Design and Realization of an Auxiliary Teaching System for Chinese Painting Coursework

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Abstract:

The traditional teaching method has low work efficiency and cannot meet the modern teaching tasks. The auxiliary teaching system that follows the trend has become the most concerned application in the field of education. At present, the auxiliary teaching system in the department where the author belongs is very scarce. Some of the existing systems have low technical content, single system functions, inconvenient operation and use, and do not support network applications. How to develop a set of auxiliary teaching system of traditional Chinese painting that suits the author's work needs, improve the work efficiency of teachers in the college, and facilitate students' independent learning is a major difficulty and challenge. The main task of this paper is to design and implement a comprehensive, flexible and efficient auxiliary teaching system for Chinese painting assignments according to the author's needs in the teaching of Chinese painting. The paper analyzes the development status of the auxiliary teaching system, and briefly introduces the main design content of this paper. Secondly, it introduces and analyzes the related technologies used in the development of the system, including J2EE architecture, Struts2 framework, Hibernate framework, Spring framework and Android SDK tools for developing mobile terminal applications. Thirdly, a detailed functional analysis and design of the system's overall architecture and business functions are carried out using software engineering related methodologies. Finally, the idea of the hierarchical design of the system is described in detail, and the detailed design and implementation of the four functional modules of the coursework management subsystem, the coursework situation completion subsystem, the educational affairs management subsystem and the system authority management subsystem are shown in detail. The system is thoroughly tested and aggregated for evaluation. The Chinese painting homework auxiliary teaching system designed and developed in this paper can well meet the application requirements of the author's teaching work. The system structure is simple, the implementation cost is low, and the functions are practical and comprehensive. use.

Keywords: Chinese painting coursework; computer-aided teaching; J2EE.

I. INTRODUCTION

1.1 Research background and significance

With the rapid development of computer technology and network technology, especially the popularization and application of mobile Internet, new technologies are rapidly changing people's traditional work, study and life. At present, the expansion of colleges and universities in my country has been going on for many years, and the number of students in the author's school is also increasing. Many

faculty members are more or less encountered in the teaching process. Teaching is not closely integrated[1]. In order to solve these problems, make full use of the basic network environment and computer software and hardware facilities of the college, so as to better improve the work efficiency of the teachers of the Chinese Painting College, which requires the introduction of an auxiliary teaching system in the usual teaching process to assist teachers in their work[2]. The Chinese painting homework auxiliary teaching system is an information system with auxiliary teaching as the core and computer software and hardware technology as the support. The purpose of researching and developing this teaching system is:

1. The needs of social development. The quality requirements of people in contemporary society are constantly improving. Each of us is in an information society, so we must learn to use computers to process information reception and transmission. As a teacher who teaches and educates people, everyone should pay attention to the practice of computer application ability in teaching. Only by adapting to the needs of social development and progress, will they not be eliminated by society[3].

2. The need for educational modernization. As a new teaching medium, computer has been widely recognized by the education circle[4]. As a new type of educational media application, computer-aided teaching can be said to be an important part of modern teaching. According to modern teaching theory, the auxiliary teaching system designed by software programming technology is a very effective auxiliary teaching tool, and the use of auxiliary teaching system is the best way to realize resource sharing and information exchange.

3. The practical needs of school education. At present, the Chinese painting school where the author is located still mainly uses traditional teaching methods in Chinese painting teaching. The outstanding performance of traditional methods is that teachers and students cannot be synchronized. For example, students' homework must be submitted in person; It is inconvenient to share resources, all of which not only waste the time of teachers and students, but also make teaching inefficient. Therefore, the development of an auxiliary teaching software for the teaching work of Chinese painting in the Academy of Chinese Painting can not only improve the deficiencies of traditional classroom teaching, but also optimize classroom teaching and improve the teaching effect, stimulate students' interest in learning and actively participate in learning, which is a very effective auxiliary teaching method[5]. The Chinese painting homework-assisted teaching system enables students to view courseware, download homework instructions, upload completed homework, and view homework grades at any time and anywhere; teachers can upload courseware or documents, publish/modify/delete homework arrangements and Correct coursework; academic staff can manage functions such as course types, student classes, user information and permissions. Through this software, students and teachers can achieve a certain degree of teaching interaction, which greatly improves the management efficiency and work efficiency of teachers[6].

1.2 Research status at home and abroad
1.2.1 Current status of foreign research
In developed countries such as Europe and the United States, thanks to the advantages of the birthplace of computer technology and network technology, they began to try to use computers in teaching very early.

Since the mid-1970s, computer technology has begun to try to combine with education and really began to have a huge impact on education[7]. After years of vigorous development, various applications of computers in education have gradually formed, including: computer-assisted teaching, computer-assisted learning, computer Auxiliary education management, computer management teaching, computer education, education information processing, education information database, teaching consultation, etc. Among these many applications based on computer technology, there is one type of application that has the most extensive coverage, greatest influence and most mature development in education - it is computer-assisted instruction[8]. The rise and development of computer-aided teaching has injected new ideas into the traditional educational field, and also brought new changes and developments to traditional educational concepts, educational theories, educational methods, educational technologies, and teachers' quality and responsibilities[19].

