International Journal for Housing Science and Its Applications
Publish August 10, 2025. Volume 46, Issue 4 Pages 6207-6219

https://doi.org/10.70517/ijhsa464455

Application of Interactive Teaching Music Intelligent System Based on Data Mining Technology

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Abstract The content and teaching tools of music education continue to expand, but as students' learning needs and ability levels continue to change, their limitations become increasingly apparent.. The tendency to focus too much on the training of hard quantitative music skills makes some students unable to perform in the practical application of music even though they can sing a few songs of a higher level. This teaching style makes it simple for students to develop inaccurate professional thinking orientations, ignores the development of students' teaching abilities, separates learning from usage, and makes it challenging to satisfy societal demands. Computer technology and multimedia technology are now increasingly needed in the teaching activities of contemporary music for auxiliary teaching, in order to foster students' capacity for independent inquiry and study, which is due to the ongoing development of art education and information technology. This paper analyzes the current research status of music intelligent systems in interactive teaching, explores the application of data mining technology combined with RBF (radial basis function) in interactive music teaching, and constructs a neural music intelligent system model to identify music learning links and design an interactive teaching model for autonomous learning. The findings indicated that the music intelligent system not only enhances students' overall performance in interactive teaching by 9.17% when compared to the traditional teaching mode, but also has a positive supplemental impact on students' acquisition of musical information. At the same time, it offered a superior method of instruction, one that is useful in real-world situations and significant for the study of music teaching.

Index Terms Data Mining Technology, Interactive Teaching, Music Intelligent System, Music Education

I. Introduction

Computer multimedia education is extensively employed in music schools as a result of the ongoing development and promotion of contemporary teaching techniques. Multimedia teaching expands students' imagination space, deepens their feelings, understanding and appreciation of music beauty by creating vivid scenes, vivid audio-visual atmosphere, and rich teaching contents, thereby stimulating their interest in learning. Interactive music lessons fully mobilize students' subjective initiative and creativity, prompting students to think actively, explore actively, innovate boldly, and actively participate in music activities.Make students the core subjects of information processing in the process of music learning and become active constructors of music and cultural knowledge.

There are scholars' related researches on music teaching in interactive teaching: Chang X believed that interactive teaching in music classroom is a new teaching method, teachers communicate effectively with students, teachers can obtain feedback information in time, and then effectively improve students' interest in learning [1]. He J pointed out that in music, a flexible and imaginative subject, teachers should scientifically plan teaching content, practice the "student-centered" education concept, focus on cultivating students' logical thinking and innovative abilities, and cultivate talents that meet the music needs of modern society [2]. In addition, Li F found that interactive teaching in music classrooms can effectively inspire students to reflect on music more deeply, promote the improvement of learning efficiency, form correct aesthetics, outlook on life and values, and pay more attention to the development of humanistic quality [3]. Sigal-Sefchovich J R believed that the realization of interactive teaching in college music classrooms should firstly be student-centered and teachers-assisted. Teachers in colleges and universities should change their consciousness, change their teaching behavior, and actively hand over time and leadership to students. In organizing teaching, in order to stimulate students' interest in interaction and guide their attention to music itself, a series of learning situations should be created to arouse their learning fun [4]. Gang L's research believed that music classroom instruction in colleges and universities must inevitably incorporate interactive teaching. The contact and communication between professors and students are fully completed, and it fully encourages students to speak with information on their own, which results in the realization of music learning and independent knowledge mastery, among other things [5]. In the usual teaching work, the communication and interaction with students are carried out in a perfect knowledge point and an atmosphere of independent activities, which can only better support learning, communication, and autonomous mastery of knowledge between students and teachers as well as amongst students themselves by doing so.

There are scholars related research on data mining technology: Cengiz M proposed that data mining technology can also be called data exploration or data mining, which is a link in the process of database knowledge discovery [6]. Rahman A.U. pointed out that data mining refers to the automatic extraction of hidden information with specific associations from large-scale data as a decision-making process based on pattern recognition, statistics, artificial intelligence and machine learning.This is a technology that uses computers to search and analyze massive data. It finds laws that have not been found before, and then unearths some hidden information, including those that represent the past and predict future trends [7]. Hou Y. pointed out that data mining can interact with users or knowledge bases and extract patterns from massive data in the database by analyzing specific data one by one. The whole process covers three key links: data preparation, pattern discovery, and pattern expression[8]. Jindal G thought that data preparation involves selecting the necessary information from pertinent information sources and incorporating it into the data set for data mining. In order to find rules, one must mine the data set's rules using various algorithms, and in order to express rules, one must attempt to make the mined rules understandable to users [9]. Wu Y proposed that cluster analysis, anomaly analysis, classification analysis, association analysis, particular cluster analysis, and evolution analysis are the major data mining activities [10]. Data mining encapsulates these incredibly complicated technologies using statistical analysis and artificial intelligence so that consumers may perform the same tasks without having to become experts in them. There would be variations in how data mining works for various application domains. These elements combine to create a wide range in the precise design and implementation of data mining in diverse sectors.

