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Retraction

Retracted: Piano Performance and Music Automatic Notation Algorithm Teaching System Based on Artificial Intelligence

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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] Y. Yang, "Piano Performance and Music Automatic Notation Algorithm Teaching System Based on Artificial Intelligence," *Mobile Information Systems*, vol. 2021, Article ID 3552822, 13 pages, 2021.

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Research Article

Piano Performance and Music Automatic Notation Algorithm Teaching System Based on Artificial Intelligence

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Artificial intelligence is a subject that studies all kinds of human intelligent activities and their laws. It is developed on the basis of the cohesion of many disciplines such as computer science, politics, information system, neurophysiology, psychology, philosophy, and language. This paper aims to study how to build a computer or intelligent machine, including hardware and software, imitate and expand the human brain to perform thinking functions such as thinking, programming, arithmetic, and learning, solve complex problems that need to be handled by professionals, and better apply the artificial intelligence assistance system to the teaching of piano performance. In this paper, Prolog language and music-assisted learning system based on the ARM and SA algorithm are proposed, the principle and operation process of music automatic recording technology are deeply studied, and the system data of artificial intelligence are summarized and analyzed by using internal database, so as to find out the implementation principle and law of piano automatic recording system. So that the artificial intelligence assistant system can be better applied to music teaching. The experimental results show that, in the teaching system of piano performance and music automatic notation algorithm, the utilization rate of artificial intelligence auxiliary technology has reached 56.81 and is growing rapidly. Therefore, we can find that the artificial intelligence assistant system plays an important role in the teaching system of piano performance and automatic music notation.

1. Introduction

With the rapid development of science, technology, and economy today, human society is developing in different directions, and artificial intelligence has become one of the hottest topics in people's lives. Due to the advancement of artificial intelligence algorithms, the development of compute and computing capabilities, and the support of governments around the world, artificial intelligence has entered a period of rapid development. The United States is the center of artificial intelligence, with cutting-edge technological research results and a rapidly developing intelligent industry. In the 1960s, the British government began to study artificial intelligence. In the 1970s, the National Engineering Department was established at the University of Edinburgh. Later, Western countries such as Japan and the Soviet Union began to pay attention to and read this website earlier, so its development was also very fast. Particularly in Japan, thanks to the support of national policies, artificial intelligence technology is very effective in promoting enterprise development and economic development. Artificial intelligence technology, including computer science, communication technology, and intelligent technology, has had a huge impact on the modern education system and caused a real change in the education field. With the continuous development and application of modern information technology, there are more and more applications of modern information technology in courses and teaching, including various teaching materials and other educational resources such as multimedia, network, and interaction. With its characteristics, modern information technology has won a reputation for supporting curriculum development and education reform.

With the popularization of digital communication technology and computer technology, electronic technology shows more and more value in the field of production and music. At the end of the 20th century, electronic music gradually became the most important direction of music

development, and the piano system was reborn automatically. Practice piano system is an intelligent electronic device, which can connect traditional piano such as grand piano and full piano. It is a high-tech product combining software and materials, which plays an important role in the industry. Practice is a simulated listening game in piano learning, including music decision-making, key pressing, maintaining foot control, and music performance. The automatic practice program can record the piano playing process, transfer the piano machine, and repeat the performance according to the recorded data. As additional equipment, the piano practice program will not affect the performance of the piano, so that people will not miss the pure sound while appreciating the original piano works. By adding new functions to the traditional harp, it reflects the progress of the times and ensures the rapid development of art, vocabulary, science, and technology. China has the ability to carry out independent research in major scientific fields of artificial intelligence and is in a leading position in the world in some key research fields. The big data mining and information retrieval program developed by the Institute of Mathematical Engineering, Chinese Academy of Sciences, has aroused great interest in the international academic community. For example, by providing candidate models through calculation, human emotional selection, and man-machine cooperation, we can build a satisfactory knowledge model through learning in complex situations.

Many well-known scholars at home and abroad have discussed and published their own opinions on the analysis and research of artificial intelligence-assisted piano performance and automatic music notation algorithm teaching system. Wick C believes that automatic recognition of scanned medieval manuscripts written in square symbols is still a challenge due to degradation, nonstandard layout, or symbols. He suggested applying a CNN/LSTM network trained with a nonsegmentation CTC loss function. He evaluated and used three different manuscripts to achieve a diplomatic symbol accuracy rate (dSAR) of 86.0% on the hardest book and 92.2% on the cleanest book [1]. Kusumaningsih et al. mentioned that the main purpose of this research is to produce learning modules with videos. The purpose is to balance the students' ability in the piano minor 1 subject of the Music Department of the Jakarta Academy of Arts. This research also obtained effective, efficient, interesting, and fruitful empire data. This is a research and development type of research. There are three stages of predevelopment, development, and application. The process includes verification, evaluation, revision, testing, data collection, and analysis to realize the product [2]. Cogliati et al. developed a new method of piano transcription time-domain using convolutional sparse coding. It models the music waveform as the sum of the piano note waveform (dictionary element) and its time activation (start) convolution. Piano note waveforms are prerecorded in a context-sensitive manner and that is transcribing a specific piano in a specific environment. During transcription, the note waveforms are fixed, and their time activation is estimated and postprocessed to obtain pitch and start transcription [3]. Nobuko's research mainly studies the differences between audience collective clapping responses to different performance forms of live performances and DVD reproduction performances from the perspective of beat synchronization. It was found that the beat synchronization of the audience group in the live performance was higher than that of the DVD reproduction performance, and the timing of the live performance group and the clapping of hands were better aligned [4]. Kumar DR said that machine learning shows the promise of producing consistent and accurate estimates. The machine learning system effectively "learns" how to estimate from the training data set of the completed operation. There are a variety of techniques in machine learning that can predict cancer based on standard data sets collected. These data sets may have been recorded by social media, healthcare websites, and other repositories [5]. Xie's article mentioned that, in the context of the information age, the importance of data resources and the importance of using data resources mean that data mining has also appeared. Under the current situation, when all walks of life are relatively equal, it is necessary to make good use of data resources to promote sales growth and slow down the loss of gross national product [6]. Rao's thesis first briefly discusses the connotation of the ideological and political curriculum and then considers the core and methods of the ideological and political construction of piano teaching in colleges and universities, hoping to provide some references and enlightenments for colleagues in the industry. To promote the smooth progress is of the ideological and political construction of piano teaching in colleges and universities [7].

