 4D 546864 "mthd" hexadecimal representation, corresponding to the marker string's contents in a standard MIDI file. The content of the title data range is the total length of the MIDI title data range (Cramer et al., 2023). The content of the title area uses 2 bytes to determine the format type, number of songs and score of the MIDI file. The first two bytes indicate the MIDI music file format, including mono, asynchronous and polyphonic synchronous. The last two bytes indicate the partition and determine the basic time format and the type of time resolution (Adam & Metljak, 2022). Suppose the first octet of the partition is very high or the first byte of the partition is very high. In that case, the partition determines the hit count of the fourth partition length; the lower seven bits indicate the number of SMPTE frames, while the second octet indicates the number of SMTP frames. Volume is the smallest unit of time in a MIDI music file (Lerch & Knees, 2021).

A MIDI header is a data area consisting of one or more audio blocks used to record detailed music data. Each track unit has a similar structure to the master unit and contains the following components:

- (1) An identifier string consisting of four octets;
- (2) Routing data area length: the number of four bytes used to store the contents of the routing data area;
- (3) The content of the channel data area consists of several MIDI events, also known as MIDI messages, which can be expressed as "insert time<<event." The extra time is the time difference between the current and last events. The event is a MIDI event.

4.2 Empirical Process

In recent years, deep learning has become a prevalent machine learning industry with the continuous improvement of neural network technology. Professor Hinton first introduced the concept of deep learning in 2006 when he proposed an efficient method for building multilayer neural networks on unallocated data. Neural networks have been developed for 70-80 years since the advent of neural structures in the 1940s.

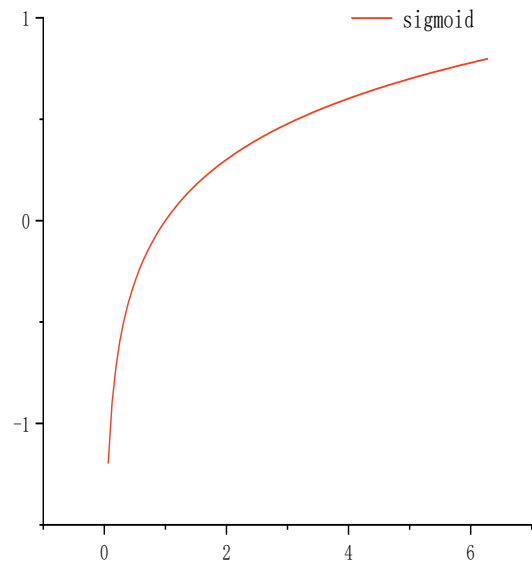


Figure 2 Image of sigmoid function results

Figure 2 shows the sigmoid function in the results image; scientists have used SIGMOID as an activation function for many years. However, its application has been limited in recent years due to its inherent shortcomings (Economics & Management, 2021). For example, if it propagates backward in a deep neural network, the gradient explodes and disappears. This will prolong the time of large deep-learning networks. Therefore, a different type of active balance lock has been proposed and widely used in recent years.

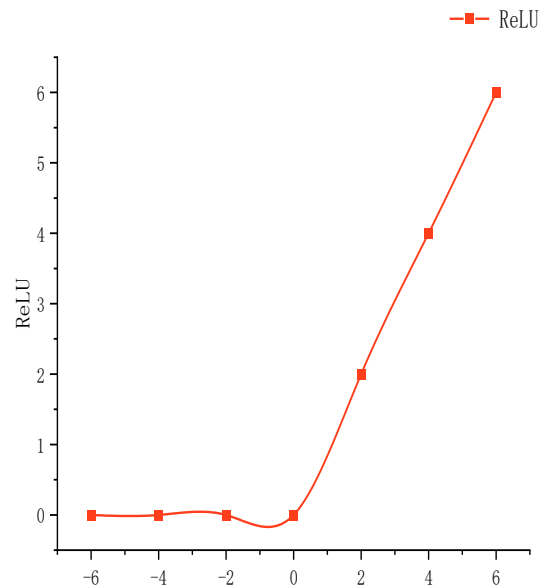


Figure 3 Image of the result of the correction function

Figure 3 shows the correction function in the results image; the neural network learning process includes forward and reverse transfer. After a few functional neurons, the prediction is finally sent to the initial level. If the predicted value does not match the actual value, the