Under the premise of current data mining technology, this research effectively integrates the interactive teaching mode with neural network as the core. Bringing into play the characteristics of platform unity, openness and flexibility, it would help to solve the problems of uneven distribution of music education resources, poor and boring content, no intelligent adjustment and poor sharing. The intelligent music teaching model fully integrates the integrated interactive characteristics of multimedia, breaks through the limitations of traditional centralized and single teaching methods, and promotes the transformation of music skill teaching to a comprehensive exchange of culture, style and art, which has a profound impact on educational content, teaching methods and means, educational institution reform and educational concept renewal.

II. Interactive Teaching Mode

As a new teaching mode, interactive teaching involves the mutual communication and exchange of ideas and emotions between two or more individuals, thereby affecting each other. This is a self-learning teaching mode based on interpersonal interaction, which was first proposed by American educators and is a teaching strategy that advocates students to constantly exchange roles. The completion of the teaching process and the effectiveness of the instruction may all be promoted through interactive teaching, which can also improve the mutual learning and resource sharing between teachers and students. Interpersonal interactions that are peaceful, just, tolerant, and democratic are all benefits of interactive education.

Modern pedagogy points out that the classroom teaching process should be an activity in which teachers and students interact and participate together. In this process, although teaching and learning are different subjects, their synchronicity, multi-directionality and interaction make classroom teaching form an organic whole. Through deliberate effort, students transform from passive recipients into fearless participants and explorers. Teachers are no longer just the communicators of ready-made knowledge and conclusions, but also become active guides and collaborators by constantly communicating, sorting, guiding, regulating and giving feedback to students. Overall, interactive teaching is characterized by the systemicity and integrity of the teaching approach, the adaptability and integration of the instructional activities, the depth and variety of the instructional strategies, and others.

(1) Characteristics of interactive teaching mode

In the interactive teaching model, teaching activities have changed from a single teacher to a "teacher-student combination" composed of students as the main body. Teachers and students play the dual roles of "actors" and "audience" in the "performance". From the perspective of "performance", the leading role of teachers is "writing" and "directing", which is the selection and arrangement of teaching content, the grasp and guidance of the teaching process. In classroom teaching, teachers are the leaders of activities, and students are the main body of activities. In interactive teaching, the leading role of teachers and the main role of students are reflected in all stages of classroom teaching. The role of teachers has changed from a critical instructor to an organizer and participant of teacher-student interactive activities. Their primary task is to motivate, guide and serve the interactive activities with student groups as the main body, and participate in students' interactive learning, providing a more flexible reference range for students' interactive exploration and discovery, so that they can acquire knowledge and skills in various learning activities [11].

In interactive teaching, it is not just a matter of teachers asking questions and students answering them. In terms of impact, most students will feel happy about the interactive activities, which aim to explore whether their learning experience is successful, whether their interest is stimulated, or whether they have the desire to explore knowledge and master techniques and skills. These are all issues that must be considered when conducting interactive teaching activities [12].

The form of interactive teaching exercises is relatively flexible. Generally speaking, classroom interaction should include interaction between individual students, between student groups, and between teachers and student groups. This interactive method can be carried out in class or outside of class. Regardless of which method is used, we should attach importance to the main position of students and the dominant position of teachers, pay attention to the guidance and promotion of teachers in the main position, and at the same time enable teachers to play a better guiding role in activities, and also position the role of teachers as participants and service providers.

(2) The application of interactive teaching mode in music teaching

When introducing interactive teaching mode in music teaching, we must take into account the differences between each teaching objective and the substantial differences in teaching content. This article explains how interactive teaching can be applied in music teaching according to different teaching contents.

As far as music teaching is concerned, although it is difficult to classify it according to its focus, it can be roughly summarized into three main content types: knowledge, skills and experience. Knowledge content refers to teaching content such as professional knowledge of music, which requires students to understand and perceive the relationship between relevant knowledge points and knowledge structure. The second type is technical content, which includes theoretical courses on composition skills, as well as courses on vocal music, instrumental music, sight-singing and ear training, and listening training. Whether in composition skills or vocal music, in teaching, the focus should be placed on the understanding of technology, that is, the focus should be placed on operation. The third part is the experience content, which is mainly based on various appreciation processes. The experience content mainly uses existing music theory knowledge to have a perceptual and rational understanding of music works, broaden students' artistic horizons, and improve their personal music art accomplishment and humanistic accomplishment.

III. Data Mining Technology Related Analysis

(1) Data mining

Data mining is to extract hidden, undiscovered valuable information from complex and irregular data. The traditional data mining method is to use decision tree models to analyze and summarize data and discover potential rules from them. It has become an essential tool in the new data-intensive era [13], providing decision support for researchers.

Nowadays, data mining technology has been widely used in many fields and has become a research hotspot of researchers. However, the results obtained by traditional data mining methods are often too abstract, lack human-computer interaction, can only be applied on computers, and the results are not ideal. Figure 1 shows the development trend of data mining and interactive teaching technology.