The above-mentioned scholars have their own merits in the research of artificial intelligence-assisted piano performance and music automatic notation algorithm teaching system, but the role of artificial intelligence-assisted piano performance in the future music education system is rarely mentioned. Therefore, this paper will focus on this aspect, carry out an in-depth study, and try to explore the path of the most suitable artificial intelligence auxiliary system for music education, so as to promote the faster and better development of music education.

2. Method of Piano Performance Based on Artificial Intelligence Assistance

2.1. Artificial Intelligence-Assisted Technology. Artificial intelligence theory proposes how to use artificial intelligence to create and expand real life [8]. It is very important in the work of scientists and technicians. It can explain many physical phenomena and the working process of many projects and the components of institutional relationships. We can simulate and expand to understand artificial intelligence by creating similar systems with highly developed electronic, optical, and biodegradable devices. Unfortunately, because the human way is very difficult, mainly due to experiments, a weapon of modern science, it cannot be used to learn the love of human brain machines and systems [9, 10]. Some basic functions of the basic equipment and system are not explained, and the overall improvement is very limited. Therefore, first, the understanding of the concept has shifted from the path of imitation to the process of project implementation.

The research content of artificial intelligence technology mainly includes artificial intelligence technology solutions, general scientific models, corporate knowledge institutions, personal creativity, intellectual property tools, special software development fields, research on highly intelligent robots and their applications, new generation artificial intelligence machines, high-model frogs, advanced expert system, and intelligent application [11]. Among them, the expert plan is a model of intellectual expertise from scientific research to practical application and from general thinking methods to critical scientific use. Society and economy with the deepening of professional knowledge, new research topics, and challenges are constantly being proposed to humans, thereby promoting the development of basic science and artificial intelligence basic technology and opening up an effective way for computers to solve nonnumerical behavior problems. Artificial intelligence is the science of writing rules for the study of human intelligence. It uses programs to make computers think, and the human-like environment has higher learning, exercise decision-making, and comprehension abilities. Using artificial intelligence can transform human understanding into computers. The characteristics of computer-assisted learning are the use of computers as media trainers for training, interaction, integration, copying of content and images, and the use of end-to-end materials. Compared with other educational environments, AI uses multimedia technology to integrate images [12, 13], text, and audio, presenting the same learning content in multiple ways and simultaneously understanding by multiple people to improve understanding. The application of artificial intelligence technology in the computer science education system, together with the online community, is a popular guide for artificial intelligence research in the education field. It aims to develop a computer science education system based on artificial intelligence and is a new curriculum technology. It explores the characteristics and processes of students' learning and thinking, explores learning situations, enables students to adopt personalized learning and practice methods, teaches the truth in their personal capacity, and enables students to learn faster and more effectively. The slow application of artificial intelligence in computer-assisted training is closely related to curriculum innovation. The development of artificial intelligence technology will also play a major role in promoting the development of intelligent computer-assisted learning programs. With the development of the Internet and the widespread application of virtual network technology, intelligent computer-assisted learning programs will also be further developed, which will promote the reform of traditional courses and training. Expert system is a computer program that trains human experts to solve problems in a specific field. It is one of the most active and comprehensive application fields of artificial intelligence applications, covering all fields of society, and it has achieved great success. Expert plans have a large amount of expertise and experience in specific fields. Human experts can use their knowledge and problem-solving methods to think and judge, simplify the decision-making process of human experts, and solve complex problems. The problem in this regard and the problems of expert systems can always be solved through interpretation, analysis, analysis, design, planning, monitoring, correction, guidance, and control. Expert programs in mineral exploration, chemical analysis, design, and medical research have reached the level of human experts. The next-generation expert plan under development includes a distribution expert plan and an enterprise expert plan [14, 15].

2.2. Piano Performance Teaching System. Piano art is the art of learning to play, learning musical sense, and developing and introducing appropriate rules for multilevel casting and piano techniques to art educators [16]. They need professional development guidance. It is a comprehensive fitness guide that transcends the boundaries of original practice techniques, covering multiple disciplines such as aesthetics, pedagogy, psychology, musicology, piano education, and pedagogy. With the strong development of country music and our art, piano, as an external form of artistic expression, has become the most popular place in our country, and the fitness level of piano is also at the forefront of the world. Piano art is a branch of piano works, and its scientific discovery is still in its infancy [17]. In the past 10 years, frequent changes in the field of science and technology and students have brought new challenges to the scientific research of the unique art of piano and may serve as a reference. Music colleges have long paid special attention to production technology, lacking scientific and in-depth research, and lack of research methods and in-depth research methods and research. In essence, the lack of proper research on teaching modifications has led to the rise of piano art that is largely embedded in an ancient traditional teaching method. Educational places are not suitable for teaching methods, and the assessment plan is incomplete, which greatly hinders the development of piano peer art and the training of art teachers. Solve the problems existing in the art teaching of peers, improve the relationship between learning and practice, break the previous model, and improve the performance of teaching practice. As we all know, this process comes from exercise and is tested by exercise. Study work must be at the forefront of teaching practice; otherwise teaching and research will lose meaning and usefulness. In piano performance, piano accompaniment and piano solo are two completely different types, but it is easy to confuse the difference between the two [18]. Most people think that playing piano is an obstacle for their colleagues, and piano solo is more important and requires more time to practice. This idea is wrong. Playing the piano requires a lot of time to practice, but completing some things during piano training requires good cooperation between peers and musicians; some piano music is difficult and requires practice with musicians. Singing piano is not the same thing. The piano itself only needs one player to practice and can be understood intelligently; with the piano, rehearsal may not achieve the expected results. For this reason, it is necessary to teach piano principles in piano education, deepen the training and development of piano skills, and increase the concentration of cognitive skills such as noise, speed, and coherence. In

order to work closely with colleagues at work, it is necessary to master many variations of piano works. In these series of works, artificial intelligence assistance has a very positive impact on the perception of automatic musicians and piano performance. With the rapid development of science and technology [19], in the 1960s, researchers brought digital control technology and mechatronics technology into the piano training system. With the rapid development of electronic technology, the real harp piano appeared in the 1980s. It achieved the fencing effect through ring control. The rapid development of the system is because it has a huge product market and a progressive environment. Many companies have also made great contributions to the technical development and R&D process of China's fitness training programs. At present, China is a developing country. In terms of business and society, it has many similarities with the United States in the 1980s. In recent years, the total sales of pianos in our country seems to be higher than that of the United States. Piano training programs have received widespread attention, and the market prospects for the next ten years are also very impressive [20].

