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Research Article

Design and Implementation of Web Multimedia Teaching Evaluation System Based on Artificial Intelligence and jQuery

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It is an important reflection of modern education and an overwhelming way to strengthen the quality of teaching. In the current environment, the traditional multimedia classroom management model can no longer adapt to the current rapidly developing network environment. How to manage more and more campus multimedia classrooms is an urgent problem to be solved. The informatization construction and application of multimedia classrooms is the key to the realization of educational informatization. The traditional multimedia classroom management model has not been able to adapt to the rapidly developing network environment, which is mainly manifested in the following aspects: electronic education management personnel cannot discover and process teaching in a timely manner. Equipment failure has not formed a set of standard troubleshooting procedures and cannot accurately record the status, use time, and maintenance records of various teaching pieces of equipment. This will not only affect the teaching quality of colleges and universities but also slow down the process of education informatization. This paper develops a web-based multimedia teaching equipment management system based on artificial intelligence and jQuery, which realizes the centralized control and management of various multimedia teaching equipment. According to the actual needs of multimedia teaching, this paper follows the design and development of software engineering, using artificial intelligence, jQuery, Ajax, and Spring MVC technology to design and develop a web-based multimedia teaching equipment management system. On the basis of realizing the centralized control and management of multiple multimedia teaching equipment, it can also track and record the use status and maintenance content of the multimedia teaching equipment to form an information knowledge base of the multimedia equipment, which is convenient for later maintenance and management. Through the use of this system, management can be systematized, standardized, and automated, reducing the tedious workload of management and maintenance personnel. It can speed up the information management process of multimedia teaching equipment and improve the work efficiency of related managers. A course can be studied online, and an online teaching system has been developed. According to our survey on Mandarin online course training in Northwest China ($N = 343$), we found that 81.6% of samples are satisfied with the Mandarin online training courses; 21.6% think that they have learned new teaching methods/teaching concepts from the teacher through the Mandarin training; 36.2% think that they have learned the theoretical knowledge of Mandarin through the Mandarin training. Gender, age, ethnicity, and learning experience are related to the difficulty of learning Mandarin online courses. Therefore, we can satisfy learners of different ages, learning foundations, and cultural backgrounds by designing different online course patterns, so as to enhance the high-quality promotion of Mandarin.

1. Introduction

The traditional multimedia classroom management model can no longer adapt to the rapidly developing network environment and cannot detect and quickly deal with multimedia teaching equipment failures in a timely manner; it cannot accurately record the status, use time, and maintenance records of various multimedia teaching pieces of equipment, and it not only affects the quality of teaching in colleges and universities but will also slow down the process of education informatization in the long run. It is important to combine the campus website with the application of multimedia teaching resources with the university reality. The integration of multimedia technology resources in the university network environment can achieve the long-term development of higher education [1]. The multimedia teaching effectiveness of multimedia includes two aspects: the effective use of multimedia teaching systems and the effectiveness of teaching achievement [2]. The digital campus is based on computer information and network. It is a complete system that integrates teaching, management, research, life services, and technology services. It is a mainstream form of campus function [3]. A smart learning classroom is a quintessential environment for smart learning and is a high-end form of the digital classroom [4]. For understanding the pedagogical effectiveness of the web-based multimedia teaching evaluation in artificial intelligence and jQuery, a questionnaire survey was conducted to obtain valid sample data from teachers attending teacher Mandarin in a particular location.

In the improved intelligent multimedia pedagogy with optimized functions, the operator can use the query function, search function, and database design function for teaching management and effectively improve the efficiency of teachers [5]. Liu [6] addresses the innovation of teaching modes of multimedia teaching classroom and English based on online learning of the platform. In the remotely multimedia teaching system with a hardware-based core, the functions of each part are implemented by the core hardware device alone on a hardware device. In [7], through the integration of the overall system, the overall stability of the system can be strengthened by avoiding the failure of the whole instruction system due to the failure of a single device. Chiou and Tseng [8] have proposed and attained an intelligent wireless sensor network-based technology for the classroom management system based on wireless sensor network technology. The status of students and classrooms is detected by wireless senses and transmitted to a management system built into the server. The management system will determine the current status of students and classrooms and provide appropriate feedback to students and teachers and on the wireless sensor-controlled devices deployed in the classrooms.