Figure 1: Development Trend of Data Mining and Data Interactive Technology

Data mining is often oriented towards large databases, which requires it to be able to process large amounts of data efficiently and places higher demands on the efficiency and scalability of the algorithm. Existing data mining technologies are mostly based on relational databases. Databases are being used in a wider range of areas, their scale is getting larger, their functions are becoming more complete, and the types of data in them are increasing, and even new data patterns are emerging. Therefore, it is very important to ensure that the data mining system can use data in the database efficiently [14]. The interactive interface conveys the results to the user, and the results can be various, that is, the data mining system must have strong interactivity. Due to the existence of massive information in the network, and the status of the network in today's society is getting higher and higher, so network mining is bound to be an important subcategory of data mining. Data mining technology can observe data from multiple levels and dimensions, but it may have a certain impact on the privacy and security of data. With the development of computer networks, research on illegal data intrusion that may occur in data mining technology has become an urgent problem to be solved. Early data mining was used to help companies improve their competitiveness. With the widespread use of data mining technology in various industries, the current trend is to establish data mining systems for specific applications. The use of standardized data mining languages or standardization in relevant fields will help develop data mining systems [15] .

(2) The structure of data mining

Data mining is a sophisticated method of obtaining rational, inventive, effective, and intelligible information from vast amounts of information held in databases, data warehouses, or other information bases. As a decision support process, data mining is mainly based on multiple technical foundations, highly automated analysis of massive data, mining of possible laws from the massive data, so as to make correct decisions. A typical data mining system architecture is shown in Figure 2.

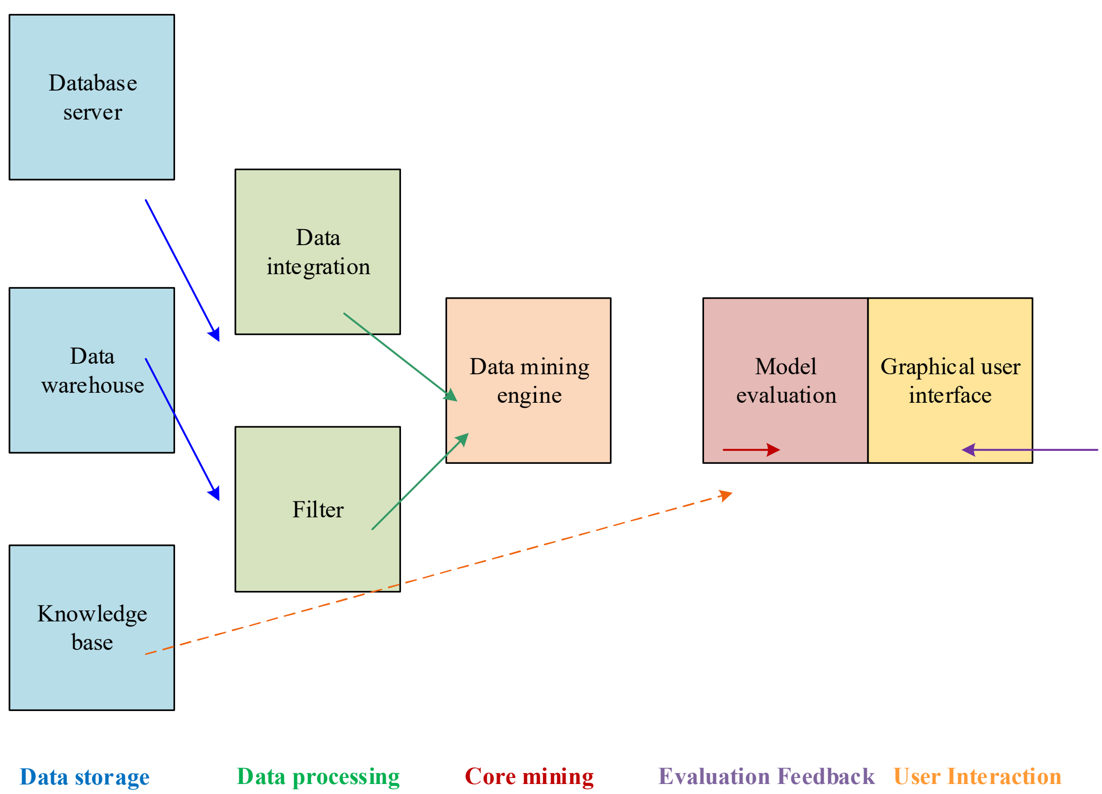

Figure 2: Diagram of the typical data mining system's architecture

(3) Methods of data mining

Common data mining methods are:

a) Subjective-oriented traditional systems

The traditional Subjective-oriented system has developed from simple trend analysis to fractal theory, spectrum analysis, etc., but this technology is based on empirical models.

b) Neuron network

Data classification, feature mining, prediction and pattern recognition are all based on neural networks, with the distribution matrix structure as the core. By mining training samples, the weights are obtained step by step.

c) Decision tree.

The decision tree includes candidate subtree generation, evaluation, and generation. Due to its simple structure and easy implementation, it is widely used, but the implementation cost must also be considered.

d) Evolutionary programming

The evolutionary programming system will automatically generate different preset conditions, expressed based on the programming language. Its internal program generation is similar to the genetic algorithm, which is a continuous evolutionary process.

e) Case-Based Reasoning

Case-based reasoning is the process of using situations similar to the current situation to select the best identical solution in the process of predicting or making decisions about the current situation.

f) Genetic programming

Genetic algorithms are mostly used in association rule mining and classification. They simulate the idea of artificial selection to screen and cultivate seeds. On this basis, through inter-species communication (hybridization, genetic variation), population (reproduction), evaluation and replication of optimal individuals, and then through generations of accumulation, the optimal knowledge set is obtained.

g) Research on nonlinear regression method

Nonlinear regression means estimating the correlation between the target indicator and other variables under given conditions, and its parameters have nonlinear characteristics.

h) Studying rudimentary set theory

Rough set theory is a set theory-based theory that organizes the vast amounts of actual data that humans have collected and uses this real data to uncover various types of information that are concealed therein.

(4) Currently, the more mature data mining technologies mainly include the following aspects.

a) Association discovery

Mining data and finding association rules.

b) Cluster analysis

In the absence of descriptive information or inability to organize it into any type of pattern, clustering can be used to automatically classify.

c) Classification

Classification refers to finding a rule to divide data records into unrelated groups and perform attribute segmentation based on it.

d) Application of neural networks

Neural networks have been widely used in many fields such as financial analysis.

e) Rule discovery and decision trees

Rule discovery is applicable to data items with attributes or descriptions, and its goal is to clearly explain the extracted rules.

f) Sequential patterns and sequences

Sequential patterns and sequences are used to find specific association rules that match a set of data sets.

IV. Data Mining Interactive Music Teaching System Architecture

Data mining integrates multiple disciplines, and the information system based on data mining is based on the premise of serving interactive teaching. Using rich information resources to build a teaching system with interactive teaching characteristics has become the core focus of current research. At present, it is difficult to obtain some unstructured information, such as emotional information contained in language and characters, by relying only on database query and retrieval mechanism.

Infrastructure-wise, the user interface would serve as the hub for interaction in the entire intelligent interactive teaching system, allowing for thorough instruction centered on the user. Through the search engine, users may get the most recent information on music instruction. They can also inspect the search engine's index table to see how dynamic updates are made. Users may easily obtain the index table since it is conveniently kept in the memory. In order to achieve efficient real-time interaction, the user information database is responsible for collecting user data and operations, and classifies the data before transmitting it to the user model and recommendation system. Finally, the recommendation system pushes music teaching materials that may be of interest to users, as shown in Figure 3.

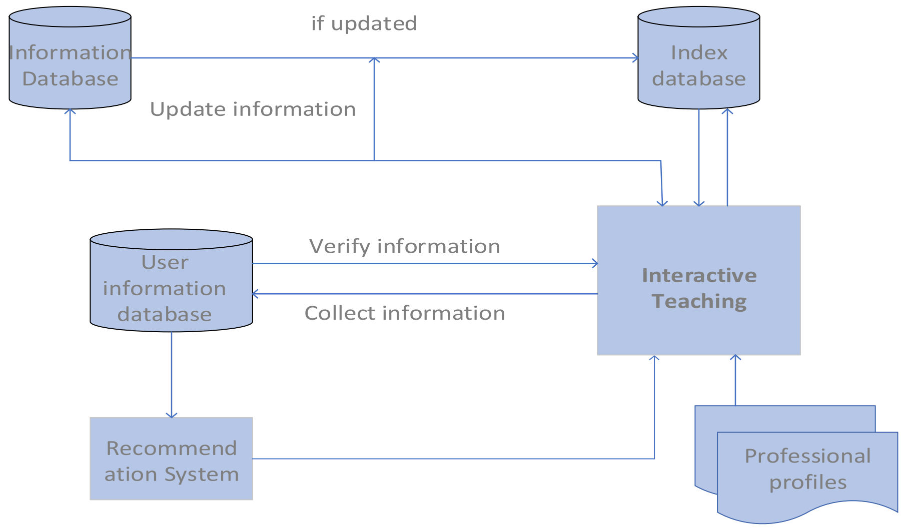

Figure 3: Framework of Interactive Music Teaching System Based on Data Mining

(1) Interactive teaching method for music using RBF algorithm

Based on the RBF algorithm, this paper analyzes the interactive teaching music intelligent system, as shown in Figure 4. The algorithm is a neural network composed of neurons, generally using a five-layer network structure.

