# An Intelligent Piano Teaching System and Method Based on Cloud Platform

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**Abstract.** This paper studies the intelligent piano teaching system and methods based on cloud platform, and the research results are as follows: combined with the current situation of piano teaching management and the needs of information construction, this paper analyzes and expounds the background, purpose, significance and feasibility of the design and implementation of the system, and summarizes the overview of the research progress of the system at home and abroad. The system uses B/S architecture as the system architecture, MVC pattern as the design pattern, SSH framework as the hierarchical structure of the main body of the system, and uses Java language to design and implement the system on the basis of structured design idea. The design and application of the system can provide a new idea for piano teaching management, and provide a normative and scientific technology management platform for the work.

**Keywords:** B/S structure · Piano teaching system · Cloud platform · Intelligence

## 1 Introduction

With the rapid development of computer science and technology, teaching methods are not becoming conventional, but a variety of teaching methods. Since the formulation and implementation of China's reform and opening-up policy, especially from the late 1980s to the early 1990s, with the rapid development of China's economy and the overall improvement of national quality, piano art has also shown a blowout development in China, and the number of people who can play and like piano has also increased significantly, and in many areas There has also been an upsurge of piano learning, and the number of people taking piano grade examination is increasing year by year, which shows that piano has been more and more loved by Chinese people. According to statistics, since China began to implement the piano amateur grade examination in 1990, the number of people participating in the piano grade examination has exceeded 300000, and is still increasing year by year, especially since the enrollment expansion of colleges and universities in our country, the number of people in higher education has been increased, followed by a further upsurge of piano learning, although many students have a better piano foundation Weak, but have a unique understanding of the piano and hobbies, have also joined the piano learning, also makes the school originally relatively weak piano teaching resources is difficult to meet the requirements of the new era of

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students on piano learning, and because of the traditional face-to-face teaching based piano teaching mode is also constantly, because of the increase in the number of students and make teaching more and more difficult Therefore, there is an urgent need for new piano teaching mode to improve this situation and provide better teaching services for piano learners.

The design and implementation of intelligent piano teaching management system based on cloud platform allows teachers to arrange piano teaching tasks with pertinence, including the overview of piano history, the study of basic piano theory, the training of piano cultivation, the creative style of piano score and piano playing skills and other theoretical knowledge related to piano, thus allowing students to use piano teaching software On the one hand, it reduces the teaching burden of teachers, but also provides students with a more optimized piano learning mode. Piano learning no longer needs to be limited by the learning site, the number of students and other conditions. It also provides a guarantee for better cultivating students' understanding of the piano score content and the sublimation of artistic experience.

When the intelligent piano teaching management system of cloud platform is implemented, MVC design idea is taken as the guidance, struts is used as the view display control component of program control, spring is used as the business logic processing control component, and Hibernate is used as the data access model, It not only realizes the sharing of data coupling between piano teaching data display and business processing, but also realizes the openness of piano teaching management system through the application of B/s, which allows piano teaching software to be better compatible with new application requirements according to the actual application requirements of teaching without affecting the previous operation functions, thus providing a more convenient platform for online promotion of piano teaching Stable support.

## 2 System Structure Analysis

### 2.1 B/S Structure

In the traditional two-tier C/S architecture, the system is divided into two layers, namely the presentation layer and the data layer, corresponding to the client and server respectively. In the three-tier C/S architecture, a function layer is added between the presentation layer and the data layer of the two-tier C/S architecture. The corresponding functions are added to process messages, applications, transactions, etc. the addition of the function layer avoids the shortcomings of the two-tier structure and greatly improves the scalability and stability of the designed system. The three-tier mode of C/S architecture is shown in Fig. 1.

B/S architecture is developed to improve the shortcomings of C/S architecture. B/S architecture has distinct characteristics, and most functions of the system are completed by browser [1]. The server side undertakes most of the functions and passes them to the user, while the script program has few functions. This kind of system running mode reduces the pressure of the server and the task of the client. Therefore, the scalability of the system is improved, and the maintenance cost in the later period is also alleviated to a certain extent. The B/S architecture is shown in Fig. 2. The reality of computer aided translation is very interesting: on the one hand, it is confused and ignored by translation