In view of the many problems in the school multimedia classroom management, Jiao and Huang [9] developed a cloud-based multimedia classroom remote control system using VMware desktop virtualization technology. The system includes a cloud computing management platform, a network switch, a single-chip microcomputer, and a device in a multimedia classroom. At present, various wireless access networks provide a wide range of multimedia services for mobile users, but even if cloud computing is integrated into such a network, sufficient quality of experience cannot be supported in areas with high requirements for multimedia content [10]. In aim at the problems in the use, maintenance, and management of multimedia teaching rooms, Gan [11] proposed a controlled system based on the Internet of Things. Through this system, remote control, equipment status monitoring [12], data analysis, and processing of alarms can be carried out. Jie [13] studied the microplanning of digital campus construction by analyzing the main part and architecture of digital campus in view of the overall digital campus programming.

MVC is Microsoft's web application development framework that combines the effectiveness and cleanliness of the Model-View-Controller (MVC) architecture, the ideas and technologies of agile development, and the best part of the NET platform [14, 15]. Sharif and Forouraghi [16] used HTML, CSS, and jQuery components to create graphics while reducing page load time and allowing graphics to be read by voice-over software applications and screen readers. Li and Peng [17] proposed a jQuery-based Ajax universal interaction architecture. The architecture designs and implements a common Ajax standard interaction model that effectively hides complex Ajax processing mechanisms and quickly implements Ajax processes to reduce exploration effort. Jang [18] proposed a general design pattern based on model-view-controller and MVC model, which makes interactive web applications based on Ajax-based framework possible [19].

Holzinger and Zupan [20] developed a web application called KNODWAT (KNOwledge Discovery With Advanced Techniques) in Spring framework using Java to operate an interactive user interface using jQuery for front-end capabilities. Davis [21] proposed Spring Boot to simplify the process of creating Spring-based applications or microservices. Guo [22] designed and developed a web application framework based on Spring and MyBatis. Through the analysis of the experimental results, the problems of low reusability of the code, poor maintainability of the expandability, and poor performance are solved. The Spring framework and its related technologies have proven efficiency in practice through the flexibility of various applications and conditional modifications. Nguyen [23] combined a database server, API server, and web server to create web applications.

Based on the full investigation of actual multimedia equipment, this paper uses jQuery, Ajax technology, and Spring MVC technology to design and develop a web-based multimedia teaching equipment management system for daily basic data maintenance of multimedia classrooms and multimedia teaching equipment and provide a reference for the establishment of related multimedia classrooms and multimedia equipment and equipment maintenance systems for other schools in the future [24].

2. Method

2.1. The jQuery Technology. jQuery is a technology based on the JavaScript framework protocol. It has hundreds of official plug-in resources, and a new and new plug-in is

available. It is a lightweight JavaScript library and can be used with other systems. The JavaScript library coexists. You only need to create a jQuery object and wrap all the functions inside it. So, it is easy and powerful to use. jQuery technology is mainly for simplifying HTML programming, task processing, Ajax application, and screen design. It is compatible with CSS and most different browsers and different modes and can handle multiple events, tasks, play videos, etc., and also make users can interact more with the website.

jQuery is a fast and concise JavaScript framework. It is another excellent JavaScript code library (framework) after Prototype. The purpose of jQuery design is "writeLess, DoMore," that is, advocating to write less code and do more things. It encapsulates the commonly used function codes of JavaScript, provides a simple JavaScript design mode, and optimizes HTML document operation, event handling, animation design, and Ajax interaction. The core features of jQuery can be summarized as follows: it has a unique chain syntax and a short and clear multifunctional interface; it has an efficient and flexible CSS selector, and it can be extended; it has a convenient plug-in extension mechanism and a wealth of plug-ins. jQuery is compatible with various mainstream browsers, such as IE6.0+, FF1.5+, Safari2.0+, and Opera9.0+.