2.3. Music Automatic Notation Algorithm. In order to use the casting hypothesis algorithm to find the solution to the global deficit and the benefits of speed points, the standard revision is divided into several key groups according to the scores, the music-assisted learning system SA based on ARM and SA algorithms; the following provides an evaluation function, using evaluation index f [21] and T means

$$\begin{aligned} f &= \sum\left(x - 1 \cdot T_{st}\right) + \sum \operatorname{avg}(T)^2, \\ F &= \min \sum f + \sum T_{\text{std}} \in o(1, \vartheta), \\ \rho &= (\text{start}) - T_{\text{std}}(\text{end}) + \sum F > \theta. \end{aligned} \tag{1}$$

Assuming that the training set samples are x and y [22] and the number of hidden layer units of artificial intelligence machine learning is k, the output model is

$$\begin{aligned} O_i &= \sum_{j=1}^{k} \beta g (a + x + d)^{1/2}, \\ &\sum_{j=n+1}^{k} \beta_j \left(g + a_1 + x_i + d_c\right) = y_i, \end{aligned} \tag{2}$$

where k is the weight connecting the j-th hidden layer node and the output node [23]. The weight matrix of the hidden layer node and the input node will satisfy the following equation:

$$\beta = g\left(a_k x_1 + d_k\right) + \left(a_1 x_n + d_1\right)(N, k). \tag{3}$$

The intelligent assistance system continues to search for a new state X within its visible range. When the state X cannot continue to be updated within the visible range and the standard meets $Y_1 > Y_2$, random behavior will be used to judge.

$$\begin{aligned} X_j &= X_i + \text{random}(\text{visual}) - \text{if}\left(Y_1 > Y_2\right), \\ X_{\text{inext}} &= X_i + \text{random}(\text{step}) * \left(X_{\max} - X_i\right). \end{aligned} \tag{4}$$

When using the basic particle swarm algorithm guided by the fact that, to solve the optimization problem, each particle has its corresponding position [24] and speed and fitness value, then the algorithm is

$$\begin{aligned} if\left(\frac{n_f}{n} < \&\&Y_i < Y_{\max}\right) &= \left(X_{\max} - X_i\right) \| \left(X_{\max} - X_i\right), \\ G &= \left\{X_i | X_j - Y_i < \text{visual}\right\} \\ &\cdot i, j = 1, 2, 3, \ldots, n, \\ X_c &= \sum_{j}^{nf} \frac{X_j}{nf} < Y_{\max}. \end{aligned} \tag{5}$$

In the convergence algorithm of X and Y functions, through the above formula, the following algorithm can be obtained:

$$\begin{aligned} X_{\text{internet}} &= X_i + \text{random}(\text{step}) * \left(X_c - X_i\right), \\ X_i &= 0.1 + 0.9 \times \frac{\left(X - X_{\min}\right)}{\left(X_{\max} - X_{\min}\right)}, \\ X(i, d) &= 11 + 0.15 * \frac{\left(X(t, d) - X_{\min}\right)}{\left(X_{\max}\right)}. \end{aligned} \tag{6}$$

According to the formula, the root mean square error of each individual is intelligent software can be calculated, expressed in RMSE:

$$\text{RMSE} = \sqrt{\sum_{i=1}^{N} \sum_{j=1}^{k} \|\beta_j\left(g + a_j + d_x\right)}. \tag{7}$$

The operating mode of the artificial intelligence auxiliary system is generally open-loop operation, and for the ring network, LP is the line loss on the branch. The processing method is as follows:

$$\begin{aligned} I_y &= \left\{ \begin{array}{l} -I_{bi} + I_{l+1} I = n - 1 \\ -I_{bn} I = n \end{array} \right\} + \text{ZI}_L, \\ P_{i+1} &= \sum_{j=n+1}^{n} \text{PL}_j + \text{LQ}_{j=1}, \\ \text{LP}_i &= \frac{R_i\left(P_{n+1}^2 + Q_{i+1}^2\right)}{\left|V_{i+1}\right|^2}. \end{aligned} \tag{8}$$

When Nb is the total number of branches of the intelligent software [25] since the voltage level of the distribution network is low, the function that usually targets the balanced load can be expressed as the following formula:

$$W(n) = w_{\min} + (w_{\max} - w_{\min}) \cdot x(n),$$
$$F(x) = \min f(x) \sum_{i=1}^{Nb} R_1 \frac{\left(P_i^2 + Q_i^2\right)}{F_{\max}}. \quad (9)$$

3. Experiments Based on Artificial Intelligence-Assisted Piano Performance and Music Automatic Notation Algorithm Teaching System Analysis

Artificial intelligence software can compile and design patent documents according to user needs, which is convenient for patent application and technology update. Users who only need relevant technical documents need to write technical file names or machine operations, technical information requests, and the website technical documents of our application documents [26]. The name comes from the fair equipment of some large scientific databases, and Alipay pays and inquires fees. Users can query relevant technical problems through the Internet database and application website related to Internet technical information and application website problems on the consulting platform [27]. In order to determine the sound and evaluate the size of the player's performance, it is necessary to calculate not only the general technicality of the action but also the individual keys of each player, including the right and wrong of each key, as well as the difference between keys, time, length, and more keys. Therefore, the action results of music masters can be used as the standard of comparative analysis. In order to reduce the complexity of algorithm design, the judgment of code is delayed for a period of time [28, 29].