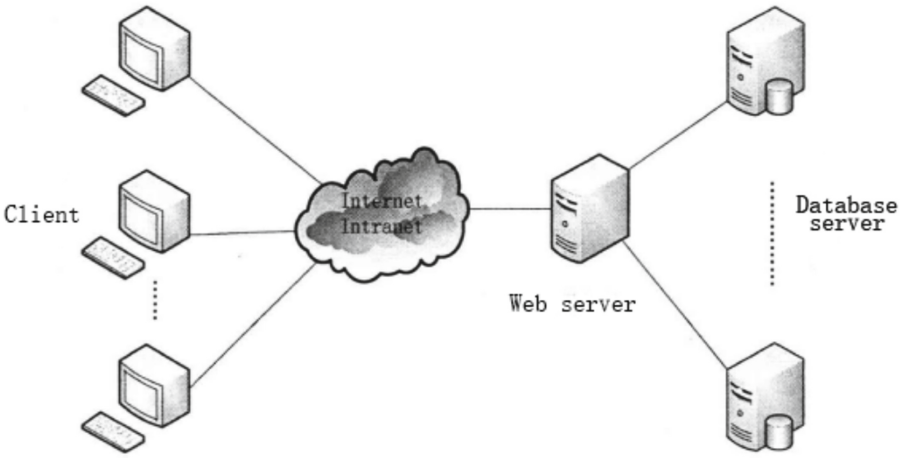


**Fig. 1.** Three tier C/S architecture

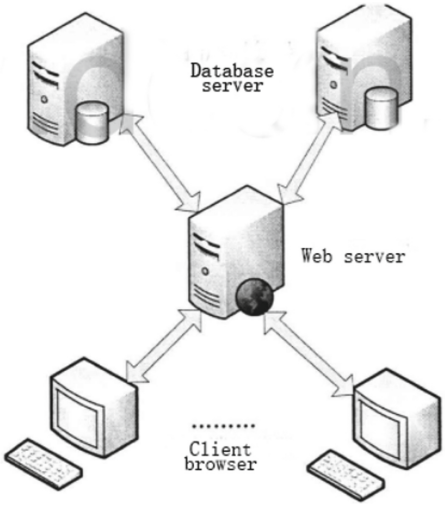


**Fig. 2.** Typical BS architecture

theories and teaching circles.Why computer-aided translation is ignored by teaching circles. The query process is shown in Fig. 2.

### 2.2 C/S Architecture

C/S architecture appeared in the 1980s. According to different layers, C/S architecture can be divided into three types, namely multi-layer structure, three-layer structure and two-layer structure. In CI/S architecture, two-layer structure is the most common. This section will discuss the basic principles of C/S architecture implementation and application from two-tier structure.

The two-tier C/S architecture divides the system into two parts, and the two parts are different. The roles and uses of each part in the system are different. The two parts complement each other to achieve the functions. The client sends the request to the server to complete the transaction. After receiving the request, the server processes the information and returns the result.

The work of C/S architecture is undertaken by the server and the client. The nature of the work undertaken by the two parts is different. The work undertaken by the server is the most important and the heaviest task. It is mainly to process the requests of the system users and return the processing results to the user interface. Different from the server side, the client side is simple in function implementation, and its main work is to interact with the customer, and transmit the customer's situation and data to the server side for processing. CIS architecture has obvious advantages, such as high computing efficiency and complete functions, but it also has many disadvantages, such as poor scalability, difficult maintenance and poor operability. These shortcomings of C/S architecture make its application subject to certain limitations, usually dealing with some simple transactions such as small data and non real time.

## 3 The Establishment of Intelligent Piano Teaching System

The design and implementation of the intelligent piano teaching management system based on cloud platform mainly provides a convenient, efficient and reasonable platform for the piano teaching management departments of colleges and universities or independent teaching units, and improves the scientific, electronic and scientific management level of the management work. Therefore, the design and implementation of piano teaching management system should have the target requirements of reliability, efficiency, integrity and integration. Reliability and efficiency are the basis, while integrity and integration are the basis for better improvement and expansion of the system. At the same time, when designing and developing the system, we should pay attention to the principles of practicality, advanced, aesthetic, maintainability and integrity [2].

### 3.1 Analysis on the Function of Curriculum Information Management

Another basic function in the piano teaching management system is the course information management function, which mainly realizes the management of all the course information involved in piano teaching, including adding courses, editing courses, querying courses and deleting courses. The use case diagram of course information management is shown in Fig. 3.

### 3.2 Analysis of Student Information Management Function

In the piano teaching management system, the most basic function is to manage the information of all the students in each training class. In this way, we can strengthen the comprehensive management of all the students in Colleges and universities or training classes [3], and understand the real-time information of the students in time. The functions of student information management include adding students, editing students, querying students and deleting students. Figure 4 shows the student information management use case diagram.