All developers are free to suggest or use modifications to jQuery. It is an open-source product. The compressed jQuery is only about 30 kB in size and is lightweight. Developers can use any of the selectors from css1 to css3, and jQuery also comes with some high-end and complicated selectors to make it easy for developers to write selector plug-ins themselves. Developers can use the selectors in jQuery to get the elements and bind the events to the elements immediately, avoiding the conflicts of previous developments and personal development forms, making future maintenance very easy. jQuery's event handler is very reliable in handling event bindings, as well as programming ideas such as reserved retreats, step-by-step, and nonintrusive; jQuery sets all the internal functions to automatically process the object collection, greatly reducing the amount of coding; in a set of operations on the same jQuery object, it can directly write the method, so you do not need to reacquire the object, which makes the jQuery codes very beautiful. The Query module is divided into three different entries: the operation function entry, system entry, and the underlying support module. The jQuery encapsulates more common DOM processing, which is convenient for developers to process DOM elements.

Easy UI is a set of plug-ins developed based on the jQuery framework. It not only optimizes the Ajax interface but also provides web components based on web development such as combobox, dialog, tabs, datagrid, and tree. jQuery encapsulates all Ajax operations through the method ajax(). It does not need to pay attention to the complicated browser compatibility features and the establishment and use of XHR objects while operating Ajax. Easy UI is based on the jQuery framework and encapsulates some components for data presentation and user interaction while providing users with Ajax support. After developers use Easy UI, they only need to focus on the implementation of the background code, which frees developers from heavy page design and layout, which greatly reduces development costs. Easy UI is mainly used to accept JSON data passed by Spring MVC and display JSON data to the page through components.

The Spring MVC framework is a lightweight framework based on Java that implements the request-driven type of the MVC framework pattern. The front controller is the DispatcherServlet interface implementation class, the mapping processor is the HandlerMapping interface implementation class, the view resolver is the ViewResolver interface implementation class, and the page controller is the Controller interface implementation class. For the front controller provided by Spring, all requests are distributed by it. Before DispatcherServlet distributes the request to the corresponding Controller, it needs to use the HandlerMapping provided by Spring to locate the corresponding Controller.

2.2. Artificial Intelligence Technology. In the daily use of this mobile platform, artificial intelligence technology has become more and more developed, such as the transition from the traditional password and gesture lock screen to the current iris and face unlock, where AI technology is indispensable. Mobile devices are also equipped with a number of input or sensing devices, such as microphones, cameras, fingerprint readers, light sensors, and gravity sensors, which can effectively improve the effectiveness of multimedia teaching and learning.

Compared with the object-oriented method, the structured software engineering method pays more attention to the function of the system, adopts a top-down, gradual refinement design process, and solves problems with modules as the center. The software system developed by the structured software engineering method can be regarded as a set of functions or procedures. Structured software design starts with the functions of the system and divides the target system into several functional modules according to engineering standards and strict specifications. MVC refers to a certain framework of the MVC pattern, which compulsorily separates the input, processing, and output of the application. Applications using MVC are divided into three core components: model, view, and controller. They each handle their own tasks.

In addition to the application of artificial intelligence to sensory simulation, more important applications are the simulation of the thinking and analytical processes of the human brain, i.e., the application of games and logical reasoning, the sensing and processing of information, and so on. The applications of this type of artificial intelligence in games or simulation systems are extremely rich. Certain techniques used in chess programs, such as looking forward a few moves and breaking down complex problems into easier subtoproblems, have evolved from the development of basic AI techniques the search and problem induction. The technology in this program is currently evolving very rapidly and is amazing.