operation of the LOSS function may result in an error. Describe the reverse distribution process after receiving an error. The error of the source layer is calculated based on the loss function. Then, the parameters of each layer are updated using the gradient frequency method to obtain the average level. Successive iterations minimize the failure of the loss function, and the convergence of the neural network model is optimal. In this paper, the structure of a typical neural network, the neural network, is studied. Neural networks are the most superficial neural networks with layered neurons. The layers are fully interconnected, and the neurons in each layer are not interconnected. Each neuron is responsible for taking the output of the upper layer as its input and output. There is no feedback between the layers. It is one of the fastest-growing and largest artificial neural networks(Xiao et al., 2021).

Each network layer (except the initial layer) is connected to the next layer, which forms the core of the neural network structure. It brings any continuous function closer to the corresponding active function. This nonlinear processor provides the opportunity to solve complex problems.

4.3 Analysis of experimental results

Using contextual data to construct attribute vectors is an expression of MIDI property. The reference vector model provides a way to automatically represent synthetic music properties using a jumping algorithm to learn and create music properties. The entire process of constructing property vectors can be summarized as follows: (1) the order of the theme notes is obtained by quantitatively selecting the time step from the extracted MIDI theme file; no more than 0125 seconds; (2) the pop-up window is set to 8 and binary (middle, item) annotations are created as records. The binary dataset is a purely thermally encoded, purely thermally encoded measurement.129 Theoretically, the larger the dimension of the attribute label vector, the more contextual information is represented. In this experiment, the researcher set the dimensionality of the generated attribute vector to 129 in order to compare the following notes with those created automatically using the thermal music encoding function(Bourgeois-Bougrine et al., 2022). A neural network model consisting of an input layer, a hidden layer, a soft axis layer, and an output layer was created. (4) The input plane between the two-vowel datasets reaches the output plane through the hidden and soft axis planes; (5) Errors are backward diffused and learned iteratively until the model converges and a vector of annotation attributes created according to the hidden level parameters is obtained(Hong et al., 2021). The annotations have a unique attribute vector corresponding to them. During the motion, the curve of the loss function of the music attribute vector is studied.

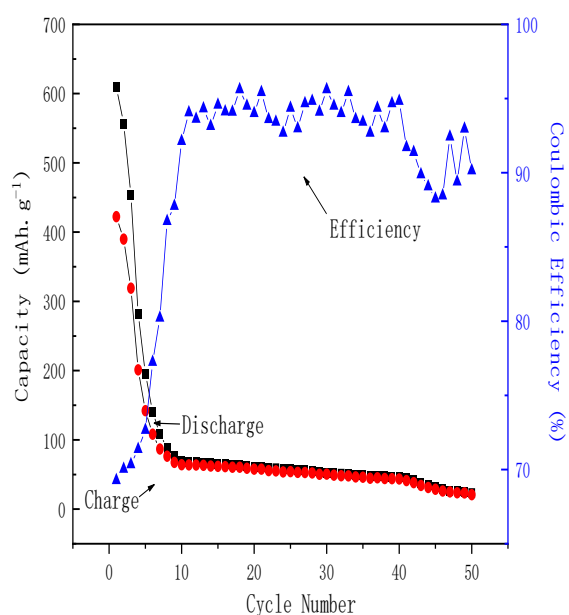


Figure 4 Analysis of note change loss diagram

The note change loss diagram is shown in Figure 4. In the gray gradient, the darker the color, the greater the similarity, the more likely it is to appear on the other side of the pop-up window. The horizontal and vertical coordinates indicate the number of votes. There are 33 of them. Since the diagonal is similar, the researcher can see a factor of 1 on the diagonal, which is the darkest color(Karkina et al., 2021). You can see the distribution of comments in the record and notice that similar comments often appear in each other's pop-up windows with high correlation. For example, if the red rectangle is black and its tones are similar, this is music theory. The height variation is minimal, usually no more than 8 degrees.