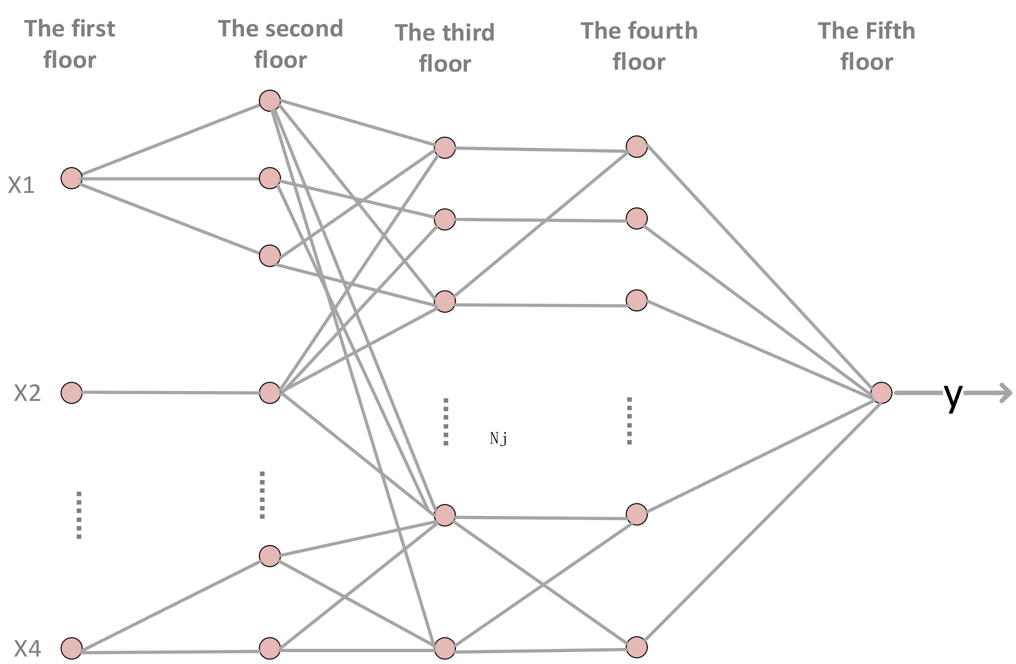

Figure 4: Five layer network model of neural network

The RBF algorithm, which is at the center of the interactive music learning model, is effectively incorporated into the interactive learning model by being fully shown in the code development process, implemented in the platform interface function, and integrated into the platform design.The hidden layer categories of these learning samples show roughly parallel distributions. Among them, X represents 100 music student investigators randomly selected from all respondents to test the proportion of their learning time in the music intelligent system; Nj represents the distribution of the hidden layer of the music learning class in each semester; Y represents the highest score of music learning corresponding to each input layer.

Let the music sample data be $x=\{x_1,x_2,x_3,\cdots,x_n\}$ and contain n samples in total. Now it is divided into K categories, then there must be a k*n classification matrix $U(x)=[u_{ij}],i=1,2,\cdots,k;j=1,2,\cdots,n$ in the music sample data set X, and u_{ij} indicates that the sample j belongs to the membership degree of the cluster i, which satisfies:

$$\sum_{i=1}^{k}u_{ij}=1,u_{ij}>0 \tag{1}$$

$$\sum_{j=1}^{n}u_{ij}>0 \tag{2}$$

A good clustering should make the total intra-class variance reach the global minimum under the constraint of $\sum_{i=1}^{k}u_{ij}=1,j=1,2,\cdots,n$. Through the iterative operation, the solution is:

$$X=\frac{\sum_{j=1}^{n}u_{ij}^{m}x_j}{\sum_{j=1}^{n}u_{ij}^{m}},i\in[1,k] \tag{3}$$

$$u_{ij}^{m}=\left(\sum_{k=1}^{n}\left(\frac{\left\|x_j-X_i\right\|^2}{\left\|x_k-X_j\right\|^2}\right)\right)^{-1},i\in[1,k],j\in[1,n] \tag{4}$$

Among them, X_i represents the cluster center of the i-th class, and m in $u_{ij}^{m}x_j$ represents the weighting coefficient that affects the clustering performance, and the value range is m>1.

The first level includes input values related to the music information elements collected here, which are summarized into indexes of different music items and input into the neural network structure. Assuming that the original music dataset has d dimensions and m rows of data, they can be represented as:

$$\mathrm{Data}Set=\begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1d} \\ x_{21} & x_{22} & \cdots & x_{2d} \\ \vdots & & & \\ x_{n1} & x_{n2} & \cdots & x_{nd} \end{bmatrix} \tag{5}$$

The music data samples are divided into k categories, and their initial cluster centers can be expressed as:

$$\xi=\frac{\max-\min}{2^i-1} \tag{6}$$

The corresponding decoding formula:

$$si=\min+\left(\sum_{i=1}a_i\right)\frac{\max-\min}{2^i-1} \tag{7}$$

The second layer represents the membership functions of different musical work indicators, the mathematical expression:

$$\mu_{ij}(x_i)=\exp\left[\frac{\left(x_i-u_{ij}\right)^2}{\sigma_j^2}\right] \tag{8}$$

σ is a fitness function among these fitness factors. According to this fitness function, the better the effect of music clustering, the smaller the variance, hence the fitness function is as follows:

$$Fit(x)=\frac{1}{c+\sum_{i=1}^{k}\sum_{j=1}^{n}u_{ij}^{m}\left\|x_j-v_i\right\|} \tag{9}$$

c represents the number of divisions in each category.

The third layer characterizes the number of fuzzy rules by analyzing music project samples and strives to minimize the number of research rules. Among them, the jth layer performs formulaic mathematical calculations on the rule output. Among them, the jth is to perform mathematical calculations such as formula on the rule output, such as the formula:

$$\varphi_j = \exp\left[-\frac{\sum_{i=1}^{r}\left(x_i - c_{ij}\right)^2}{\sigma_j^2}\right] = \exp\left[\frac{\left\|X - C_j\right\|^2}{\sigma_j^2}\right] \tag{10}$$

Count the current i-th generation individual music sample selection probability and current cumulative probability:

$$p_i = \frac{Fit(i)}{\sum_{i=1}^{n} Fit(i)} \tag{11}$$

$$p_i = \sum_{j=1}^{i} p_i \tag{12}$$

If the activation value of music teaching is low, the probability of crossover is high, and if the activation value is high, the probability of crossover is low, so as to avoid damage to excellent music teaching individuals and ensure sufficient music data. The formula for the activation value of music teaching is as follows.

$$p_i = p_{\max} - \frac{p_{\max} - p_{\min}}{Fit_{\max} - Fit_{avg}} \tag{13}$$

Among them, $p_{\max}$ represents the maximum activation probability; $p_{\min}$ represents the minimum activation probability; the current music instruction sample's average activation value is represented by Fit_{avg}, while the sample's maximum activation value is represented by $Fit_{\max}$. Its variable teaching model that influences interactive music learning is more consistent with the adaptability of activation levels.

The fourth is the normalization layer, whose nodes must match the nodes in the fuzzy rules. The output of its jth node is represented as N_j.

$$P(c_i) = \frac{\left|N_j\right|}{|x|} \tag{14}$$

At this time, the uncertainty measure for dividing the interactive music teaching is as follows:

$$H(X,c) = -\sum_{i=1}^{j} P(c_i)\, lbp(c_i) \tag{15}$$

When the segmentation c is determined, the definition of H(X,C) is as shown in formula (16):

$$H\left(X|_c\right) = -\sum_i \sum_j p\left(c_i;\ a = a_j\right) \tag{16}$$

When the test attribute a is used for testing, when the attribute is $a = a_j$, the number of music teaching samples belonging to the i-th category can be obtained, which is recorded as c_{ij}, as shown in formula (17):

$$p\left(c_i; a = a_j\right) = \frac{\left|c_{ij}\right|}{|x|} \tag{17}$$

The uncertainty level of the segmentation in the decision tree is characterized by the conditional entropy of the attribute X training set.

$$H\left(X_j\right) = \sum_i p\left(c_i \middle| a_j\right) lbp\left(c_i \middle| a = a_j\right) \tag{18}$$

The output layer, which is the fifth layer, is used to evaluate the results of various teaching methods using a fuzzy model and the RBF algorithm. The results are as follows:

$$y(x)=\frac{\sum_{i=1}^{u}\left[\left(a_{i0}+a_{i1}x_1+\cdots a_{1k}x_k\right)\right]\exp\left(-\frac{\|x-c_i\|^2}{\sigma_i^2}\right)}{\sum_{i=1}^{u}\exp\left(-\frac{\|x-c_i\|^2}{\sigma_i^2}\right)} \tag{19}$$

The total of the weight products of the output variables, represented by the interactive music instruction connection method w_k, can be calculated as follows:

$$y(x)=\sum_{k=1}^{u}w_k.\sigma_k \tag{20}$$

The second, third, and fourth layers can be combined with the hidden layer to streamline the RBF algorithm. The algorithm uses several facets of music instruction as its input layer on layers one through five, with layer five serving as the output layer. When dealing with a larger range of data, the RBF algorithm model for teaching students about music is initially built using the music data m as the initial training object. It is continuously evaluated through a self-designed software platform until a perfect model is finally established. Figure 5 displays the diagram of its program design.

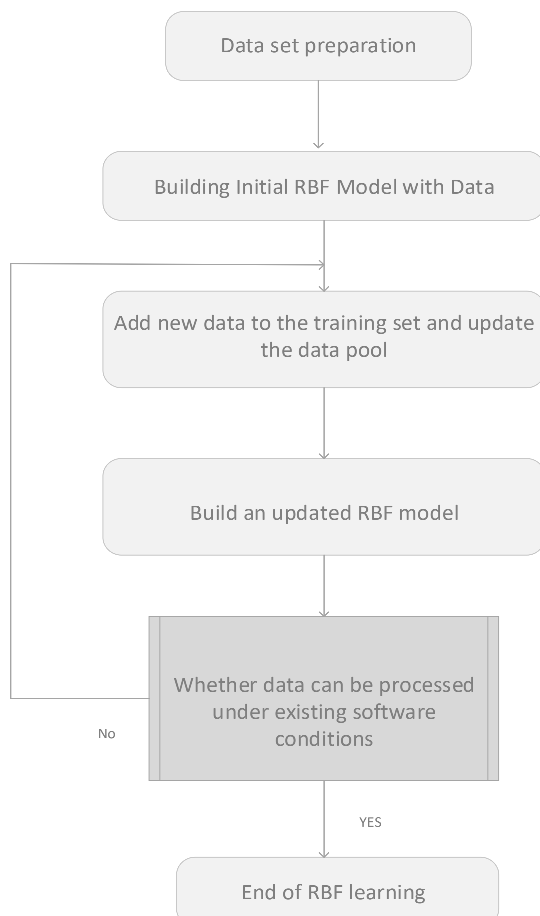

Figure 5: Interactive Music Teaching Model Based on RBF Algorithm Program Structure Diagram

(2) Planning an experiment

The interactive teaching music intelligence system's network structure is produced based on the aforementioned study, as illustrated in Figure 6.