In the United States, almost all colleges and universities have established specialized computer network platforms that serve the education of the school or the community. Whether students, teachers or even other researchers can obtain and communicate through these basic network platforms in teaching and research. information and access to better business services. Computer technology is not only widely used in universities, but even primary and secondary schools have established their own computer network systems, including local area networks within their schools or networks interconnected with other schools[10]. Through these various networks, students and teachers from different regions and schools can be connected. In Europe, the United Kingdom, as a pioneer in the practice of computer technology in the field of education, has always been regarded as a pioneer. As early as the 1970s, the government began to publicize and introduce the important role of computers in teaching and put them into action. The biggest advantage and characteristic of the booming development of computer-aided teaching in the UK is that it relies on the strong support and funding of the government[11]. It is precisely because of the strong support from the government and all sectors of society that the extensive use of computer-aided teaching in schools has made the use of computers in British education impressive. The remarkable achievements have gradually formed the theory and practical operation system of computer-aided teaching. According to incomplete statistics, so far, more than 1,600 kinds of auxiliary teaching software have been developed and used in primary and secondary education in the UK. Not only primary and secondary schools and colleges and universities, many families purchase and configure computer software and hardware equipment and computer-aided teaching software in order to help develop children's intelligence and increase their knowledge[12].

After nearly 30 years of development, various levels and forms of computer-aided teaching have been widely adopted in schools at all levels in developed countries, and very good practical results have been achieved[13]. Developed countries have formed a complete set of theoretical systems for computer-aided teaching by summarizing past practical experience, and have protected and supported the healthy development of computer-aided teaching by formulating various laws and regulations, as well as various preferential policies and measures. At the same time, all sectors of society have responded to the call or provided sponsorship to schools, or provided computer-aided teaching software and hardware equipment to help their development. In addition, computer-aided teaching has also received general cooperation and

support from schools and teachers at all levels[14]. Some schools not only carry out their own attempts and practices in computer-aided teaching, which provide experience and reference for the improvement and development of computer-assisted teaching in the future[15].

1.2.2 Domestic research status

Since the beginning of the 21st century, colleges and universities in our country have established their own auxiliary teaching systems. So far, the auxiliary teaching systems in colleges and universities nationwide have entered a relatively mature period. There are various types of auxiliary teaching systems in the education market, including text, images, animation, audio, video and other forms of expression[16]. At present, the C/S mode and the B/S mode are widely used in the technical application process of the auxiliary teaching system in our country. The CIS mode is to install the client software on the user terminal to process a part of the data. However, this inevitably requires the client's hardware conditions to be excellent[17]. Once there is a problem with the client's software and hardware environment configuration, on-site maintenance will inevitably occur. The cost of this process is very high; and the use of C/S mode for remote access requires special technical support, and the system should be designed to handle distributed data, so the CIS mode is currently only used in local area networks. However, with the rapid development of emerging science and technology such as the Internet, especially the continuous expansion of the popularization of distributed office and mobile office, more new requirements have been put forward for the scalability of the system. Therefore, the C/S mode was gradually abandoned in the auxiliary teaching system, and the B/S mode was adopted instead. The biggest advantage of B/S mode is that it only needs a browser installed on a computer that can use the Internet, and users can operate anytime and anywhere without installing any other special client software, which makes the maintenance workload of the client zero[18]. Therefore, it is very easy to expand the system designed in B/S mode, and end users cannot feel that the system has been upgraded because as long as they can use the browser and enter the user name and password assigned by the original system administrator, they can be the same as before. Use the application system. At this stage, the popular Struts+Hibernate technology based on NRVC mode effectively improves the "low coupling, high aggregation" performance of the system and greatly improves the development efficiency of the system. It improves the scalability and ease of maintenance of the system.

II. INTRODUCTION TO RELATED TECHNOLOGIES OF TEACHING SYSTEM DESIGN

2.1 J2EE Enterprise Development Platform

J2EE is a series of standards based on Java technology first proposed by SUN company. All enterprise-level applications developed using J2EE technical specifications can be easily deployed on various J2EE servers, thus providing a platform-independent application development for Java server-side applications., portable, multi-user, secure and standards-based enterprise-level platform that simplifies the development, management and deployment of enterprise-level application systems.

2.2 Struts2 framework

Struts2 is an extensible J2EE Web framework that has been merged and updated on the basis of strutsl and Web Work technology. The goal of framework design runs through the entire development cycle, that is, the entire process from development to release to maintenance. Compared with struts 1, Struts 2 is very different. Many revolutionary improvements have been introduced, such as the removal of ActionForm in Struts 1, and the use of innovative interceptor technology to handle various user requests, allowing users to create business logic controllers. It is separated from Servlet API, thus realizing the loose integration with Servlet API; Struts2 also takes the design idea of WebWork as the core, so that it fully absorbs the advantages of both, so performance and stability are well guaranteed.

2.3 Hibernate framework

2.3.1 Hibernate overview

According to the description and analysis of Struts2 architecture, Struts2 has many advantages as the development of enterprise-level Web applications, but it also inevitably has some shortcomings and deficiencies: such as insufficient support for data persistence layer, RM mapping and so on. Therefore, Hibemate technology came into being. Through the combination with Struts2, enterprise-level handsome application system can be developed efficiently.