2.3. Ajax and Spring MVC Technology. HTTP requests and responses from traditional web-based applications are synchronized, which requires the user to wait for the server's

response to arrive after the request page and only issue a second request after receiving the response. Due to the limited bandwidth processing speed of the server and the network and the delay of data transmission, the request sent by the user always requires the submission of the entire page, which makes it necessary to transfer a large amount of page data, which imposes a great burden on the network bandwidth. Based on this problem, Ajax Technology came into being.

The classic three-tier architecture is a layered idea. The development model is divided into these three layers. Each person develops different modules according to his own expertise. The page becomes better-looking to attract others, and some people who specialize in database work can only focus on the operation of the database and how to make the query faster and more effective, instead of paying attention to how the data should display this kind of problem. This is the great benefit of layering.

Multimedia teaching is a method of teaching using advanced science and technology. The teaching method presents a large amount of content and information, can provide intuitive and good vision, can make classroom teaching more efficient, and improve the efficiency of teacher preparation. Therefore, most colleges and universities get popular applications. The construction and application of the informatization of multimedia classrooms in colleges and universities is an important part of the informatization of education.

Ajax is an acronym for Asynchronous JavaScript and XML(Extensible Markup Language). It essentially processes the content and form of web pages through XML and CSS (Cascading Style Sheets) and interacts with data through XML and XSLT. It uses the XML HTTP Request object to exchange data asynchronously between browser and server and a web development technology for creating interactive web applications. Ajax dynamically interacts and displays through the DOM that only a part of the data of the page is submitted, that is, each time the data of a certain part of the page is refreshed instead of the data of the entire page. This mode of operation reduces the amount of data transmission, reduces the burden of network bandwidth, and improves the transmission speed and user experience. JQuery encapsulates Ajax operations and implements Ajax by providing targeted methods and properties, greatly simplifying the process of developing Ajax programs.

DispatcherServlet interface is the front controller provided by Spring; all requests are distributed by it. Before DispatcherServlet distributes the request to the corresponding Controller, it needs to use the HandlerMapping provided by Spring to locate the corresponding Controller. HandlerMapping interface completes the mapping of the client request to the Controller. A controller interface is necessary to process requests for concurrent users. When implementing the Controller interface, it must be thread-safe and reusable. The Controller completes the processing of the user request and returns the ModelAndView object to the DispatcherServlet. The ModelAndView object contains the model Model and the view View. From a macro perspective, DispatcherServlet is the controller of the entire web application; from a micro perspective, the Controller is the controller of a single HTTP request processing process. ViewResolver interface finds the view View in the web application according to the ModelAndView object and passes the data in the model to the view View for rendering.

The MVC mode is a very popular application development architecture in recent years. The MVC mode mainly divides the application into three parts: model, view, and controller, as shown in Figure 1. The model is responsible for storing and encapsulating data to facilitate data transfer; the view is responsible for displaying information, and the controller is responsible for controlling the flow of data. The MVC mode makes the program structure clearer and easier to maintain. To implement the core concepts of MVC, the Spring MVC framework organically combines the MVC framework with Spring to provide a number of features related to this model for the final controller and program processing. Once the inversion control is added to MVC, the application is highly decoupled, with simple configuration changes to enable dynamic changes to the component.

2.4. System Architecture Design. The staff can analyze the recorded data in the knowledge base of this equipment maintenance and count the types of failures of various teaching pieces of equipment, the number of occurrences of various types of failures, the corresponding troubleshooting methods and processing results and give the classroom management of our school, and the maintenance personnel of the department provide a set of standardized and professional multimedia teaching equipment maintenance procedures that are in line with the actual maintenance situation.

The company's system is based on a browser/server (B/S) architecture with a split layer implementation. Administrators and users in the system are divided into a client and a server. The server processes the demands and returns the processing results to the client. The client sends the service quest to the server through the browser, and the client returns the requested results to the user through the browser. The architecture design based on MVC structure with "three layers of computing" (representation layer, data layer, and business logic layer) is adopted, as shown in Figure 2.

(1) Presentation layer is responsible for processing user requests and receiving user data, sending user request data to the web server through the client, and receiving data sent by the web server for real-time management. It places the background management function program on the server layer

(2) The data layer is a web server and an application server running business code and logic to process user data. It places the database and other back-end data resources in the data layer to centrally store all the data

(3) The business logic layer is primarily responsible for processing the business and generating, processing, and transforming logical data. It is responsible for verifying the correctness and validity of the input

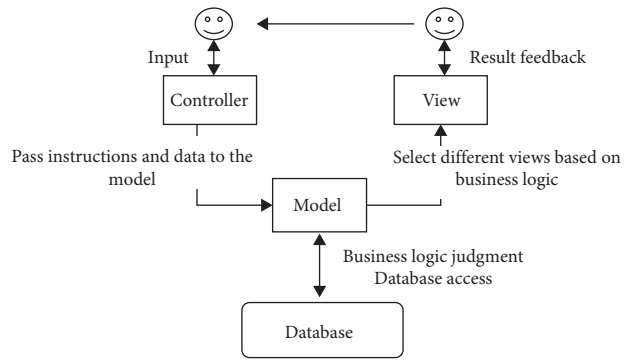

Figure 1: MVC framework model.

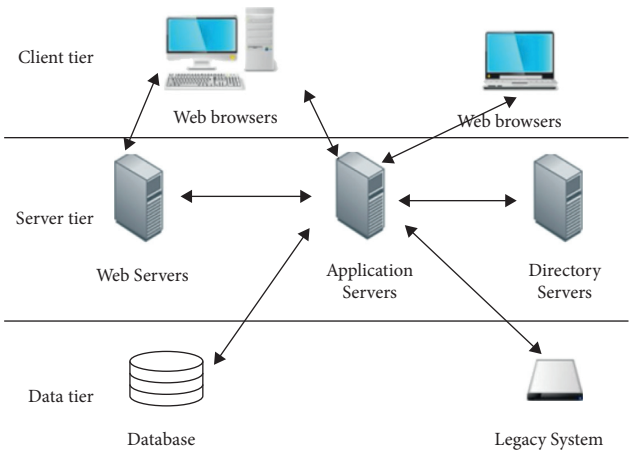

Figure 2: System architecture structure design.

data and is not responsible for the presentation style of the data

The system uses Easy UI as the presentation layer; Spring MVC is the business logic layer, and My Batis is the data layer. Through Spring MVC, the interaction between the browser and the server is effectively divided into three layers: model, view, and controller, which makes the development level of the multimedia teaching equipment management system more clear. Easy UI is mainly used to accept JSON data passed by Spring MVC and display JSON data to the web page through components. Easy UI is based on the jQuery framework, which encapsulates some components for data presentation and user interaction and provides Ajax support for users. It mainly uses My Batis to achieve data persistence, accept the commands passed by Spring MVC, operate on the database, and return the results of the operation to Spring MVC.

2.5. The System Requirements. The purpose of this system is to build more reasonable management and use the mechanism of multimedia teaching equipment. On the basis of optimizing the configuration of multimedia teaching resources, we improve the usage rate and integrity rate of multimedia teaching equipment and ensure the security and integrity of multimedia equipment in colleges and universities. This multimedia teaching equipment management system performs different functions for different roles to realize five functions of the management of digital resources, classification management of multimedia equipment and transmission lines, statistical analysis management, report management, and system management, in accordance with the MVC structure, as shown in Figure 3.

(1) We establish a management system for digital multimedia resources and use computers to realize intelligent management of various multimedia teaching pieces of equipment, supporting communication equipment and transmission links, and various types of equipment and communication equipment links. Information about resources can be added, deleted, and changed accurately and conveniently to ensure the accuracy and timeliness of the information

(2) Adopting a web-based operation interface, suitable for management personnel of all levels, the human-machine interface has good interactivity and simple and convenient operation and realizes classified management of various multimedia devices and transmission lines

(3) According to the different attributes and working environment of multimedia equipment, the detailed information of the equipment is displayed on the corresponding terminal equipment, which can meet the maintenance work of equipment administrators while facilitating the use of teachers and students and improve the management, use, and maintenance efficiency of all kinds of multimedia equipment

(4) Through the statistical analysis of the data of equipment or transmission link failure causes, failure points, and high-frequency periods, the large data of operation and maintenance are formed by recording and maintaining equipment failure data. The system administrator can automatically generate monthly reports, quarterly reports, and annual reports for all kinds of multimedia teaching equipment. The teaching equipment generated by the system can be counted by the system. Statistical reports can improve the efficiency of operation and maintenance and ensure the safe operation of multimedia equipment and transmission lines

(5) To help system administrators or equipment administrators quickly find out the fault points and causes according to the fault situation by recording the fault situation in the operation report and its solutions, aiming at the fault information of multimedia teaching equipment in the life cycle, system administrators can record the complete fault processing flow, so as to generate the fault maintenance record report. The maintenance record of multimedia teaching equipment and the report forms generated by discarded equipment are audited to provide reliable technical support for solving the problem of failure quickly

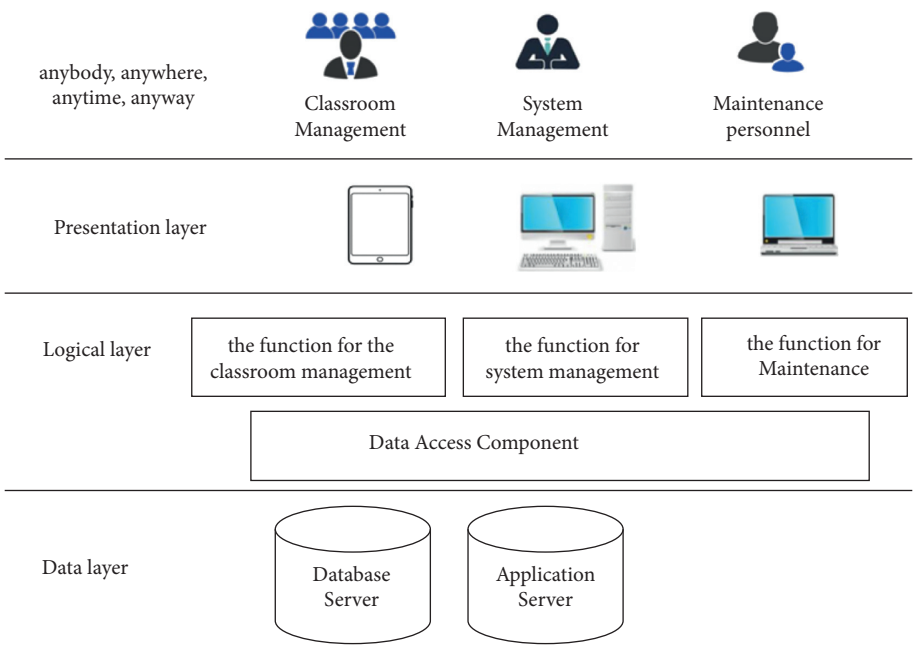

Figure 3: Multimedia teaching equipment management system architecture.

(6) The maintenance personnel can view the usage instructions and precautions of the multimedia device through the multimedia device management system. The system administrator can view the fault classification of the multimedia device and the corresponding solution and can also be in the database of the system after completing the new fault repair. The description of the fault and the solution are recorded in the fault description table, which can provide relevant solutions for solving similar problems in the future

Through the multimedia teaching equipment management system, functions such as maintenance, query, statistics, and analysis of various multimedia resource information can be completed. Therefore, the intelligent management of multimedia teaching equipment and supporting resources under the "Internet +" era is realized, and it has broad application prospects in various fields of equipment and communication link resource management.

3. System Design and Implementation

3.1. Overall System Design. The multimedia teaching equipment management system mainly faces three types of roles: system administrators, classroom administrators, and equipment maintenance personnel; these three different roles perform different functions. For classroom management personnel, any one of the campus networks can be used to log into the multimedia teaching equipment management system of any computer and realize the input and inquiry of the multimedia device information. The system administrator reviews the fault information processing flow of the equipment. manages the distribution of the multimedia classroom. and protects the security of the data. Maintenance personnel only have the right to browse and query and enter the fault handling information of the equipment; the system should be friendly, easy to operate, and easy to learn and understand.

(1) The system administrator module mainly includes basic information management, multimedia teaching equipment management, equipment failure processing process audit management, and classroom management composition for all users. The system administrator can create multimedia classroom administrators, equipment statistics reports and equipment fault maintenance reports, multimedia teaching equipment information management, classroom management, and multimedia teaching equipment fault information audit management. For the information of the multimedia teaching equipment, operations such as query, addition, modification, and deletion can be realized and comprehensively track the fault information of various multimedia teaching pieces of equipment. The fault information includes the fault handling process, fault processing results, life information, return time, and operating status. After the fault maintenance information of the multimedia teaching equipment is reported by the maintenance personnel, the operations of the fault processing are performed to perform operations such as viewing, searching, and auditing

(2) After processing each multimedia device fault, the maintenance personnel need to register the fault information, processing flow, and processing result of the faulty device and record the fault-related information on the device fault record management page. Each fault information is recorded in a table in the back-end database, which records the maintenance

information, processing flow, and processing results of the multimedia teaching equipment. For the basic information of multimedia teaching equipment, maintenance personnel can also perform operations such as query, addition, deletion, and modification

(3) Classroom administrators can view, add, delete, and modify information such as multimedia classrooms and multimedia teaching equipment. The tracking information is processed for the related fault information of various types of devices from the date of activation and includes the processing flow, the loan status, the return status, and the running status of the multimedia device. The software structure diagram is shown in Figure 4

3.2. Database Design. The design of the database is to abstract the information in reality into the relationship between the data entity and the entity in the system. The user's data needs are expressed through the conceptual data model, which is the design of the database, and the logical data model and database are built on this basis.

(1) The system administrator can create and manage multiple multimedia classroom administrators. The system has one and only one system administrator. The system administrator can manage multiple multimedia classroom administrators and multiple multimedia devices in multiple multimedia classrooms and can view faults at the same time, maintain records, and generate multiple device statistics reports.

(2) A multimedia classroom administrator can contact multiple maintenance personnel, and a multimedia classroom administrator can audit the fault maintenance records of multiple devices.

(3) A maintenance person can manage multiple classrooms and can fill in the breakdown of multiple equipment maintenance records.

(4) A classroom can have multiple multimedia devices and transmission lines.

According to the conceptual model entity and relational database paradigm theory analysis, the media teaching equipment management system satisfies the basic data integrity and consistency requirements. Therefore, the following logical structure design of the database can be obtained:

(1) user_info: job number (primary key), name, password, authority, title, department, mailbox, phone, and account

(2) Equipment_info: Serial_num (primary key), device model, device name, classroom, year of activation, usage status, retirement year, and maintenance record

(3) Equipment_trouble:trouble_id (primary key), device model, device name, fault date, device number, classroom number, maintainer employee number, and fault registrant employee number

(4) Classroom: classroom_id (primary key), the building where the classroom is located, the name of the maintenance personnel, and the employee number of the maintainer

(5) record: report_id (primary key), report name, reporter name, job number, and generation date

4. System Implementation

The multimedia teaching equipment control system can be mainly divided into three modules: system administrator, multimedia classroom administrator, and maintenance personnel. The implementation mainly adopts the mindset of three-layer architecture, which divides the application of business logic into three phases: user presentation layer, business logic layer, and data access layer. The business logic layer is mainly responsible for the operational processing of system business processes and also for data level operations. The data access layer is responsible for all layers that interact directly with the database, i.e., adding, deleting, modifying, and querying information in the database according to the business logic.

The previous recognition was only for a specific person and not suitable for others. According to our survey on the training of Mandarin online courses in Northwest China ($N = 343$), we found that samples with different genders (male and female) have differences in the difficulty of learning Mandarin online courses. Compared with female teachers, male teachers believe that Mandarin online training is more difficult. Different ethnic groups (the Han nationality and the minority) have differences in the difficulty of learning Mandarin online courses, and non-Han teachers think that Mandarin online course learning is more difficult. Teachers of different age groups (under 40 years old and over) have different difficulties in learning Mandarin online courses. Compared with teachers under 40 years old, teachers over 40 years old think that Mandarin online training is more difficult. Therefore, differentiated courses and categories can be set in online courses to serve different learners of online courses.

In addition, according to our survey on the training of Mandarin online courses in Northwest China ($N = 343$), we found that most samples are satisfied with the Mandarin online training courses. Gender, age, ethnicity, and learning experience are related to the difficulty of learning Mandarin online courses. The samples with different genders (male and female) have differences in the difficulty of learning Mandarin online courses. Compared with female teachers, male teachers believe that Mandarin online training is more difficult. Different ethnic groups (the Han nationality and the minority) have differences in the difficulty of learning Mandarin online courses, and non-Han teachers think that Mandarin online course learning is more difficult. Teachers of different age groups (under 40 years old and over) have different difficulties in learning Mandarin online courses. Compared with teachers under 40 years old, teachers over 40 years old think that Mandarin online training is more difficult. Therefore, differentiated courses and categories can be set in online courses to serve different learners of online

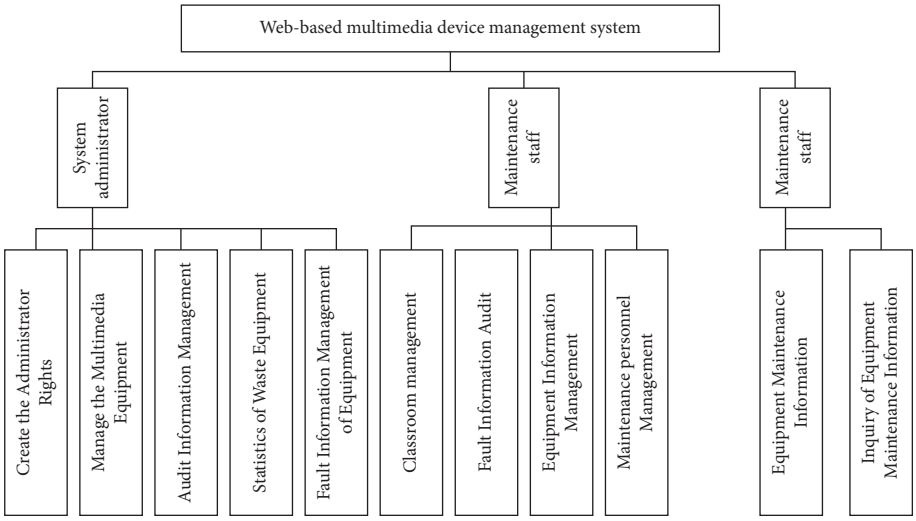

Figure 4: Structure diagram of multimedia teaching equipment management system.

courses. Meanwhile, there is a positive correlation between course satisfaction and teacher's teaching level, perception of Mandarin learning value, and overall Mandarin curriculum effectiveness. The research results show that the satisfaction of Mandarin courses can be affected by improving the teacher's teaching level, perception of Mandarin learning value, and overall Mandarin curriculum effectiveness. Therefore, we can satisfy learners of different ages, learning foundations, and cultural backgrounds by designing different patterns, so as to enhance the high-quality promotion of Mandarin.

The multimedia teaching equipment management system adopts the B/S (Browser/Server) structure. Under this system structure, the user only needs to install the WWW browser on the client side, and the system can realize the corresponding authority within the WWW browser. There is an operation without any understanding of the business processing logic of the system and the working mechanism of the web server. Such an architecture not only liberates the client but also reduces the cost and workload of maintaining and upgrading the management system for users who use the system. The B/S three-tier architecture software has higher maintainability, reusability, and low cost. These advantages are unmatched by the traditional C/S architecture. