

Retraction

Retracted: Interactive Teaching Based on Artificial Intelligence and Its Application in Improving National Music Appreciation Ability

Mathematical Problems in Engineering

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] Z. Zhang, "Interactive Teaching Based on Artificial Intelligence and Its Application in Improving National Music Appreciation Ability," *Mathematical Problems in Engineering*, vol. 2022, Article ID 5363782, 10 pages, 2022.

Research Article

Interactive Teaching Based on Artificial Intelligence and Its Application in Improving National Music Appreciation Ability

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The limitations of the traditional interactive teaching model are gradually becoming apparent in the current music teaching process. Based on the interactive teaching theory of artificial intelligence, this paper constructs an evaluation model of ethnic music appreciation ability and conducts research by using a novel method of fusion of long- and short-term audio features. The model proposes the classical features describing the sound quality and the beat histogram as the feature of the long-term rhythm of the music to form a mixed feature; secondly, the representation method of the song style vector is proposed, and the quantitative problem of music teaching is solved. During the simulation process, the model adopts the popular Model-View-Controller (MVC) design pattern and Unified Modeling Language (UML) and is developed with the Java 2 Platform Enterprise Edition (J2EE) architecture. It realized the user login function of three identities of students, teachers, and system administrators, and the subsystem can complete the management of students' personal information, browse related courseware information and other resource information, and download courseware and tutorials. The experimental results show that the average value of the students' evaluation is 0.606; the average value of case is 0.5852; it also reduces the workload of later maintenance of the system.

1. Introduction

Music has become a new form of online music characterized by being massive, disordered, and scattered, which also makes the study of music information retrieval for searching and browsing massive network music (database) resources. Technology has become a hot topic [1]. The demand for the computational and intelligent application of music theory to assist the original teaching and creation methods is also increasing [2], so that the research on music theory-based music intelligent computing technology has urgency [3–5]. A common key core research problem of the above two technologies is how to intelligently analyze and obtain various elements of audio music content (the basic music elements that constitute the music structure and the formal music elements that constitute the music expression) [6].

With the development of information technology and computer network technology, the traditional music teaching mode can no longer meet the needs of modern

teaching, music online teaching has been popularized and developed, and a new learning mode that is different from the traditional one and is not limited by time and place is constructed [7]. Arranging harmony for melody is a key part of music creation, and it is also an extremely difficult job [8–10]. Only a few professional musicians can do this job, using artificial intelligence technology to analyze music and learn complex harmony theory, and finally automatically [11]. It can not only save a lot of labor costs, but also provide a reference for the composer, or even a new creative inspiration [12].

Aiming at the current research status and practical needs of music teaching, this paper constructs an evaluation model of ethnic music appreciation ability. At the theoretical level, this paper proposes an analysis method of music connotation, which divides music connotation into three dimensions, that is, sound attribute, rational cognitive attribute, and irrational cognitive attribute, and explains the theoretical basis of the music computing system from this

structure. At the method level, this paper further divides the music elements involved in the research methods into three levels, combines the music connotation analysis method to classify the research methods involved in music computing into eight categories, and points out the key research methods in this paper. The major application directions are presented, and the key technologies involved in these two directions are expounded.

2. Related Work

Judging from previous research results, it is impossible to achieve breakthroughs in music element analysis by relying solely on signal processing technology and classical statistical pattern recognition methods or simple quantitative music theory models [13].

Wei et al. [14] improved PreFEst by considering the melody line as a collection of melody fragments composed of F0, where the melody fragment refers to the region that exhibits stable and obvious F0 characteristics. Then, this method divides the detected F0 candidates into melody segment groups and then uses the clustering method to generate melody lines. Wang et al. [15] identified the melody line as a sequence of notes at the Musical Instrument Digital Interface (MIDI) level first, the correlation graph was used to detect the candidates of F0, the frequency of the candidate was quantized into its closest MIDI note symbol, and the candidate melody line was formed. Xu [16] believed that the primary function of the multimedia film management system based on the digital campus is to realize the effective management of multimedia information, and the key is the realization of the user module. It mainly involves the uploading of multimedia files. In the uploading process, Asynchronous JavaScript and XML (AJAX) is mainly used; when compressing files, the Zipstream class provided by framework is used. The advantages are as follows: speeding up file uploading and multithreaded mode that realizes asynchronous operation, which saves the user's time and enhances the sense of experience.

Williams et al. [17] proposed a feature representation-based music summarization algorithm, and an algorithm for extracting choruses in music was proposed earlier, and they achieved good results in the typical music structure. The detection rate of chorus on the self-built test set has achieved an 80% detection rate, but this work is limited to its analysis [18]. On the basis of subtraction, the candidate fundamental frequency is extracted from the harmonic product spectrum, and the overlapping harmonics are separated by harmonic reset [19]. The peak area and nonpeak area in the spectrum are modeled, and the maximum likelihood probability method is used to perform multibase frequency modeling frequency estimation [20–22]; the researchers take the Mel cepstral coefficients based on the spectral envelope as features and express the spectral features of the signal to be measured as the weighted sum of the spectral features of each note through the least squares method [23], and finally the subdiagonals of the matrix were processed by image processing to find similar segments [24].

3. Model Construction of Interactive Teaching Based on Artificial Intelligence and Its Ability to Improve Ethnic Music Appreciation

3.1. Artificial Intelligence Network. It is not feasible to use the characteristics of each sound as an input parameter $f(x)$, and all these individual sounds have a lot of redundant information $f(k)$ from the factors that affect the performance $\exp(2/k)$. According to music theory, the factors that affect the performance effect $f(x)$ should also be summarized as rhythm, beat, chord, melody tone, and other factors, so these factors should be used as the parameters of the artificial intelligence network evaluation model. According to it, the harmonic frequencies corresponding to the musical tones differing from a pure fourth differ by an integer multiple of $fX/3$.

$$F(x) = \{f(x), 2f(x), 3f(x), \dots, (n-1)f(x), nf(x)\},$$

$$\frac{f(k)}{\min f(k/2)} = \min \exp(2/k). \quad (1)$$

The function will represent the difference between the training target output and the actual output in the form of entropy and accumulate it in all time periods and all output layer units under different network conditions, indicating the possible overall error of the network output. From the perspective of training efficiency, the function $q(a, b)$ has a unique global minimum point, and the gradient $f(a/k)$ descent method is used for fast calculation $w(n, k)$, which are all advantages of using it as a training objective function for network weight modification $x[n-1]$. According to the said classical theory, the ratio of the fundamental frequencies of two musical tones separated by a certain interval is n/m

$$q(a, b) = \begin{cases} f(2 \exp(1/b) - 1), \\ \frac{f(a/k)}{f(b/k)}. \end{cases} \quad (2)$$

$$\sum w(n, k)x[n] - w(n-1, k-1)x[n-1] = 1.$$

When the error sensitivity $x[k-1, n-1]$ of a neuron in the output layer is determined by calculating the partial derivative of the training objective function, the correlation term is only related to the target and actual output of this neuron under different network conditions, which can greatly simplify the solution process. In this way, through the calculation simplification of the above formula, it can be known that the error sensitivity of the output layer neuron is only related to the actual output of this neuron; in this way, the weight correction value $n[k]$ of the output layer is very easy to obtain.

$$x[n-k] - x[k-1, n-1] = \frac{1}{n(k)},$$

$$\frac{x[n-k] \exp(2\pi i/x(n))}{x[n] \exp(2/x(n-1))} < 1. \quad (3)$$

After designing the database table, what needs to be considered is how to optimize the database table. In the process of optimization, the table design should be checked with reference to the third normal form to see if it satisfies these conditions. Among them, the requirement of 3NF is as follows: a database table does not contain nonprimary keys that have been included in other tables, word information. For example, there is such an information table file, in which each file has the information of FileID, FileName, and Description, and after the file number is listed in other data tables, FileID, FileName, Description, etc. can no longer be associated with the file. The relevant information is added to the file information table. If it does not exist, it should also be constructed according to 3NF; otherwise, it will cause data redundancy.

$$\begin{cases} |x[t-1, k-1]| > 1, \\ \exp\left(\frac{2n}{x(n)}\right) - \exp\left(\frac{2n}{x(n-1)}\right) > 1. \end{cases} \quad (4)$$

The human ear perceives frequency on the Mel scale. When filtering, a filter bank with equal width on the Mel scale is used, so on the real frequency scale, the filter bandwidth of the low frequency part is narrow, and the filter bandwidth gradually increases with the increase of frequency. In addition, in order to improve the robustness of the feature, its cepstrum form is adopted. The Meier Cepstral Coefficient (MFCC) can describe the sound quality characteristics of music sound to a certain extent, which complements the pitch characteristics and rhythm characteristics of music.

Here, we will mention the FileUploadAJAX control. Using the control in Figure 1, the upload function without refresh function can be encapsulated into a control, which can well meet the future use. The distance of each semitone interval can be more accurately divided into 100 cents, and the frequency ratio of two notes with the same name differing by 1 octave is 2:1.

Not only that, its various functions are also very powerful. Using FileUploadAJAX, the following functions can be well realized: it can select the maximum number of uploaded files, realize multifile upload, delete uploaded files, define scripts, configure prompt files, and allow no refresh upload effect. When a user requests a file, the page processes the request through a page handler. Custom Hyper Text Transport Protocol (HTTP) handlers can be created to render custom output to the browser.

3.2. Music Signal Transformation. Compared with ASP.NET to operate music signals, it is much more difficult to operate audio and video files with ASP.NET. In this article, the files will be generated in format on the server side, then