3.1. Experimental Description and Experimental Strategy. In the artificial intelligence-assisted piano performance and automatic music notation algorithm, data mining is the process of extracting useful information and hidden information from a large amount of incomplete, noisy, chaotic, and useful material data. This information is not known to people, but it is also useful. Research on data mining and knowledge exploration has created three powerful technical databases, artificial intelligence, and statistical analysis. For preliminary research content, the main insights include search algorithms, data warehouses, landscape technology, scale and scale conversion templates, discovery, maintenance, and recovery of representative methods for acquiring knowledge, knowledge discovery in segmentation and unstructured data, and online data mining. A database program or a knowledge base program is a computer program that stores a large number of facts about a specific subject and can answer many questions asked by users on the subject. Many technologies have been developed to effectively define, store, and capture a large number of facts and meet the needs of human data processing, and the agency is an information retrieval system. With the growth of data, the database becomes larger and larger, so when designing an intelligent information retrieval system, you will face many problems, including the need to understand the mother tongue, the difficulty of interpreting answers based on stored facts, and the benefits. Understanding the question and determining the answer can go beyond the information provided by the database in the subject area. Therefore, how to quickly retrieve and replace the stored data has become an urgent problem to be solved. After the extensive application of computer technology, a traditional way of thinking has been formed, enabling teachers and students to understand each other clearly and to understand themselves, others, feelings, and other behaviors. In addition, students can also expand their knowledge system and use new developmental abilities and thinking abilities. These developments make it possible for the development of teaching models and their adaptation to modern learning systems and training models. The data mining workflow is shown in Figure 1.

Statistical data feature clustering and classification and evaluation of effective data are based on clustering results, using search algorithms to obtain data and observability of the three angles of data mining. Before executing the data mining algorithm for calculation, it is necessary to preprocess the data for each algorithm.

3.2. Sample Collection. Input the sample note set with piano accompaniment, and establish the piano accompaniment material metastructure database through sample training. The system compiles the original piano audio concept, converts it into a sound-based system, stores it in the database, and resizes the HMM to create a comparable body of the input model. In the fusion stage, according to the basic information of music melody and the harmonious culture of the existing world, the program uses the Viterbi algorithm to quantify the database and select the appropriate piano metastructure for the melody part. Then create a piano presentation. The database includes k-tone size characteristic table, physical melody table, tone table design table, characteristic modulus table, modulus of sample score record, hidden horse parameter table, collected test score noise, and hidden array in parameter table. In music education, the evaluation of science, field, and teaching achievements is of great benefit to improve students' music level, teachers' teaching ability, and academic level. However, only based on the knowledge of researchers, it is difficult to evaluate the results of the project pertinently, fairly, and effectively and to provide an accurate and quantitative reference. There is almost no direct reference to intellectuals. Therefore, it is necessary to develop a scientific, methodological, and conceptual evaluation concept as a means of evaluating things, to help one learn music better. New tools and platforms must be used to develop learning models. Program is an important factor in the development of new music education. The innovation and change of technology have brought about great changes in traditional education and methods. Using new technology in teaching can make students more comfortable in learning and greatly increase the influence of learning. It has also made great contributions to improving students' quality of life. Use computer music in teaching activities. It also has a great

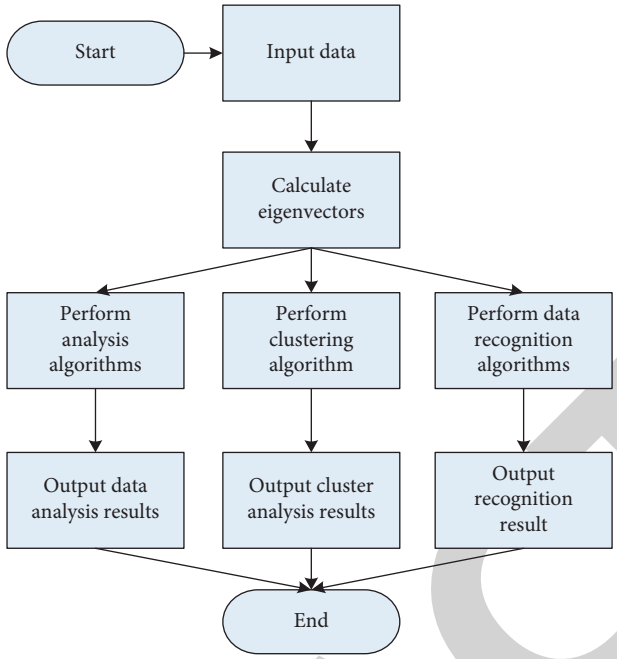

Figure 1: Data mining workflow.

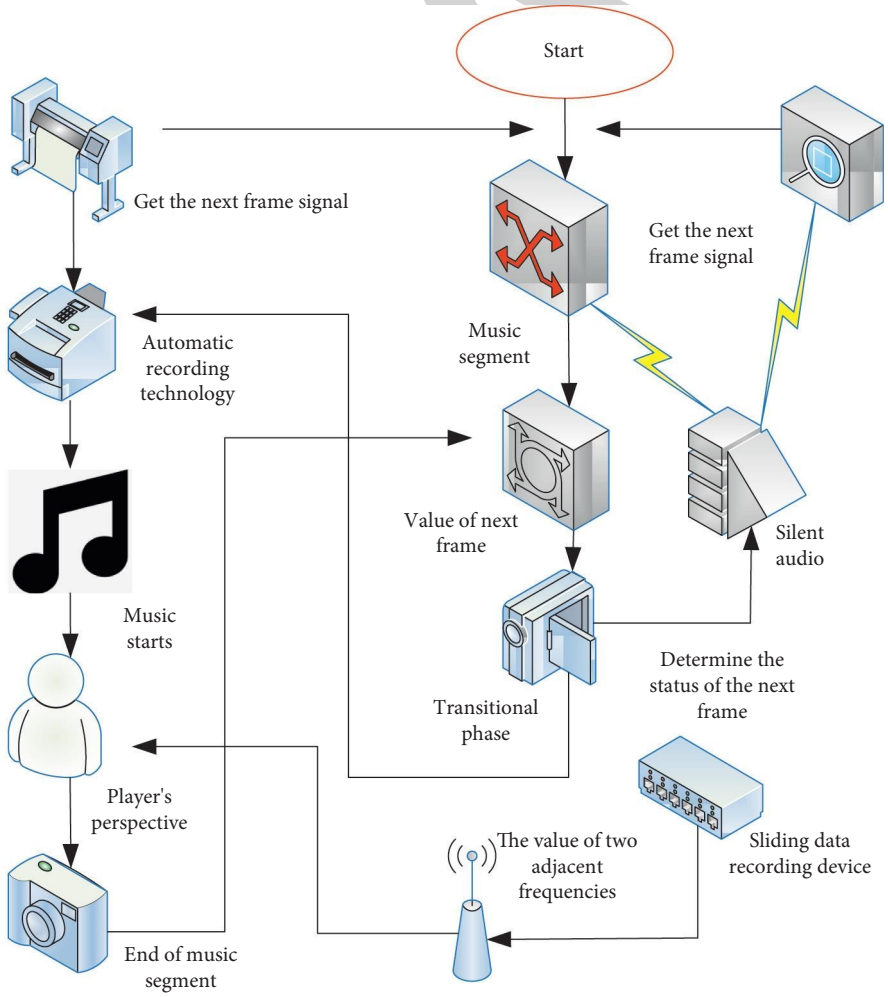

Figure 2: The operation diagram of the shop.