2.3.2 Hibernate Architecture

Using Hibernate's persistence solution makes users no longer need to pay attention to the underlying JDBC operations such as data connection acquisition, data access implementation, transaction control, etc., but to focus more on persistence layer operations in an object-oriented manner, so as to save users from cumbersome JDBC operations. Released during the visit. The following figure is an architecture that uses Hibernate's "comprehensive solution" solution. It completes the encapsulation of the persistence layer function to the greatest extent, and abstracts the application layer from the underlying JDBC/JTA API to Hibernate for completion. The least amount of work that needs to be done in development is the most frequently used method in development. The architecture of the Hibernate "total solution" solution is shown in Figure 1 below[19].
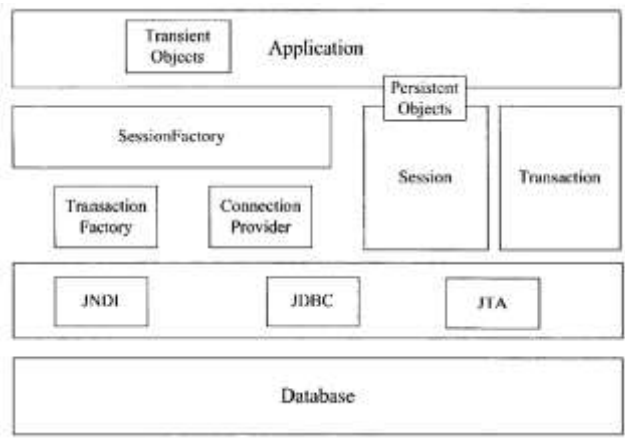
Figure 1. Architecture diagram of Hi6emate "total solution" solution

2.4 Spring Framework

2.4.1 Spring Overview

Spring is an open source, lightweight Java development framework created to address the complexities of enterprise application development. What used to be done only by EJB can now be done by Spring using basic JavaBeans, not only for server-side development, all Java applications can benefit from simplicity, testability, and compatibility Spring[20].

2.4.2 Spring Architecture

The Spring Framework is a layered architecture consisting of 7 well-defined modules built on top of a core container that defines the way beans are created, configured and managed. The Spring framework diagram is shown in Figure 2:
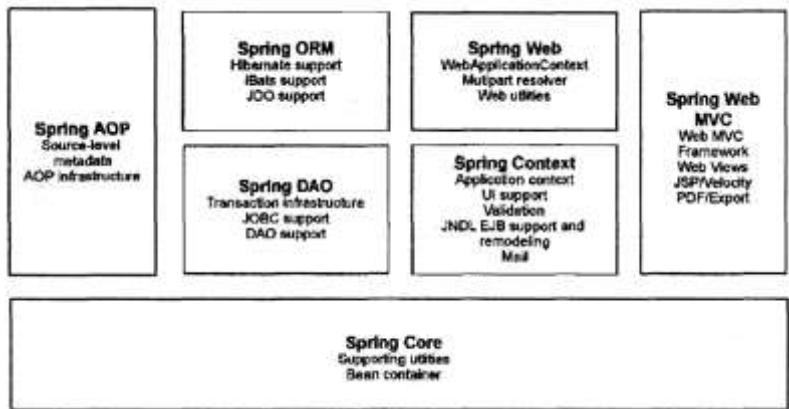

Figure 2 Spring framework diagram

III. OVERALL DESIGN OF CHINESE PAINTING TEACHING SYSTEM

3.1 System Architecture Design

According to the analysis of system requirements, a layered architecture design scheme is adopted in the architecture design of the auxiliary teaching system for Chinese painting homework, and each business is organized in a layered manner. The Chinese painting homework auxiliary teaching system is designed with a layered viewpoint because: layered design can stack each subsystem like stacking wood, each layer is supported by the lower layer, and the lower layer defines various service interfaces for the upper layer to access. It does not need to know the information of the upper layer itself. The advantage of this design is that without knowing too much about other layers, a layer can be viewed as an organic whole, and the specific implementation of a layer can be replaced, as long as the services provided before and after are the same, which reduces the level of Once a layer is built, it can be used to provide support for many upper-layer services[21].

3.1.1 Database connection pool design

In the implementation of the SSH architecture, each framework has been configured accordingly to make it meet the needs of the development of the auxiliary teaching system for Chinese painting lessons. Therefore, the system no longer needs to design the database architecture separately, and only needs to use the SSH architecture when developing the code. You can automatically map and convert JAVA classes into database tables through custom objects. Therefore, we only need to focus on the writing of custom objects and JAVA classes, which greatly reduces the amount of development. Because the performance of the database itself is determined by the database itself, the implementation of the database in this system mainly starts from how to improve the efficiency of the system to use the database, and decides to use Druid, an open source high-performance database JDBC connection pool, to realize the idea of the overall structure design [22].

There are many high-performance database connection pools, such as DBCP and C3P0 database connection pools, but the selection of Druid connection pools in the development of the Chinese painting coursework-assisted teaching system is mainly based on the following design considerations:

1. Druid provides a more efficient, more powerful, and more scalable database connection pool.

2. In order to be able to count the SQL execution performance of the database in detail, a powerful filter is needed to monitor the database access performance. Druid just has a built-in StatFilter plug-in with this function, which is useful for online analysis of database access performance, and further analysis of the Academy of Chinese Painting. The behavior of all teachers and students using the auxiliary teaching system is of great help and is conducive to the subsequent improvement of the system [23].