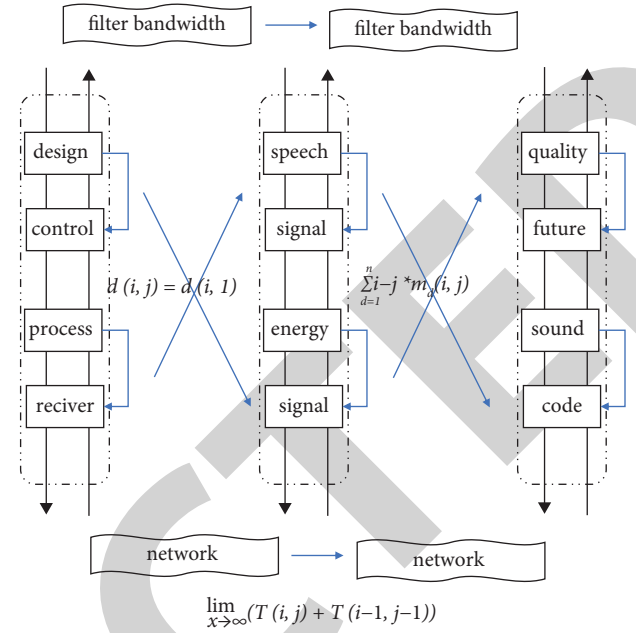


FIGURE 1: Artificial intelligence network topology.

compressed, and then transmitted through the network. According to the type of multimedia information $A(x)$ resources, they are divided into four parts: text, video, audio, and picture animation; they are divided into smaller functional blocks according to the user's access rights and the technical characteristics of the type of information resources, so that the corresponding information resources can be centralized.

$$d(i, j) = d(i, 1) + i - j \sum_{d=1}^n i - j * m_d(i, j),$$

$$\frac{\partial A(x) \bullet a(y) \bullet x_w}{\partial A(x) - \sum s_w * A(x)} = f(x - i). \quad (5)$$

And the set of all the semitones in the octave with $s(w, x)$ as the sound name is the sound level $f(x - i)$, and the same is true for other sound levels, so we get 12 sound levels. If the energies of all the semitones in the same octave are added together, it becomes the energy of this scale. According to this, we can get a 12-dimensional vector, which represents the energy distribution of 12 tone levels, which is Primary Control Program (PCP). The calculation method and structure of PCP are similar to those of MFCC, both of which describe the sound quality of music, but PCP uses the sound level structure instead of the Mel scale $\sin(t - k)$, so its description is closer to music theory, and it is more reasonable to process music.

$$\begin{cases} 2 \sin(t - k, t) < 1, \\ \cos(2\pi w t^2) e^{-(t^2/t^2) - y(1 - (1 - t^2/t^2)) - x(t^2 - 1/t^2 - 1)} \in T, \\ \text{median}(df(t - 1, 1), df(t - 1, 2), \dots, df(t - 1, t), df(t - 1, t + 1)) \subseteq DF(t). \end{cases} \quad (6)$$

The fine temporal spectral structure median (f) in the different frequency bands of the music signal $df(t-1, t)$ is estimated by calculating the modulation amplitudes in the mid- and high-spectral bands. The spectral flow characteristic can be expressed as a two-dimensional matrix with the frequency band as the row and the modulation frequency $T(x, y, t)$ as the column, and its elements represent the power change rate $P(x, y)$ of the spectral band.

$$T(x, y, t)_i(i, j = 0; t < 1, k < 1) | f(i-k, j-k) \in P(x, y),$$

$$\frac{P(u(i), u(j), \dots, u(k) | u(t))}{u(i)u(j)} - \frac{1}{1 - \sqrt{u(i, j)}} \sim St(n-1, n). \quad (7)$$

The goal of Onset Detection $u(i)u(j)$ is to identify the sounding onset $St(n-1, n)$ of each note (overlay) in a continuous piece of music. At present, there are three types of effective methods in this direction based on the difference of the amplitude spectrum $X(B(x, n), A(x, n))$ of the adjacent time points, based on the difference of the phase spectrum of the adjacent time points, and the complex detection method based on the mixture $St(n+1, n-1)$ of the first two methods.

$$\overline{X(B(x, n) | A(x, n))} - St(n-1, n) = St(n+1, n-1). \quad (8)$$

Compared with the starting point information, the tempo is the rate/time information that is closer to the music theory, and its relationship with the rhythm is easier to understand and perceive. Beat information is often used in conjunction with other features to locate the temporal position of other features. It is indicated in the score that the duration of the notes is fixed, and they have a strict proportional relationship. For example, in a 2/4 beat rhythm, a denominator of 4 means that a quarter note is defined as one beat; a numerator of 2 means that each measure has two beats, and each measure in the score is also the smallest unit that characterizes the rhythm of music.

The value is obtained by counting the distribution of subband spectral values in the experiment. Table 1 randomly and repeatedly examines from the most significant subband (such as the subband where the root note is located) to the insignificant subband (it is not significant in itself and has no adjacent significant subbands); in each case, consider the spectral mean of the two most obvious local maxima (peaks) in the subband and their surrounding 10 spectral lines, and compare this local mean with the subband spectral mean. The interference reduction factor set in this paper is intended to control the variation difference brought by different observation data to the posterior distribution in the process of calculating the distribution parameters of the time series when $h=1$, it means that the new observation data has obvious fundamental frequency characteristics, and the posterior distribution parameters are greatly affected by the observed data; and when $h=6$, it means that the observed data has a large disturbance factor ($h=6.67$ when $a > 100$, the standard deviation disturbance range is larger than the halftone band range).

TABLE 1: Music signal transformation properties.