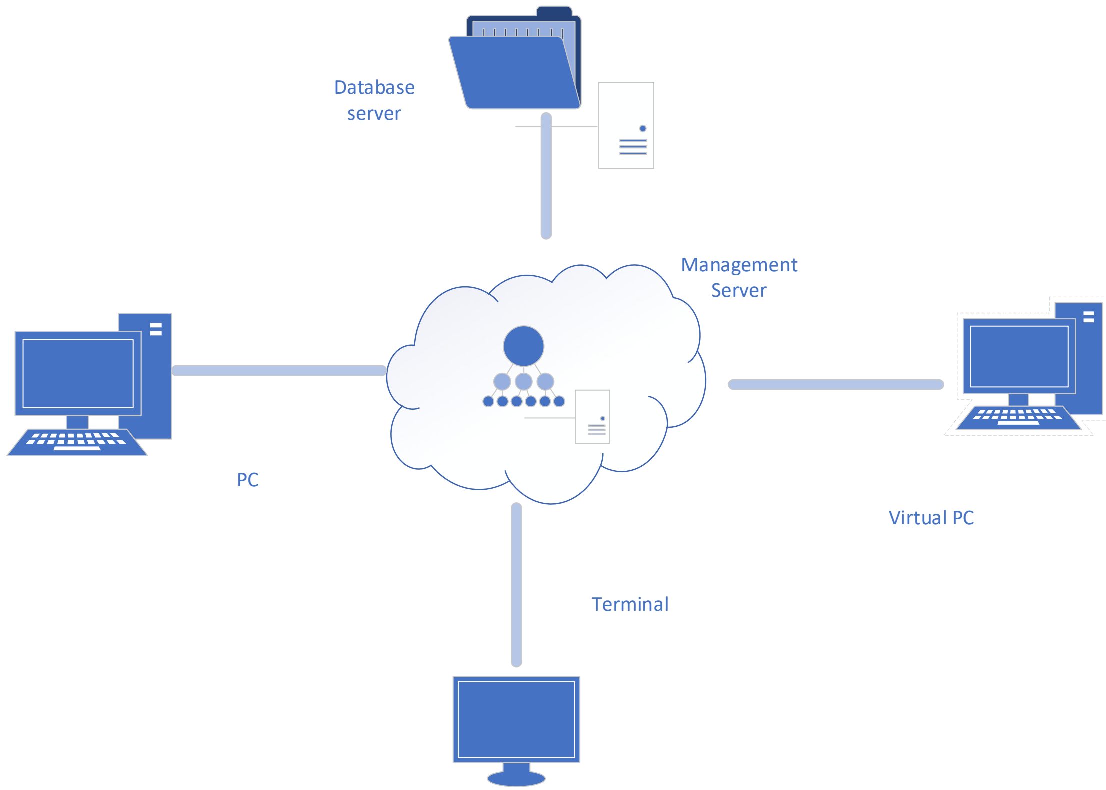

Figure 6: Network Topology Structure of Interactive Teaching Music Intelligent System

It adopts a distributed network structure and provides different identities and permissions for users at different levels, such as teachers, students, and administrators. Different services are provided according to different identities and permissions. The music intelligent system greatly shortens the distance between teachers, students, and teaching resources. In teaching management, intelligent teaching models and learning ability assessment methods are used to effectively integrate and manage various disciplines, teaching methods (organization, management, evaluation, strategy), and teaching behaviors, and enable each role to get the services they need in the intelligent system. The system includes three modules: auxiliary training, autonomous learning, and performance training. As shown in Figure 7.

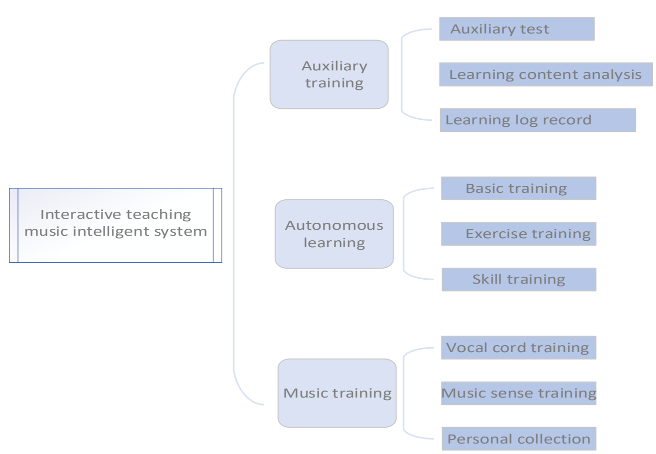

Figure 7: Function Diagram of Interactive Teaching Music Intelligent System

V. Experimental Test and Analysis of Interactive Music Teaching Mode

(1) Analysis of test scores after the experiment

In order to determine the impact of the interactive music teaching mode used in music instruction, the goal of this research is to compare and evaluate the post-test score data of the interactive music teaching mode. The study firstly used SPSS20 (Statistical Product and Service Solutions) to count students' music post-test scores under two methods of traditional teaching and interactive teaching, and then analyzed the post-test score data by independent samples t-test. The results are shown in Tables 1 and 2.

It can be seen from Table 1 that the average scores of traditional teaching and interactive teaching music post-test are 37.170 and 35.040 respectively. After students study the test in one semester, the post-test scores of the interactive teaching are improved compared with the traditional teaching. The average score of the interactive teaching post-test increased by 2.130 compared with the average score of the pre-test, and the interactive teaching had a significantly greater increase in students' music scores than the traditional teaching.

Table 1: Statistical Results of Posttest Results of Traditional Teaching and Interactive Teaching

Class	Traditional teaching	Reciprocal teaching
Sample size	50	50
Mean value	37.170	35.040
Standard deviation	4.7914	4.8596
Standard deviation of mean	0.5206	0.5456

It can be seen from Table 2 that the variance equation test shows that the Sig (significant: meaning) value of the homogeneous test of variance of the statistical data of the interactive teaching mode is 0.550>0.05, indicating that the experimental data of the interactive teaching mode obey the normal distribution and are comparable. The significant P value for the interactive teaching mode test, which is 0.0060.05 under the criterion of homogeneity of variance, shows that there is a significant difference in the post-test scores for the interactive teaching mode. Therefore, the above experimental data confirms the research hypothesis that the interactive teaching model has effective value for music teaching, and this model has more advantages in improving students' music performance.