3. Druid can provide password encryption services for the database. Both DruidDruiver and

DruidDataSource support the PasswordCallback function. These functions solve the security problem of traditionally writing database passwords in configuration files for application calls.

4. Druid can provide a variety of LogFilters that support Common-Logging, Log4j and JdkLog functions. Different LogFilters can be selected according to system functions to monitor the database access of the Chinese painting homework auxiliary teaching system and provide data support for future optimization.

5. Druid is an open source database connection pool, which makes it possible to modify the source code as needed to add new features and functions, which is beneficial to the subsequent improvement of the Chinese painting homework auxiliary teaching system[24].

3.1.2 System database design

Database design occupies a very important position in the auxiliary teaching system of Chinese painting coursework, because the quality of database structure design will directly affect the execution efficiency of the system and have a significant impact on the realization effect. In order to improve the efficiency of data storage and ensure the integrity and consistency of data, a reasonable database structure design is required. This system adopts advanced Struts2, Spring and Hibernate frameworks, thus changing the pattern of database system design in traditional system design. We only need to design database persistence classes and automatically generate required database tables with the help of Hibernate advanced framework to meet the requirements of database design. The entity E-R diagram design of the data persistence class of the library, the data persistence class and the corresponding entity class[25].

In this system, a user can belong to multiple classes, a user can have multiple roles, a coursework corresponds to a class, and a coursework can have multiple attachments. Based on these functional requirements, the following entity objects are summarized: User entity, Assignment coursework entity, Coursework Attachment entity, Class entity, Role entity, and Completed Coursework entity are the main entities[26].

3.2 System function module design

The Chinese painting homework auxiliary teaching system is mainly composed of four modules and an Android mobile client. The four modules are mainly divided by user roles, namely: administrator management module, teaching staff management module, teacher coursework management module and students completing homework module.

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IV. TEACHING DESIGN STRATEGIES FOR HIGH SCHOOL CHINESE PAINTING CHARACTER APPRECIATION BASED ON ICONOGRAPHY

4.1 Design strategy of teaching objectives for appreciation of Chinese painting characters

The goal of high school art appreciation teaching should be based on the educational philosophy put forward in the "New Curriculum Standard for High School Art (2017 Edition)". Life-long development and the necessary character and ability of the society, the ultimate goal of art teaching under the concept of art core literacy is to enable students to use the thinking and spirit of art to solve some problems in their future study, work and life. This goal is to solve some problems in life. real problem. The cognitive structure of students in high school is gradually becoming mature, and they are able to do some complex thinking and solve some abstract problems.

It can be mastered, so in the teaching of high school art appreciation, students should be guided to conduct more in-depth study. For example, when appreciating art works, students can choose a systematic and effective appreciation method, independently collect relevant information and literature in the process of appreciation, question authoritative comments, and finally, in the expression of appreciation of art works, strive to meet the requirements of language organization. Be organized and express content innovatively[28].

4.2 Teaching content design strategy for Chinese painting character appreciation

In the classroom, teaching content is the most direct way for students to acquire knowledge and skills, emotions and values, and the choice of teaching content will affect the effect of students' learning in this field. Teachers need to understand the knowledge mastery of students in this field, and after analyzing these situations, choose appropriate topics as teaching content. The main teaching content of high school art appreciation is the representative classic art works of China and the West from ancient times to the present. Through these art works, we can understand the development context, art style, art flow, art phenomenon and so on of Chinese and foreign art history. Under the background of the era of promoting traditional Chinese culture, the study of traditional Chinese art should be the main focus in the curriculum setting.

4.3 Design strategies for the teaching process of character appreciation in high school Chinese painting

In the current Internet information age, teachers are no longer just the transmitters of knowledge, but need to play more roles such as guides, supervisors, and critics. The most fundamental reason and value

for teachers to exist is to stimulate students' desire to learn, guide students' learning activities, and help students to think deeply in the learning process. Teachers are no longer the leaders of the classroom, and the relationship between teachers and students has changed from a single Shift from authoritative to multidirectional generative. In the teaching process, the degree of interaction between teachers and students has a great influence on the learning effect of students. According to the teaching inspiration principle, it is emphasized that teachers should guide and inspire students to think independently in the teaching process, so that students can actively explore and consciously Use knowledge to analyze problems, understand problems and solve problems. The learning of teachers and students is mutually accomplished. Without good teachers, it is difficult for students to carry out effective and in-depth learning. A virtuous cycle of teaching and learning[29].

V. DETAILED DESIGN AND IMPLEMENTATION OF THE SYSTEM

5.1 System Development Environment

The software R&D environment of the system refers to the system application program adopted to ensure the system application and the R&D design of the software. In this section, the system development environment is established to meet the needs of the entire development process. Table 1 lists the basic information of the software development environment required by the entire system[30].