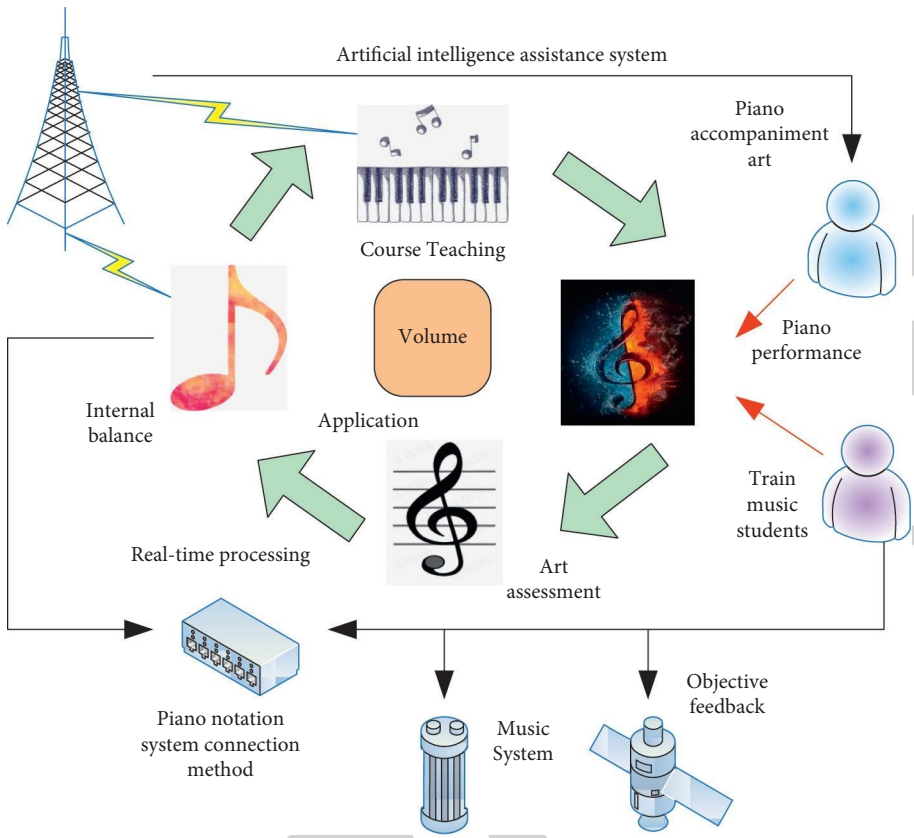

Figure 3: Music student comprehensive proficiency test.

impact on the training and development of teachers. It provides special courses for college teachers. They need to learn new information and learn basic knowledge in continuous communication. At the same time, it also sets a new time for learning strategies, which enables students with music education to achieve rapid and efficient growth. Challenging fitness talents in the new era and providing music-related occupations at different levels are not only a new requirement for the development of performing arts in colleges and universities but also the first requirement.

3.3. Experimental Results and Data Analysis. This paper introduces a device with an artificial intelligence analysis function, as shown in Figure 2; it has a recording device and artificial intelligence analysis function. The first is that the voice recorder is better than the microphone, music data can be recorded, the monitoring function performs artificial intelligence analysis, and the above data is stored through the storage module and then retrieved and uploaded to the cloud. The cloud collects and then downloads from the cloud through an external storage device.

At present, the main body of piano art assessment in our country is one subject, most of which are completed by the first teacher to complete student self-tests, interpersonal skills, students' internal balance, and statistics of students outside school. So we have to try many connection methods. In actual learning, the evaluation results are often ignored and used. The evaluation result is the starting point, not the next end. Assessment should not be a review of graduate courses; it should be used to retrain students as shown in Figure 3.

For the existing more complex pianos, it is more difficult for artists to hone their playing skills. They need a lot of training time and consume a lot of energy and time. In the process of students' performance, in most cases, teachers need to guide and correct mistakes, but teachers are limited in ability and always difficult to guide. The comprehensive ability of students can be evaluated through the use of artificial intelligence auxiliary systems, and the system records the comprehensive scores of students and makes a summary evaluation of the scores and abilities. There may be some uncertainty in the results. Uncertainty lies in the mistakes made in the learning process of artificial intelligence-assisted systems, that is, whether it lacks directionality or diversity, as shown in Figure 4.

It is understood that the piano training program is relatively new and has some shortcomings. For example, the production process is corrected according to the normal data recording information, the behavior that does not have the image of music makes the performance more delicate, and the sports performance of the music is not humane. But because of this, piano practice projects have great prospects for development, as shown in Figure 5 and Table 1.

In order to overcome these weaknesses, in addition to the role of music itself, the future automatic notation system should also pay attention to increasing the scientificity of art from the visual, emotional, and emotional fields, and let the audience truly feel the sense of intelligence and innovation. Pay attention