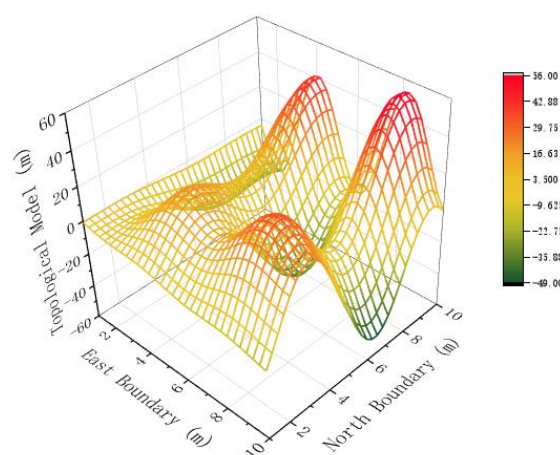


Figure 5 Trends in Electronic Music Composition Data Informatization

As shown in Figure 5, Electronic Music Composition Data Informational Trends, for the symbol vectors used here, the distance between different hot codes is zero when a single hot code is used for annotation, meaning

that each annotation is independent. It is impossible to describe the similarity of annotations, i.e., the context of the annotated data (Müller et al., 2021). Note: Function vectors have contextual data at the data representation level. The extraction of note attributes helps improve the accuracy of notes in later automatic synthesis predictions. After the experimental data, the experimental results and specific analysis of the automatic synthesis are given. In this paper, we first selected and constructed a dataset and experimental environment for automatic printing. Then, we conducted experiments on creating attribute vectors based on semantic context encoding and measured the effect of attribute vectors based on cosine intervals. He analyzed the experience with automatic sentences.

In the automatic composition test, three comparative experiments were conducted in two domains: the presentation of musical features and the selection of automatic composition patterns. The experimental results show that the method outperforms traditional methods and adds BI-GRU networks to the attention mechanism, providing greater flexibility to select essential properties between comments and improving the accuracy of comment prediction. The effectiveness of automatic writing is assessed by combining objective and subjective assessments. The objective assessment criterion is to ensure the accuracy of the centralized prediction data. The maximum accuracy of the proposed automatic composing system is 81.93% and 90.15%. the accuracy of the TOP1, TOP2 and TOP3 test series is 92.62%. An automatic composition curve evaluation system has been developed to invite music lovers to evaluate the effectiveness of automatic composition based on emotional and subjective listening results. This objective and subjective evaluation method is more suitable for music evaluation.

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5. Conclusion

In this paper, we have optimized the representation of musical features in MIDI automatic synthesis and designed an automatic synthesis model with good experimental results. However, some limitations must be explored and improved due to time constraints and excessive interdisciplinary interference with automatic composition: automatic composition only deals with the song's theme, while soft music also requires chords. More complete music can be created using appropriate chords from the theme. This article provides an example of a MIDI melody file with a constant length. During the sampling process, the long notes are divided into several short notes, resulting in the order of the selected notes in the MIDI file being different from the order of the actual notes.

Further research may consider how to send each comment in its entirety in order to make the created material more realistic. Due to the limited performance of servers and other devices, this paper's data is small, so there is still enough room to optimize the automatic combination model. Future researchers need an efficient and fast way to compose music to develop an automatic composition method. Especially in recent years, with the continuous development and advancement of neural networks, automatic composition techniques have been improving, and the quality of preserving music works has been increasing. This is mainly to meet the demand for musical enjoyment and to improve entertainment and interest in music. At the same time, independent music has a certain serendipity, which can also provide creative inspiration for composers and other professionals.

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