TABLE 1: Description of the development environment of the auxiliary teaching system for Chinese painting lessons

name	development environment
Desktop PC	CPU: Core Duo 2.3GHz, RAM: 8G
desktop computer operating system	Microsoft Windows7 X64 bit system
server system	Microsoft Windows Server2008R2 system
database software	Standard MySQL
design language	Sun's Java language
Development Platform	MyEclipse10
development library	Sun's JDK1.7
JSP server	Tomcat7.0
Mobile development library	Android4.0 SDK
Development Framework	Struts2.3.16、Hibernate4.1.7、Spring3.1.2

5.2 Detailed design and implementation of system Web front-end

In the design of the system Web front-end, the author uses the DataGrid, Tree,

Combox and Layout controls and Swfupload controls for attachment upload and download. By using these controls, the amount of code in the design is greatly simplified, and the interface effect is better, which basically meets the requirements of the auxiliary teaching system for Chinese painting lessons[31].
1. The DataGrid control has paging and table functions. It is more user-friendly when it is used in the display of information and data in the auxiliary teaching system for Chinese painting homework.

2. In order to meet the management flexibility, display the tree structure layout of the system menu, and realize that users can edit the data displayed under their own authority on the browser side according to their own personalized needs, using the Tree control. Figure 3 The system menu shows the page diagram, which uses the Tree control and shows the tree layout, which is one of the functions.
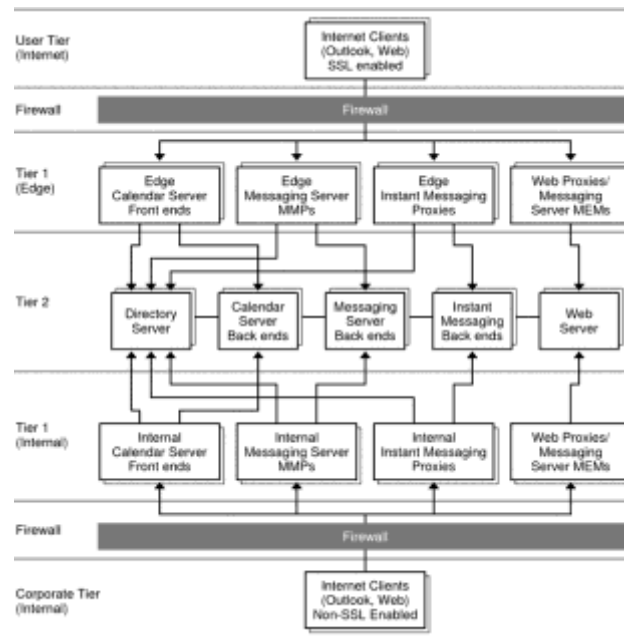

Figure 3 System menu display page diagram

3. In order to satisfy the client's display of the many-to-many database relationship between users and roles on the client interface, the Combox control was chosen as the data display control during system development.

5.3 Detailed design and implementation of the main modules of the system

5.3.1 Administrator Management Module

The administrator management module is divided into three layers: presentation layer, business logic layer and data persistence layer, which are designed according to the SSH architecture model.

1. The presentation layer of this module is mainly responsible for receiving requests from administrators and users, objectifying the data requested by the business, and at the same time receiving the data returned by the business logic layer, encapsulating the data into JSON format data and feeding it back to the client through the HTTP protocol[32]

The administrator role presentation layer action class has the following classes: resource action class ResoursesAction, rights action class RightsAction, rights type action class RightstypeAction, role action

class RoleAction, user action class UserAction, user role action class UserroleAction, role rights action class RolerightsAction and permissions The resource action class RightsresourcesAction. Specifically, the method implementation of each class is shown in the action class diagram of the administrator role presentation layer in Figure 4.
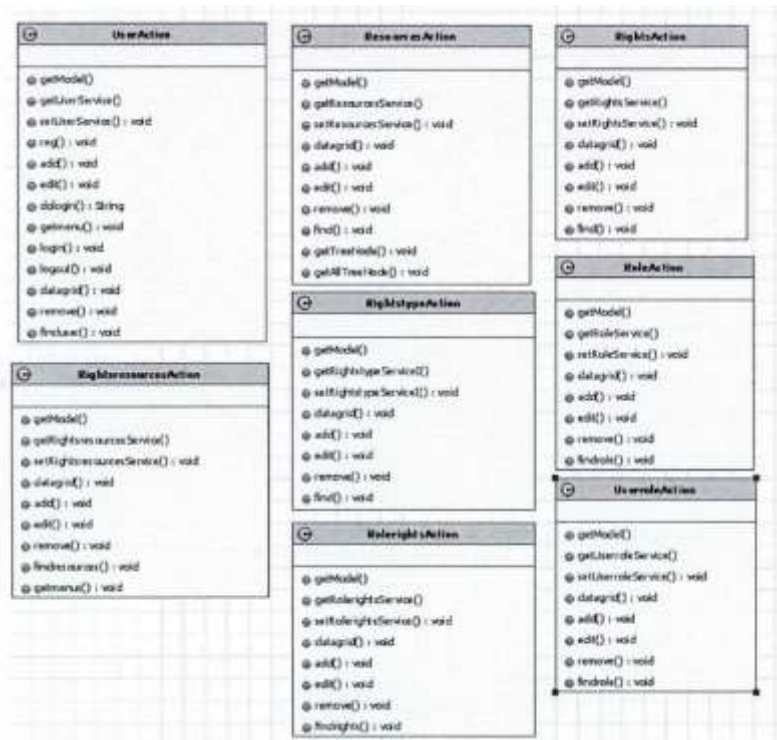

Figure 4 Action class diagram of administrator role presentation layer

2. The business logic layer of this module is mainly responsible for processing the request data sent by the presentation layer. After processing it according to the self-designed business logic, it saves the objects by calling the data persistence layer and returns these data objects to the presentation layer[33].