Music signal	Subband value	Beat value	Spectral value	Spectral value
Rhythm 1	87.17	90.88	20.57	40.18
Rhythm 2	66.71	44.61	33.26	86.30
Rhythm 3	86.77	98.35	64.35	59.34
Rhythm 4	24.80	26.52	5.35	27.40
Rhythm 5	26.74	97.92	21.82	67.34
Rhythm 6	33.62	20.12	25.07	50.83

3.3. Interactive Teaching Analysis. Interactive teaching considers all possible frequencies of F0 in the preset frequency region (mid-high range, that is, the possible region where the melody of a general musical work appears) at each moment and assumes the input mixed sound to be analyzed. In this case, the PreFEst method represents the sound of the mixture to be analyzed using a weighted probability density function that represents a weighted mixture of the probability density functions (sound models) of all possible values of F0. When the server returns the information, the user does not need to refresh, and the returned information will automatically appear in the corresponding position of the page.

Since the distribution of scale frequencies in music is a geometric series, this makes the frequency components not completely matched when using DFT to describe music signals. Then, this method uses the maximum a posteriori probability estimation method (MAP) and the expectation maximization algorithm (EM) to estimate the weight of each possible value of F0 and its probability density function and select the possible value of F0 with the largest weight as the most significant value at this moment. Finally, the method of Figure 2 also presents an algorithm for smoothing F0 so that it is continuous in time.

Therefore, the user has to wait for a long time after completing the upload operation. In order to optimize this problem, the author has taken certain measures through analysis; that is, the position of the upload control is placed in the front, and the user can upload the file first. If the upload fails, the data will not be submitted. In order to obtain the relevant data results accurately, the experiment also needs to process the relevant values of pitch, sound intensity, and sound length through accurate calculation. Once the wrong pitch occurs, the corresponding error value is 1, and the value in the other case is 0.5, and then the related chord calculation is performed, and relevant parameters are input and correspond to each input neuron. There is still some content that needs to be discussed; that is, the sum of the relevant differences is obtained by calculation, which is used as the basis for the strength and weakness of the chord, and the relevant input and output of the relevant duration are carried out.

3.4. Quantification of Music Appreciation Ability. The characteristics of music appreciation belong to the basic elements and formal elements in music. When designing the system management class diagram structure, the system management interface class diagram object is provided, which includes different subordinates such as user

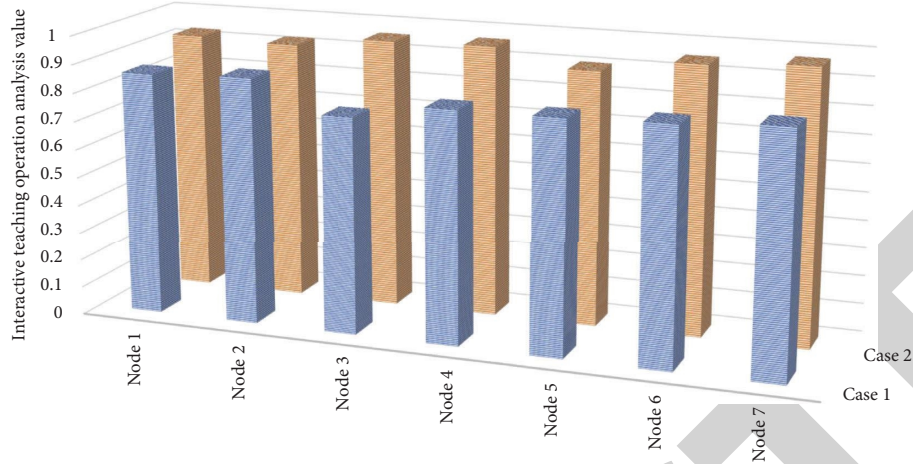


FIGURE 2: Analysis of interactive teaching operations.

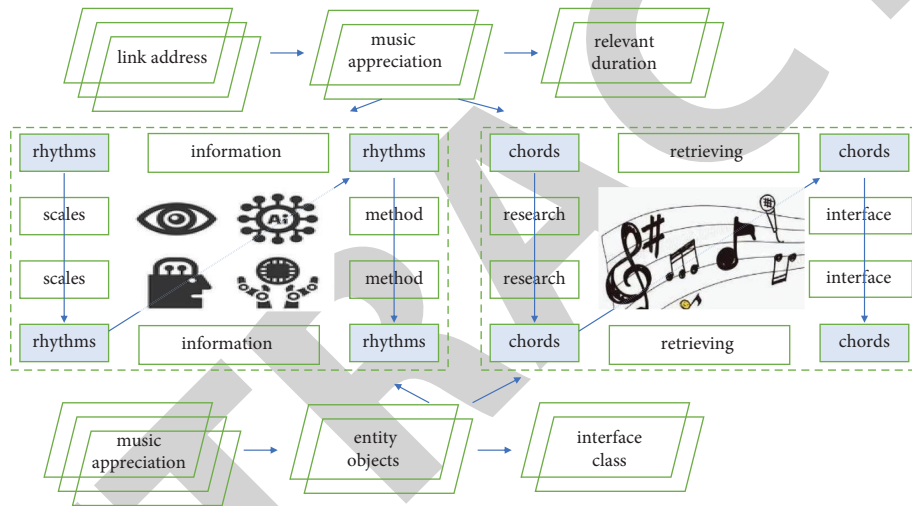


FIGURE 3: Distribution process of music appreciation.

management interface class, role management interface class, and menu management interface class object, and at design time, user management provides user interface objects including user ID, user password, user name, as well as getting users, adding users, editing users, and deleting users, retrieving roles, updating roles, and deleting roles including role interface objects; Figure 3 provides menu information entity objects including menu ID, menu name, link address, and alias.

In order to make note pitch identification not erroneous due to the pitch shift of the instrument, it is necessary to use the pitch calibration techniques proposed in this section on the resulting spectrum of the signal transformation. The basic idea of pitch calibration technology is to estimate the overall pitch offset of all musical tones by obtaining the statistical characteristics of the pitch offsets of all instruments in the target music in the spectrum, and to correct the spectrum accordingly.

The above problems all make the spectral characteristics of music signals cannot be effectively expressed in the frequency domain space through DFT. Due to the harmonic structure of tones in real music and the effects of overlapping notes in the case of chords, it is difficult to determine the

fundamental frequency of each note and calculate its pitch offset, so we need to find some spectral nodes. Quick search supports single-item and multicondition search, you can select the search term matching mode, and quick search also supports searching in the results. This search method is fast and simple. In general, these local maximal candidates will contain some harmonic components in addition to the fundamental frequency, and if selected properly, most of these candidates will have the same pitch offset. Here, a normal distribution is introduced to estimate all the candidate offsets, and the parameters of the normal distribution represent the maximum possibility of the offset distribution.

4. Application and Analysis of Interactive Teaching Based on Artificial Intelligence and Its Model for Improving Ethnic Music Appreciation Ability

4.1. *Artificial Intelligence Feature Recognition.* Taking the case where the maximum accuracy of the pitch offset is 10 cents as an example, the scale of $b = 120$ is selected for the

artificial intelligence feature transformation spectral line per 10 cents, and then the commonly used in this paper is the scale of $b = 120$. There are a total of 630 spectral lines in the frequency range. There are four beats in each measure, and each beat is a quarter note. When recording the intensity, it is the intensity of the quarter note; that is to say, the number of beats in each measure is determined, and the recorded intensity is the number of beats. The weight is relatively heavy, and for real music in which the vocal intervals differ by at least one semitone, this accuracy can basically meet the correction requirements. Of course, the processing method for the case where the maximum accuracy of the pitch offset is 1 cent is similar to the method in Figure 4.

Most of the previous starting point detection methods did not consider the prior knowledge of the pitch of the musical instrument. If the musical sound features are integrated into the detection method and combined with the specific pitch distribution information, the effect of the starting point detection is bound to be improved. The delay mechanism that is relied upon is to make the time series in one time period input into the network at the same time, and the adjacent time periods are overlapped and sequentially input, which ensures that the time sequence and continuity of the input sequence will not be destroyed; but only relying on delay, time information retained in the sequence may not be fully utilized, and it is somewhat difficult to determine the size of the overlap caused by overlapping inputs.

4.2. The Saliency Analysis of Interactive Teaching. The test database contains 7,000 phrases, and the interactive teaching selects 100 phrases in 10 styles as query samples and requires to retrieve the 5 most similar songs from the 7,000 phrases corresponding to each sample (not the samples themselves, not by the same artist). The evaluation of the results is based on manual scoring. In order to avoid these problems, the method research under the framework of music computing in this paper is all based on the note as the processing primitive.

This system uses two types of features: rhythmic features and timbre features. The extraction of rhythm features is based on the wave pattern; the sound quality features are based on MFCC and spectral contrast features and are represented by a single Gaussian model. The final distance measure based on the two features is calculated separately and then fused to obtain the final distance measure of similarity. The values that the players get when they play are 98, 75, 80, and 70. Then, the value that this subsection grasps for the beat is $2 + 5 + 10 + 0 = 17$.

As can be seen from Figure 5, after the spectrum of the music signal passes through the temperament filter bank, 88 energy outputs can be obtained. The energy output represents the energy component contained in the music signal corresponding to the fundamental frequency. In the process of determining the parameters of the rhythm feature, the parameters representing the grasp of the rhythm need 6 neurons in the input layer to correspond to them. To sum up, the important musical rhythm of a piece of music is an important feature used to describe the length and shortness of the sound, and it is also an important means. In the score

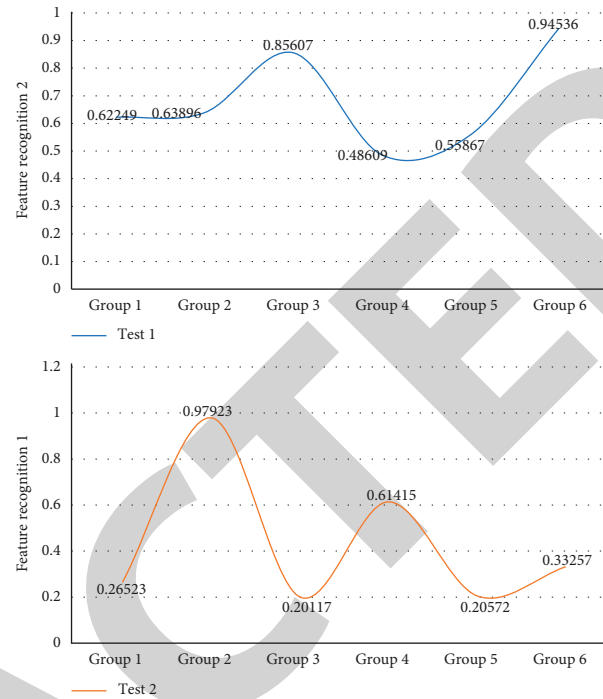


FIGURE 4: Artificial intelligence feature recognition distribution.

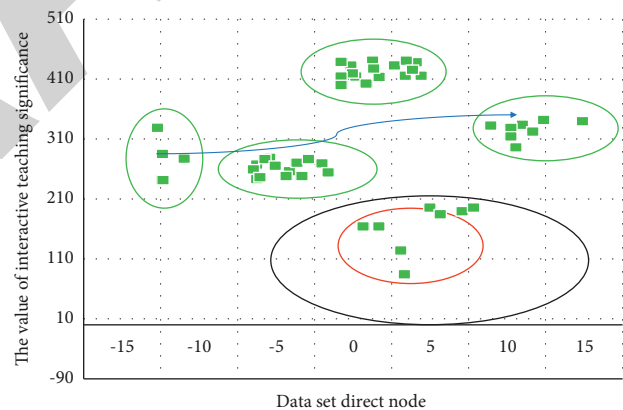


FIGURE 5: The significance analysis of interactive teaching.

of the music piece, the indicated time will appear corresponding to it. During the performance of any performer, the speed will be different, but this difference will not significantly affect the result. The core problem of this method is the construction of the detection function, and the detection function should use a lower sampling rate in the calculation to reduce the amount of calculation and give a peak value when the starting point is encountered in the detection.

Here, we also need to grasp the meaning of the pitch period. It is the reciprocal line of the pitch frequency. It usually refers to the time each time the vocal cords are opened, and the vocal cords are closed each time. Since the pitch period is a very important concept, its role in speech signals cannot be ignored, and the changing pattern of the pitch is usually called pitch.

4.3. *Simulation of Music Appreciation Ability.* At present, the data access method of the main music appreciation system is as follows: users enter the system through the browser page, and because the system can automatically translate the request sent by the user to the server operation, you can see the processing results delivered by the server in the mode. The artificial intelligence network is a general function approximator, which means that only one hidden layer can achieve the approximation of any function. In practical applications, the most difficult thing to determine in the network structure in Table 2 is the number of neurons in the hidden layer. If the frequency is correspondingly large, the pitch will be high, and vice versa.

Among all the note starting points, the interval between some of them may be very small. Considering the influence of human factors and the structure of national musical instruments, even if multiple keys are pressed at the same time, the occurrence times of multiple notes will not be exactly the same, so it is necessary to postprocess the note origin. Taking into account the auditory characteristics of the human ear and the sound effect of harmony, this paper sets a fixed time threshold of 50 ms and merges all the notes whose starting point interval is less than 50 ms.

One of the most prominent problems in doing so is to sacrifice the descriptive characteristics of CQT for music to accommodate the implementation of the FFT algorithm, which is obviously not desirable. The method first uses a scoring function to traverse all possible polyphonic combinations and evaluates them according to energy residuals and spectral smoothness. The frame estimates the fundamental frequency and then uses the maximum likelihood estimation-based voice tracking algorithm to select the active fundamental frequency; the above system still performs well in task 2; and task 3 only has one team participating, so it is impossible to compare the effects horizontally.

The module of Figure 6 is to complete the student authentication function. If the user passes the test, the system considers the user to be a legitimate user, and the student can log into the system to use the functions; if the user fails the test, the relevant warning messages remind users to log in again. The amplitude of the note increases rapidly in the attack phase, reaches the peak, then goes through the decay phase, and then gradually disappears after being held for a period of time in the sustain phase. Among them, preprocessing is generally a simple process of the original music signal to make the subsequent detection performance better, signal reduction refers to extracting a series of features that can represent the original signal from the signal, and peak extraction is performed by a specific peak detection function.

4.4. *Example Application and Analysis.* The folk music teaching management system adopts SQL Server 2020 relational database, which supports hundreds of users log-in at the same time, and the music teaching management systems can not interfere with each other at the same time, and the system will not slow down due to the increase in the number of users. All administrators and individual users within the system can use the system normally. The powerful logical

TABLE 2: Music appreciation ability algorithm.

Ability algorithm code	Music appreciation network
To get distance between two point	Input neuron to $S(j)$
Double $dist(pt\ a, pt\ b)$	Method of the main $w(t)$
{Int double $get_sum(pt\ p0, int\ n)$	Users enter the system
Return $\sqrt{\sqrt{a.x - b.x} + a}$;	The data access $u(i, j)$
For(int $i = ; i < n; ++i)$	Through the browser $x(t)$
Ret += $dist(p0, p[i])$;	Music appreciation system
Int main	According to the
$X += (p[i].x - x0)/dist((pt)\{x0, y0\}, p$	$St(n - 1, n)$
$[i])$;	In the output layer $d(i, 1)$
$Y += (p[i].x - y0)/dist((pt)\{x0, y0\}, p$	Used in music $B(x, n)$
$[i])$;	Performance evaluation
$F\{x0 + x^*temp, y0 + y^*temp\}, n$;	Input parameters $m_d(i, j)$
Double $tmp = get_sum((pt)$	Mentioned above $d(i, j)$
$Sqr(a.y - b.y)$	Delivered by the server
$Z(ans - tmp)/temp)$	Corresponding to two
Else if($math.exp(>random())$)	output

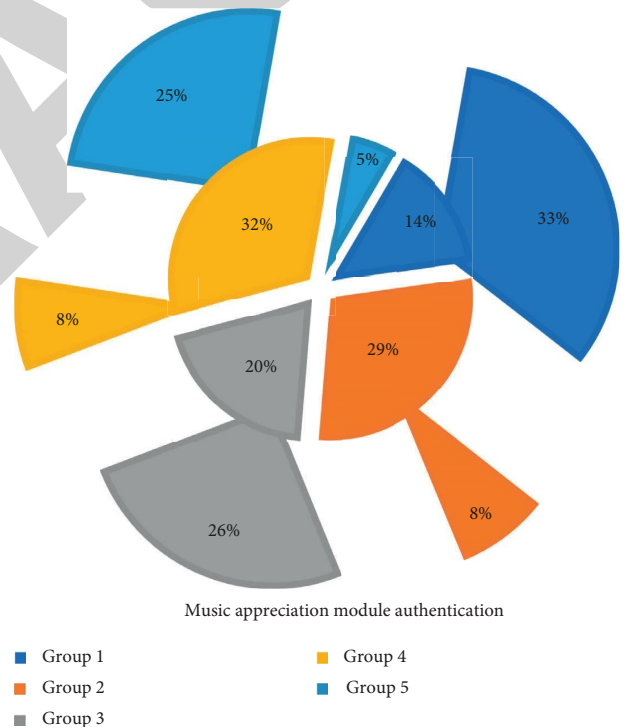


FIGURE 6: Music appreciation module authentication.

computing capabilities of the SQL Server 2020 relational database ensure the stability of the entire system. The system can run around the clock and can store information in a safe module when a hardware failure occurs. A total of 3 important related tables have been designed in the experiment, that is, the music file database, the feature information database, and the system audio manager information database. In this audio database, various important relevant pieces of information about the administrator are stored. Once a qualified user logs into the software, the comparison

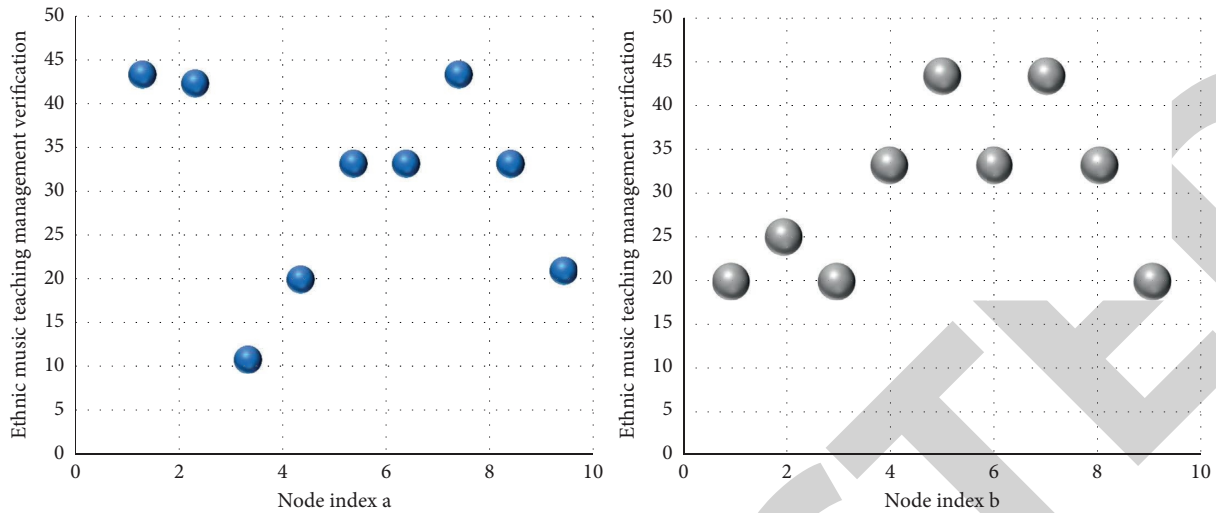


FIGURE 7: Verification of ethnic music teaching management.

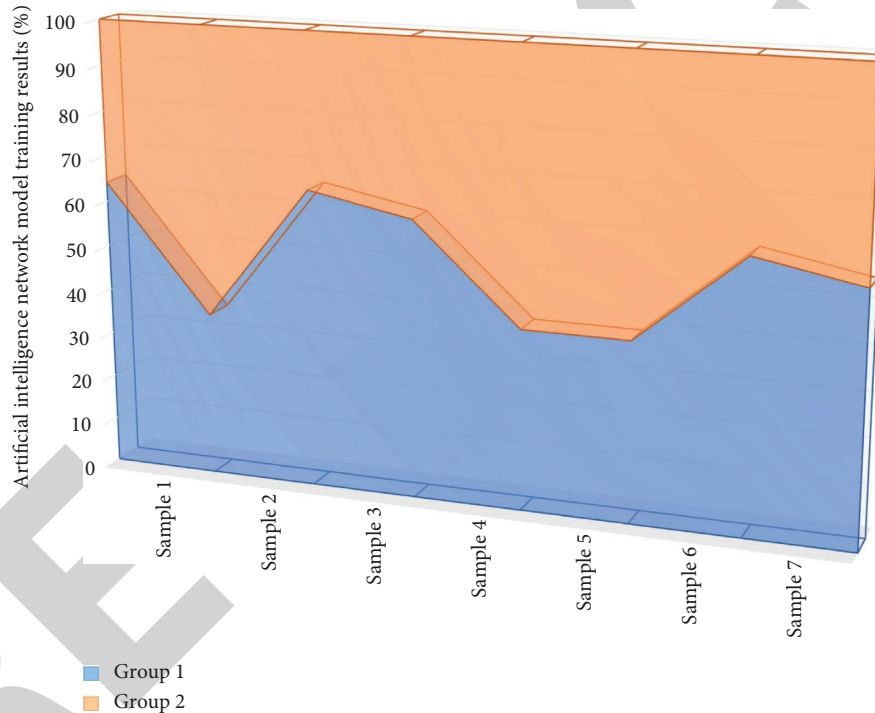


FIGURE 8: Training results of artificial intelligence network model.

with the database in Figure 7 can be realized. If the comparison is the same, the verification of the software is passed; otherwise, the verification cannot be passed.

First of all, the first point is to effectively obtain relevant files, then obtain important standard values by the performance teacher of the musical instrument, and finally determine the input characteristics of the data through the performance of the relevant national musical instruments. The idea based on cognitive distributed music features believes that listeners (who have received professional music training) store in their auditory cognitive mechanisms standard listening templates for various musical elements based on pitch distribution.

In the example, the input of relevant data must first be completed through the artificial intelligence network model, so that a comprehensive evaluation can be made from the overall effect of the music performance, the rhythm of the music, and the artistic expression of the work. The input value remains between 0 and 1 once the data about the parameter is present. The experiment requires a total of nearly 10 samples for example training in Figure 8.

Through learning, it is found that, in the MIDI signal, 127 keys are corresponding to 127 kinds of pitches. MIDI input devices generate related signals when there are multiple keys that generate corresponding signals. There is only a 0.1 millisecond signal difference, which has no effect on the

polyphony of the song. The important characteristics of the extracted sound are then analyzed; if it is derived from a MIDI signal, each key and release are paired, and each action produces two different signals. If there is a time difference between the two signals, the length of the tone will be obtained. In the MIDI signal, the first data is the pitch, and the resulting quantization range is within 127. One difference interval corresponds to the corresponding semitone, and one semitone corresponds to the keys of the piano, which can fully meet the requirements. In the MIDI signal, its second data is expressed as the strength of the button, and the resulting quantization range is the strength within a certain range. During the operation of the system, some users may need to delete the user due to the resignation of the employee or no longer have the login authority of the music teaching management system. After the user is registered, if the user information changes, such as the user's contact information, the department to which the user belongs, the user's responsibilities and permissions, the administrator or user with the user's modification authority can be allowed to modify the user information.

5. Conclusion

According to the research results of artificial intelligence theory and cognitive psychology on human perception of music, this paper proposes a set of methods for measuring the salient part of music teaching based on artificial intelligence cognitive theory and proposes the characteristics of acoustic auditory saliency, which is based on the establishment. The model describes the three-dimensional eigenvectors of musical subband structural differences and timing differences. In the scoring, mode, and key judgment part, if the tonic and mode type are all correct, a full score of 100 points will be awarded. If the tonic is wrong, the score is 0; if the tonic is correct, the score is 50, and only if the tonic is correct will it be considered whether the tonality is correct. Starting from the contextual relevance and harmonic structure characteristics of music, this paper proposes the auditory saliency feature of music theory, which complements the previous acoustic auditory saliency feature and confirms the musical connotation analysis theory proposed in this paper. Finally, we use the full auditory saliency feature to synthesize the techniques (constant Q transform, pitch correction, etc.), tools (time integration network, etc.), and conclusions (mode and chord recognition results) involved in this paper and add a variety of music theory rules. For the results of the melody analysis, this paper proposes a melody flow that is closer to the actual listening sense and perception target of human beings. In addition, the use of this system will play a significant role in promoting school teaching reform, improving students' autonomy in learning, improving teaching effectiveness, and reducing teachers' workload.

Data Availability

The data used to support the findings of this study can be obtained from the author upon request.

Conflicts of Interest

The author declares there are no conflicts of interest or personal relationships that could have appeared to influence the work reported in this paper.

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