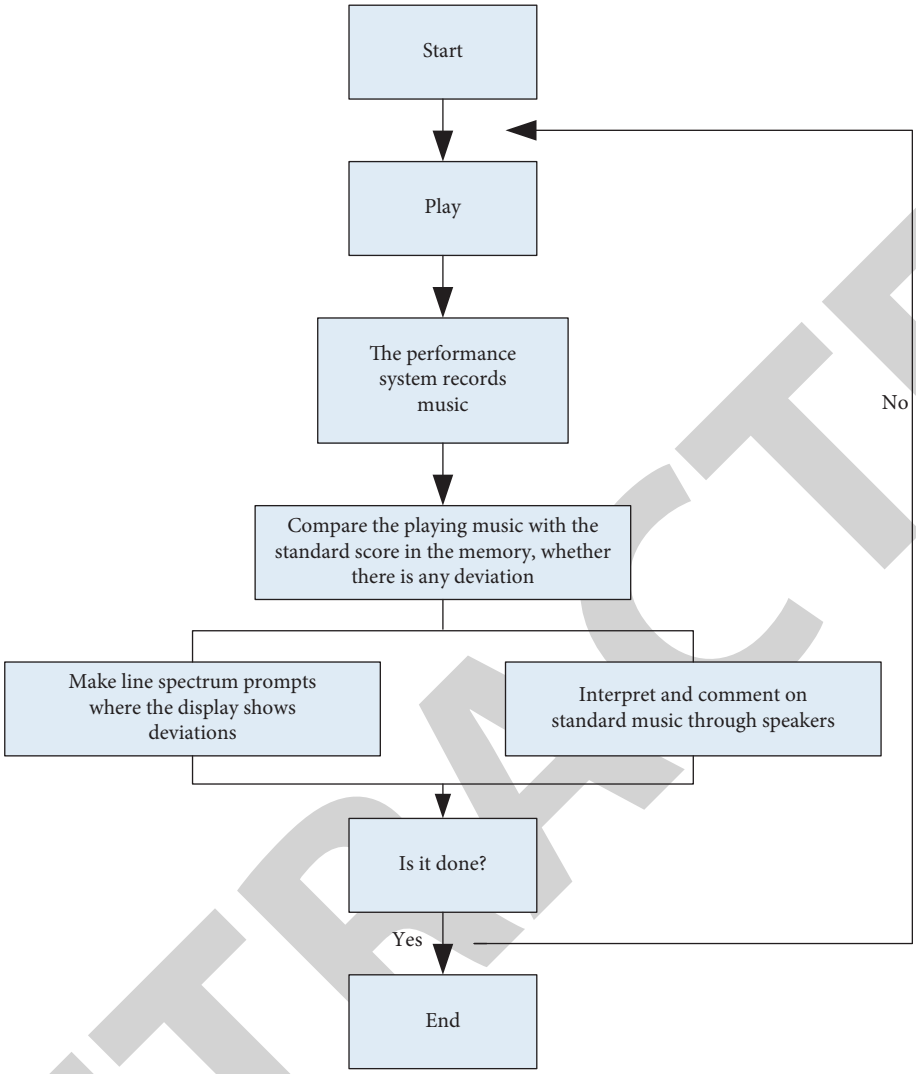

Figure 4: Automatic playing flowchart.

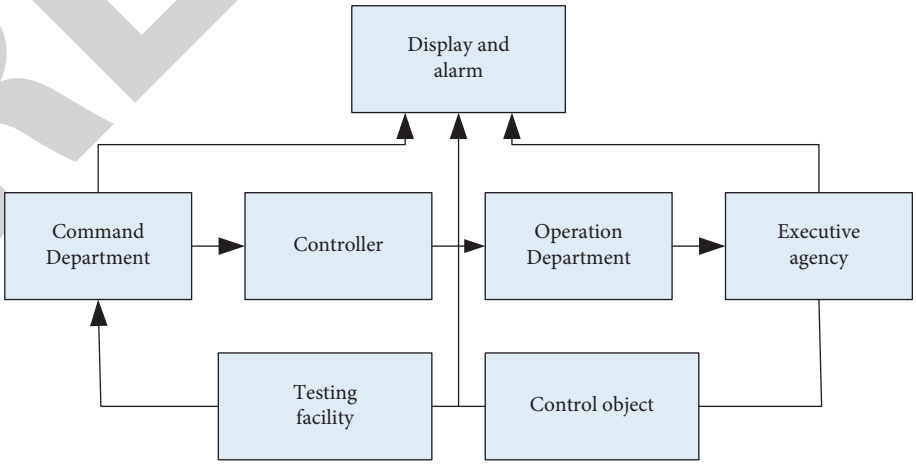

Figure 5: The lack of piano training programs.

Table 1: Vulnerabilities in the automatic piano playing system.

HMM parameter	VAB algorithm	Structure converter	Database
CPLD	124	220	450
EDA	145	241	431
VHDL	166	235	520

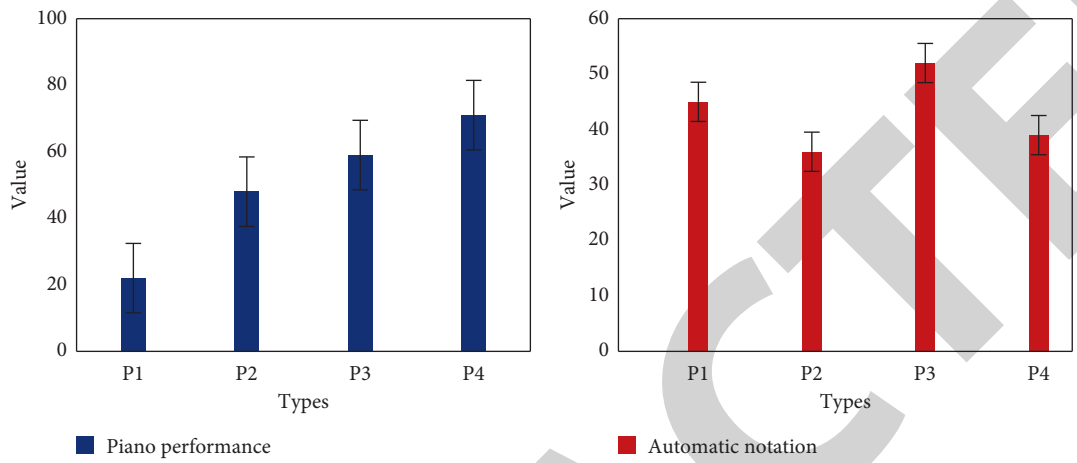

Figure 6: The emotional realm of music.

to the connection between the artist, the music performance, and the audience. The sound in music aesthetics darkens the interactive sound and recognizes the perfect combination of people and materials, technology and art, as shown in Figure 6.

The artificial intelligence-based automatic notation system for piano performance is proposed, combined with the demand analysis of the system, from the aspects of music information recognition, collection and processing, and data information management, as shown in Figure 7.

The subject system of artificial intelligence technology includes beliefs, desires, intentions, capabilities, choices, and commitments. It is a state of mind. It is stronger than objects and smarter and has a certain degree of autonomy. The subject tries to perform tasks autonomously and independently, which can interact with the environment, communicate with other subjects, and achieve goals through plans, as shown in Figure 8.

Language work is one of the oldest research fields in artificial intelligence and an important branch of artificial intelligence research. It provides basic scientific and technical training on the use of computers to understand and create a native language, and there are now programs that can answer questions from internal databases, as shown in Table 2.

In the piano automatic notation system, the host computer is used as the control center of the entire system, through the main control module to complete the collection and processing of piano scores and finally to record it for later use, as shown in Figure 9.

According to the automatic notation system in music teaching, there are many uncertainties in the input information and the rules in the knowledge base (Table 3).

Prolog language is a programming language with modeling process and intelligent thinking ability. It is related to the field of design and information technology understanding, including proposals and decision-making understanding cases. Prolog language is widely used in related databases, problem-solving, mathematical engineering, brand promotion, scientific verification, native language understanding, expert programs, and other fields. Nowadays, it is also widely used in the field of music teaching and the notation and notation system of piano performance, as shown in Figure 10 and Table 4.

Artificial intelligence education has become an urgently needed altar for innovative education, and the construction of artificial intelligence facilities in primary and secondary schools has accelerated. However, robot training, to a large extent, is at the level of comprehensive hands-on activities, and it also encounters many limitations. Because the business of competitive services is very important, the direction of development has changed. The education system is not sufficiently supervised, and some companies restrict the products of other companies through unfair competition, as shown in Figure 11.

4. Discussion

Through research or development of programs or equipment with human understanding capabilities, artificial intelligence assistive technologies can better help a person to work, thereby creating social value. The human brain itself is mainly manifested in the understanding and application of knowledge, that is, the recognition, storage, processing, and updating of knowledge and information through the memory, thinking, learning, and interaction of the human brain. When the device can perform human activities such as discussion and analysis, problem-solving proof, decision-making, and piano performance, it indicates that the device has a certain level of understanding.

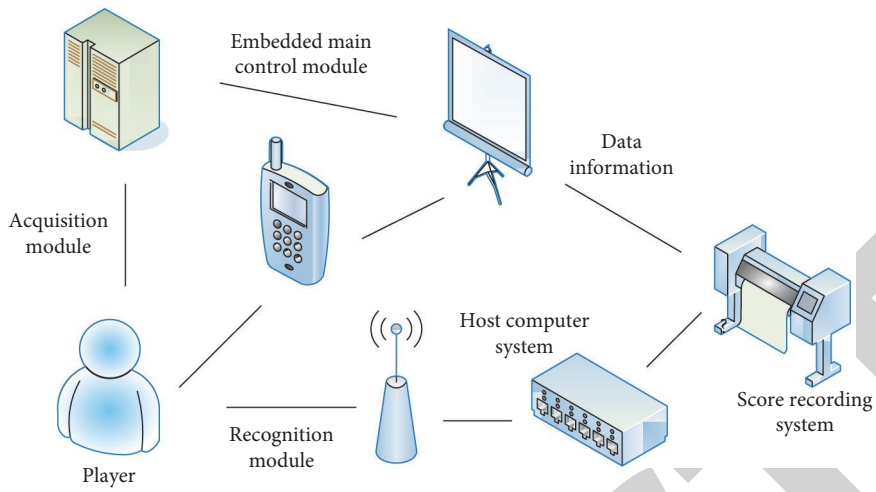

Figure 7: System overall architecture design.

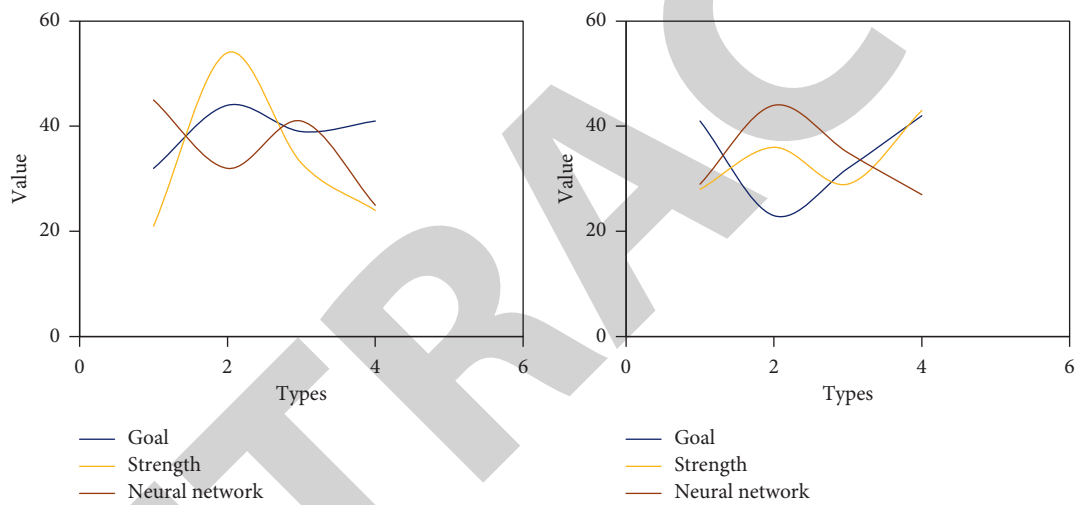

Figure 8: Artificial intelligence agent system.

Table 2: Artificial intelligence language work.

	Ratio	Number	Percent (%)
Piano translation	1.25	265	56.81
Language processing	1.14	147	36.24
Music memory	1.03	235	41.64

After the 21st century, music education has become an important factor in the reform of the music education system, which mainly benefits from the educational projects and educational projects introduced from the West in the early 20th century. In the past, such courses have also exposed many deficiencies. For example, the viewing of music in the education system is narrow, which is based on the direct use of the western music education model and is not combined with China's social and educational environment. In terms of music education, the course is unique and does not include basic education or general education. Due to its long history of music abroad, music education cannot be fully integrated into the culture of global scientific and technological development, and there are more music activities and music exchanges with foreign countries. With the gradual development of electronic music technology, the application of music education in colleges and universities has closely increased the computer music platform, highlighting the importance of this new technology in education and training. With the introduction and development of this new technology, great changes have taken place in the traditional education and training mode, making school training more dynamic, flexible, and efficient than the previous traditional mode and urgently promoting the independent development of students and the development of new thinking ability. Therefore, electronic music assisted by artificial intelligence is also a new challenge for music education and teaching environment.

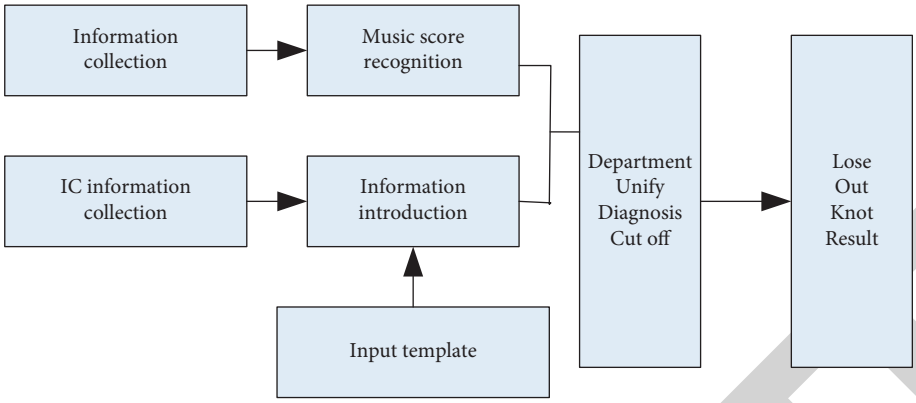

Figure 9: Basic structure of piano.

Table 3: Numerical value of credibility fuzzy quantifier.

	Numerical value	Fuzzy quantifier	Specific amount
Absolutely credible	1452	256	144
Ordinary credible	2210	229	152
Weak credibility	2431	401	130

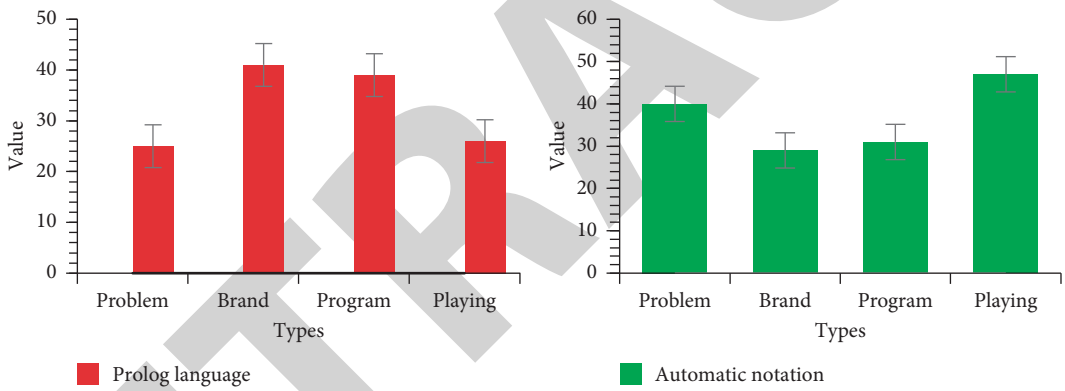

Figure 10: The use of Prolog language.

Table 4: Frequency of use of Prolog language.

	Prolog language	Automatic notation	Mathematical engineering
Proposal	1441	269	101
Expert program	1210	254	114
Database	1304	223	139

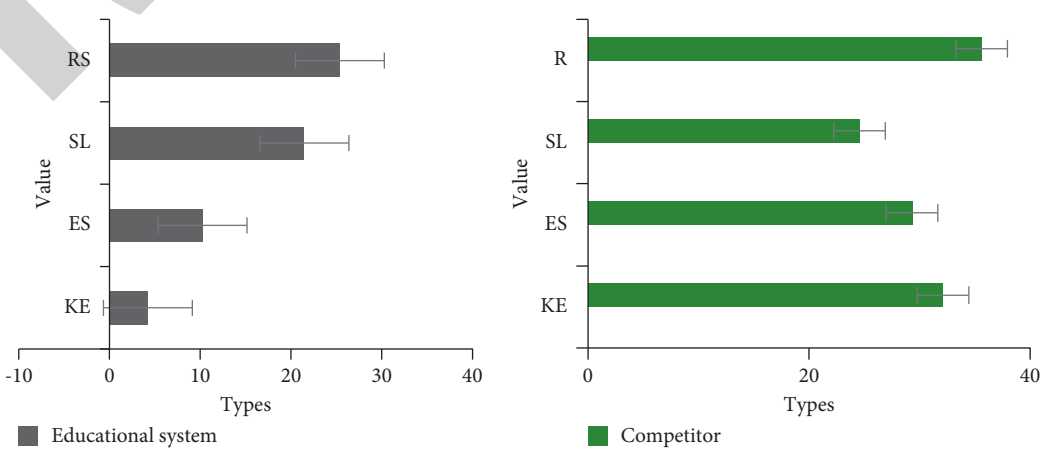

Figure 11: Artificial intelligence education.

5. Conclusions

Cultivating students' comprehensive music skills is a sustainable process and requires continuous education of students. In the process of piano teaching, we must be good at discovering and summarizing problems, focusing on improving students' music theory intake and piano skills, and using effective teaching methods to cultivate students' understanding, attractiveness, and adaptability in the process of practicing piano, and then cultivate students' comprehensive ability in the process of piano performance. Spatial learning is composed of problems arising in the teaching process and ultimately cultivates students' comprehensive music skills and piano performance. Comprehensive music education is a mature subject, including artificial intelligence, computer science, pedagogy, science, and behavioral skills. The syllabus has replaced human teachers to a certain extent in order to successfully achieve a good education. The research on intelligent auxiliary education system in our country has a long history, but in recent years, with the widespread use of computers and the increasing demand for curriculum software, it has developed rapidly. Artificial intelligence-assisted technology ensures the smooth development of music education and training and music sports rehabilitation. The use of the Internet has also made our country's music education parallel with foreign education models and established a complete network system. It has increased the exchange of experiences between different countries and countries, promoted a better national culture, and established a better experience in education demonstration models. From the perspective of students, through the establishment of subject networks and comprehensive courses, students' learning ability will be built into the society, beyond music education and practice and comprehensive development.

Data Availability

No data were used to support this study.

Conflicts of Interest

The author states that this paper has no conflicts of interest.

Acknowledgments

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