The administrator role business logic layer has the following classes: resource business class esoursesServiceImpl, rights business class RightsServiceImpl, rights type business class RightstypeServiceImpl, role business class RoleServiceImpl, user business class UserServiceImpl, user role business class UserroleServiceImpl, role rights business class RolerightsServiceImpl and rights resources Business class RightsresourcesServiceImpl. Specifically, the method implementation of each class is shown in Figure 5 Administrator Role Business Logic Layer Class Figure 1 and Figure 4 Administrator Role Business Logic Layer Class Diagram.
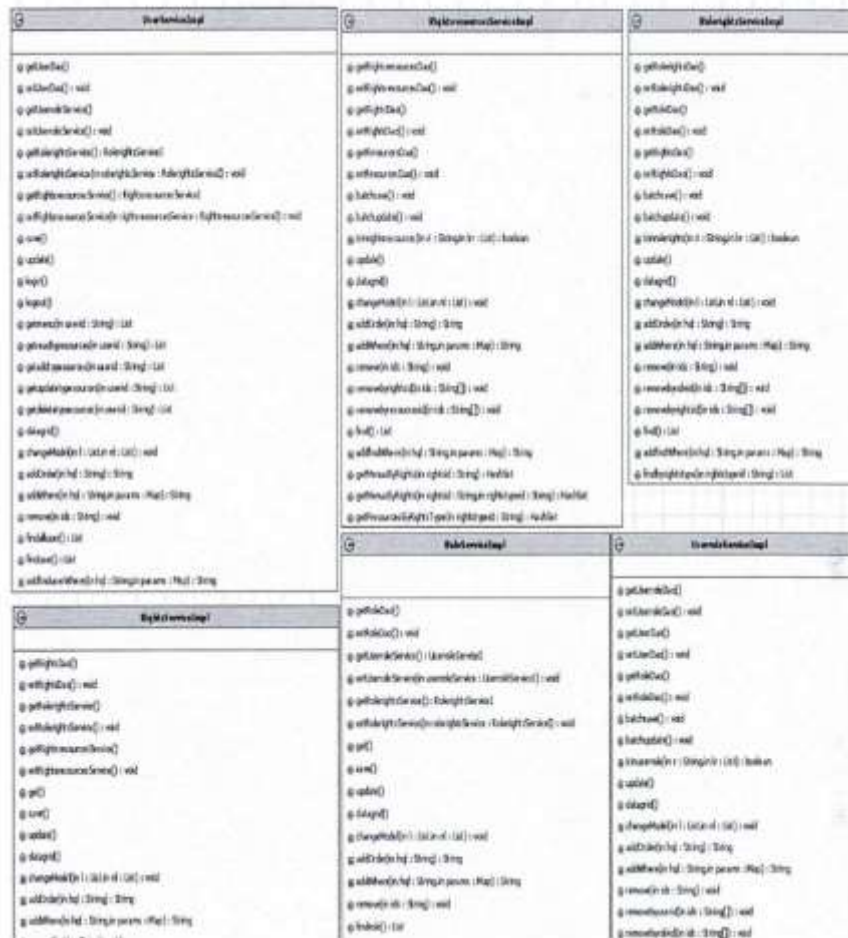
Figure 5 Administrator role business logic layer class Figure 1

5.3.2 Teaching staff management module

The educational staff management module will also be designed in three layers according to the SSH architecture model. This section also describes its design and implementation in terms of presentation layer, business logic layer and data persistence layer.

1. The presentation layer of this module is mainly responsible for receiving requests from academic staff and users, objectifying the data requested by the business, and receiving the data returned by the business logic layer, and then encapsulating the data into JSON format data and feeding it back to the client through the HTTP protocol[34] .

The action classes of the role presentation layer of the teaching staff include: class action class KyClassAction, schoolwork type action class KeyetypeAction and user class action class UserClassAction. The specific method implementation of each class is shown in the action class diagram of the role presentation layer of the teaching staff in Figure 7 below.
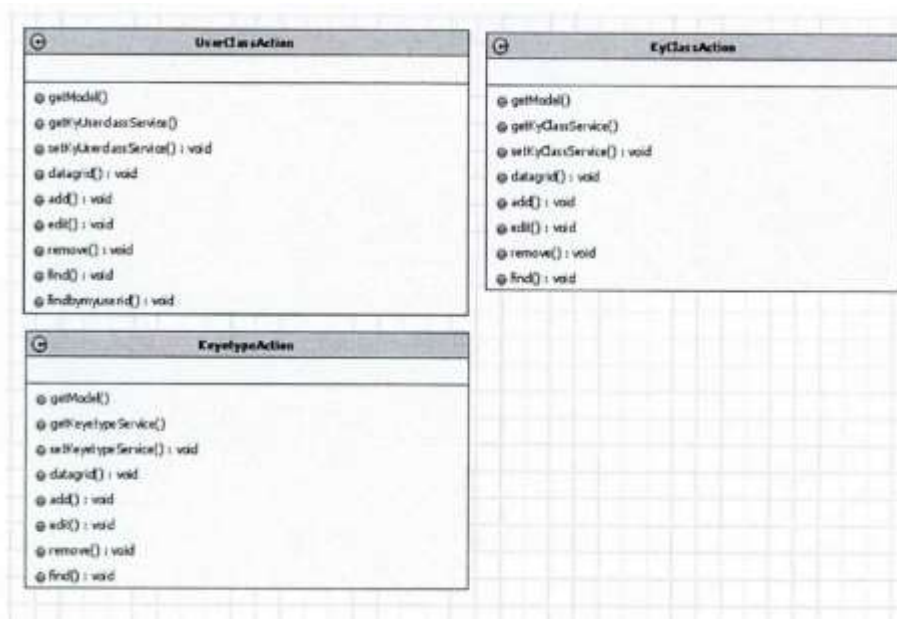
Figure 6 Action class diagram of the role presentation layer of academic staff