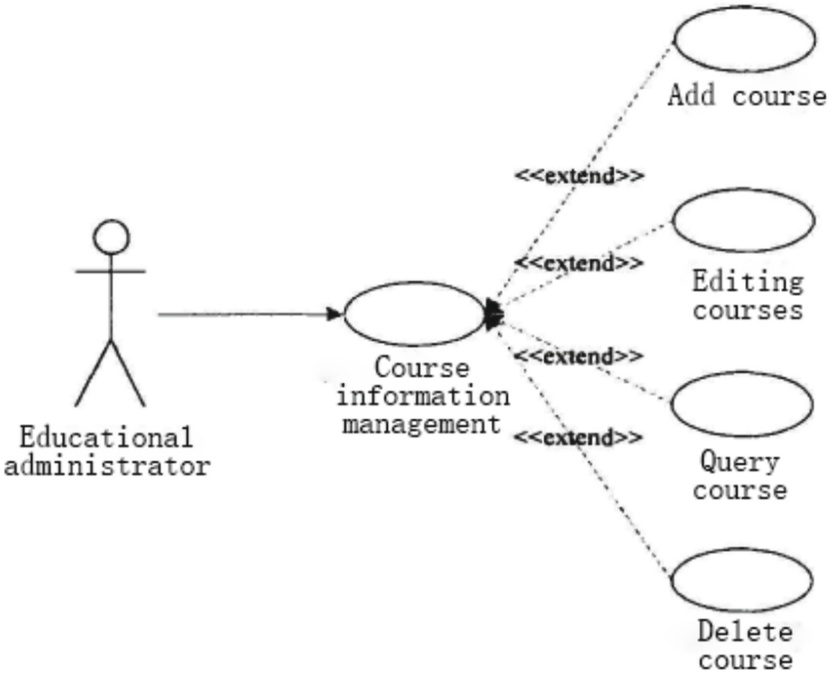


**Fig. 3.** Course information management chart

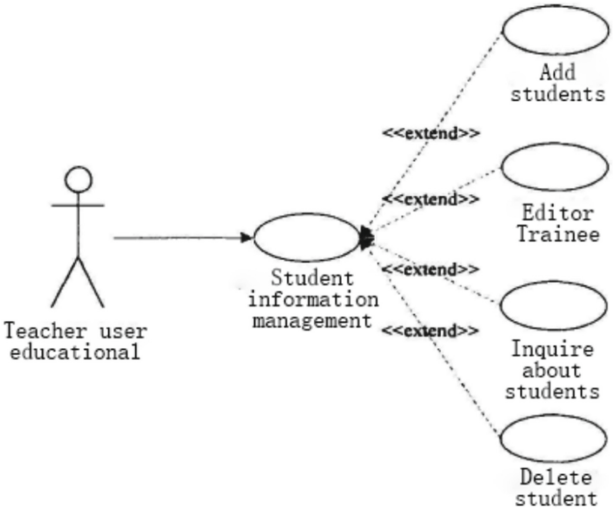


**Fig. 4.** Student information management use case diagram

## 4 Structure Design and Implementation of Intelligent Piano Teaching System

In the implementation of piano teaching management system, this paper mainly uses SSH Framework (i.e. Struts.Spring And Hibernate). Through this framework, not only the view, processing controller and database can be separated, but also the logic layer and persistence layer can be separated, so as to reduce the coupling among modules and layers and increase the degree of aggregation among modules. The independence of each layer increases, and the change of one layer has little impact on other layers. If the information in the front-end application layer changes, we only need to make corresponding changes to the middle layer in the model [4].

We have developed the piano teaching management system in B/S mode. The computer environment to be configured during the design is as follows: the operating system must be above Windows XP Version (Windows 7 is recommended), the computer memory must be higher than 1G, the CPU and browser of the computer have no hard requirements (IE browser is recommended), and the browsing mode should be set to 1024 * 768.

SSH framework divides the system into four different levels, the most basic is the system presentation layer, which uses struts framework. The framework used in the business logic layer of the system is spring framework. The persistence layer of the system uses hibernate framework. The last layer of SSH framework is the module layer. In these layers, struts is the basic part of the system. Through struts, the separation of model, view and controller, that is, the separation of MVC, can be completed, and the database can be connected through JDBC, so that the operation of the database will be more persistent. Spring plays a core role in supporting the business logic layer, reducing the coupling degree between the internal modules of the system and increasing the cohesion between the modules of the system.

## 5 Conclusion

In this paper, combined with the actual project and process of piano teaching management, Using SSH Framework Technology in J2EE technology system, the requirements analysis and system design of piano teaching management system suitable for universities and training institutions are carried out under B/S architecture. After using mature framework technology to determine the system structure framework, the system is implemented with Java language. After deployment and testing, it shows that the design and implementation of the system has basically completed the basic requirements and objectives of the system design.

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