Table 2: Post-test results of traditional education and interactive teaching, as determined by independent sample T tests

	Test of variance equation				T Test of Mean Equation				
	F	Sig	T	df	Sig(bilateral)	Mean difference	Standard standard deviation	95% confidence interval of difference	
								Lower limit	Upper limit
Assume equal variances	0.357	0.550	2.856	99	0.006	2.1299	0.7541	0.6340	3.6256
Assume unequal variances			8.824	99.410		2.1299	0.7543	0.6330	3.6265

(2) Analysis of changes in test paper scores before and after the experiment

This study evaluates the music scores of traditional teaching and interactive teaching separately in order to highlight the changes in music scores in each kind of instruction. It clearly explains the effects of the interactive teaching mode on students' music scores in Figure 8 and illustrates the changes in grades under the two teaching styles using Excel 2017 software. Figure 8 illustrates the stark contrast between the pre-test and post-test music scores of students who participated in interactive teaching. There are 5 students in the pre-test and 1 in the post-test for students whose score range falls below 60 points. The post-test has fewer students than the pre-test, indicating that the music scores of the lower-grade students have improved; there are 6 students in the pre-test and 4 in the post-test for students with scores between 60 and 75; there are 25 students in the pre-test and 18 in the post-test for students with scores between 75 and 85; and there are 18 in the post-test for students with scores between 60 and 85. There are fewer students in the post-test than there were in the pre-test, and there were 14 in the pre-test and 21 in the post-test who scored between 85 and 95. In comparison to the pre-test, there are more post-tests available; among students who scored over 95, there were 0 pre-test participants and 5 post-test participants. In comparison to the pre-test, more students are participating in the post-test. The data demonstrates that after a semester of interactive music instruction, there has been a considerable rise in the proportion of students scoring in the 85–59 range, and the total music scores have steadily improved.

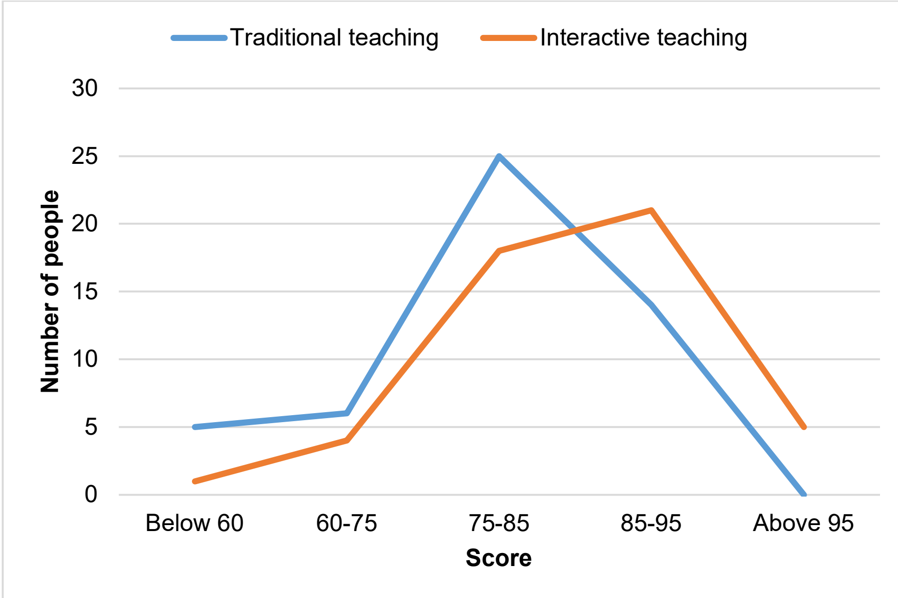

Figure 8: Analysis of changes in test paper scores before and after the experiment

Figure 8 shows how much the students' musical scores have improved following a semester of interactive instruction using the interactive music intelligent system mode. The research results showed that the overall level of students' music performance has increased by 9.17%. Compared with traditional teaching, the interactive music teaching mode has a promoting effect on the improvement of students' music performance and the improvement of students' exploration ability. In the interactive music intelligent system mode, mutual teaching and mutual learning are used as the means, and students are the main body for teaching, which mobilizes the enthusiasm and consciousness of students for music learning, and achieves relatively ideal results.

VI. Conclusion

The intelligent interactive teaching system for music provides students with superior technical assistance and lesson topics. This study first explained the use of interactive teaching in music education and then conducted research using a data mining neural network model, focusing on the RBF algorithm in a teaching music intelligent system. How music students learn in order to better realize the effects of the interactive teaching music intelligent system is simulated to provide students a more immersive experience with it, which is done by considering the neural network training model and building approach. The evaluation of music intelligent system design can enhance software design. The accuracy of artificial intelligence should be made more universal by using a wider variety of model samples in the subsequent study, and the operation degree should be increased to provide greater stability. Additionally, it is feasible to combine different AI methods, enhance neural network training algorithms, and acquire more general music intelligence systems, all of which are hotspots for future study.

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