2. The business logic layer of this module is mainly responsible for processing the request data sent by the presentation layer, and after processing the business logic designed according to the demand analysis, save the objects by calling the data persistence layer and return these data objects to the presentation layer.

The educational staff role business logic layer has the following classes: class business class yClassServiceImpl, user class relationship business class KyUserclassServiceImpl and coursework type business class KeyetypeServiceImpl o The method implementation of each class is specific, as shown in the class diagram of the educational staff role business logic layer in the following figure7.
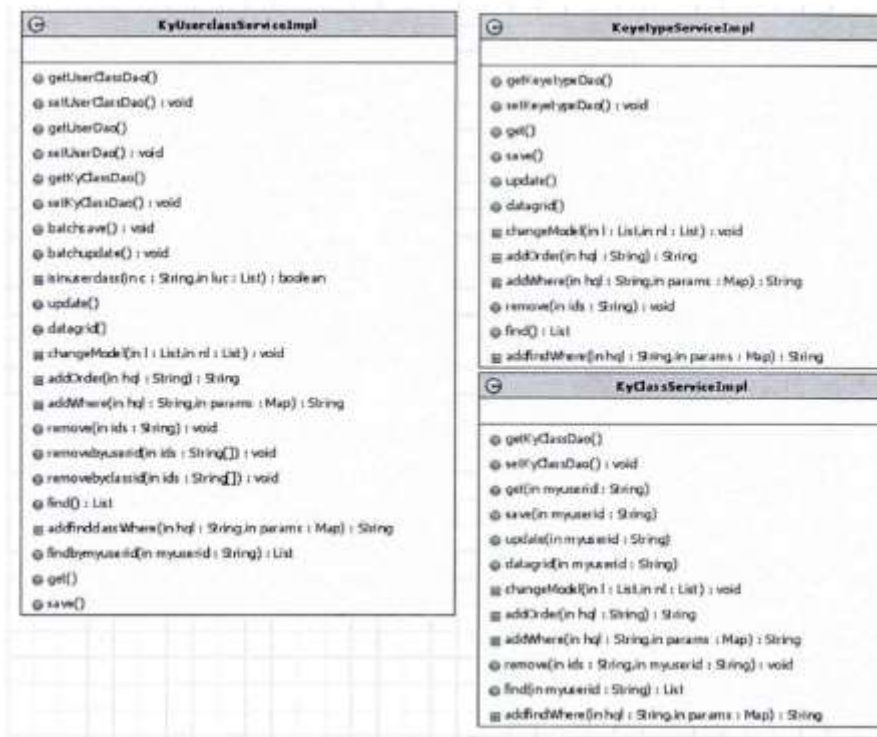
Figure 7 Class diagram of the business logic layer of the role of academic staff

5.3.3 Teacher/Student Coursework Management Module

The teacher coursework management module and the student coursework management module are the two main modules of this system. Putting these two modules together in the same chapter is a design that has many common functions. The specific programming is also realized through functions. similar class. These two modules continue the idea of the overall architecture design, and are also designed in three layers according to the SSH architecture model, namely the presentation layer, the business logic layer, and the data persistence layer.

1. The presentation layer of each module is mainly responsible for receiving requests from teachers or students, objectifying the data of business requests, receiving data returned by the business logic layer, and encapsulating these data into JSON format data and feeding back through the HTTP protocol back to the client.

The teacher or student role representation layer has the following classes: coursework information action class olessonAction, schoolwork completion action class KywcqkAction, schoolwork attachment action class DolesfujianAction, schoolwork download action class DovcmloadAction and schoolwork attachment upload action class loadFilesAction. The specific method implementation of each class is shown in the action class diagram of the teacher or student role representation layer in Figure 8 below.
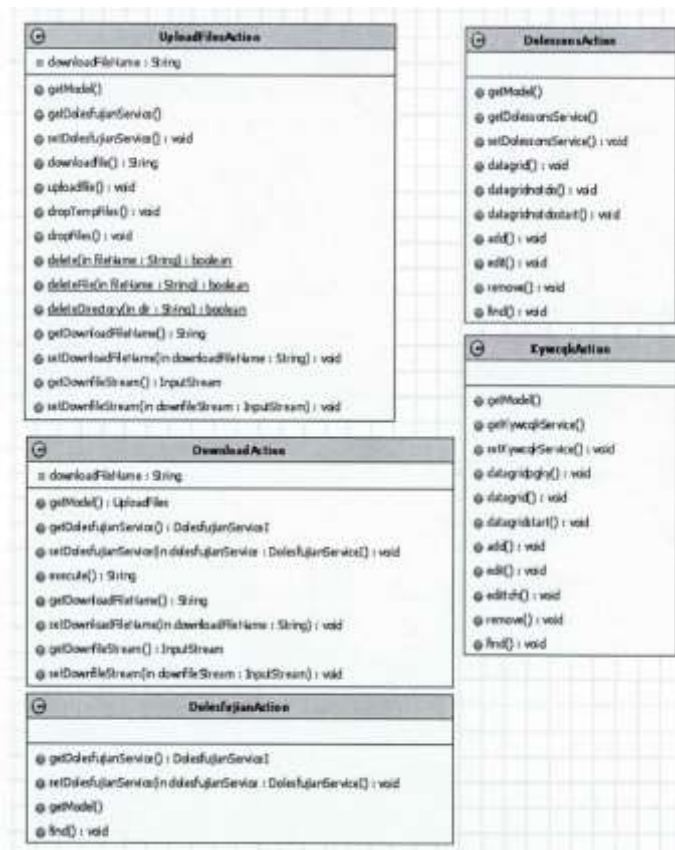
Figure 8 Action class diagram of teacher or student role representation layer

2. The business logic layer of each module is mainly responsible for processing the request data sent by the presentation layer, and processing the business logic designed according to the demand analysis, and then saves the objects by calling the data persistence layer and returns these data objects to the presentation layer.

The teacher or student business logic layer has the following classes: DolessonsServiceImpl, a business class for arranging homework, KywcqkServiceImpl, a business class for completing homework, and DolessfujianServiceImpl, a business class for coursework attachments. The specific method implementation of each class is shown in the class diagram of the business logic layer of the teacher or student role in Figure 9 below.

Figure 9 Class diagram of teacher or student role business logic layer

5.4 Implementation of Data Interchange Format

After each module of the Chinese painting homework auxiliary teaching system is processed by complex business processing logic, the server side needs to feed back data in a certain way. For this purpose, the system designs three feedback models in JSON data format to feed data back to the user client.

At present, AJAX has become the mode and architecture adopted by most websites, so JSON will become the first choice for data exchange. Compared with JSON, the text method is too simple and cannot be understood if the amount of data is large; while the XML method has a large amount of data, but it will increase the burden on the server when parsing. Features, JSON is used as the data exchange method in the system design. The server performs JSON parsing on the data of three types of services[35]. The first type of service data is the number of JSON items displayed on each page, the second type of service data is the return data of the operation result, and the third type of service data is the data displayed by the Android mobile phone client.

VI. CONCLUSION AND PROSPECTS

6.1 Conclusion

Based on the J2EE platform, this paper designs and develops an auxiliary teaching system for Chinese painting homework. The system is a network application using B/S mode, which supports users to access service applications through browsers and mobile terminals to access service applications by installing application programs. The Chinese painting homework auxiliary teaching system can meet the business function requirements of the design, and its business logic is implemented on the server side, which simplifies the operation cost of the customer service side and reduces the workload of maintenance and upgrades.

The thesis mainly completes the following tasks:

1. Through the analysis of the current situation of Chinese painting teaching, the requirements of the auxiliary teaching system for Chinese painting homework are analyzed in detail, and the system is divided into four functions: coursework management subsystem, coursework completion subsystem, educational affairs management subsystem and system authority management subsystem. module, and two presentation frontends namely PC client browser and Android mobile client.

2. According to the division of subsystems, the detailed design and implementation method of each subsystem module is determined, that is, the system architecture is designed by the multi-frame integration method of Struts2 framework, Hibernate framework and Spring framework, and the database design and security of the system are carried out at the same time. design.

3. Implemented each module of the system, completed the development of the prototype system, and verified that all functions are running normally.

6.2 Prospects

After many months of hard work, the design and development of the auxiliary teaching system for Chinese painting homework has finally been completed. This project is generally not complicated, and the system development has reached a good level in terms of function and technology. However, due to the constraints of R&D time and R&D manpower and other factors, the system must have many shortcomings, and the system needs continuous improvement in the follow-up. Improvement and improvement: On the one hand, from the overall point of view of the system, the functions implemented by the system need to be further expanded and perfected to serve users better; Efficiency, safety and other performance, to prepare for future promotion.

At present, the auxiliary teaching system is in full bloom in the education market, which makes the country pay more and more attention to the application of auxiliary teaching. Although the auxiliary

teaching system can be perfected in the market, it is undeniable that It really improves the work efficiency of college teachers. How to cover the whole process of Chinese painting teaching in the Chinese painting academy with the functions of the Chinese painting homework auxiliary teaching system, I think this is not only a challenge in technical realization, but also a challenge in design. But I always believe that as long as we keep working hard, the ups and downs on the road will eventually be overcome, and the auxiliary teaching system of Chinese painting classwork will be unanimously recognized by the teachers and students of the college.

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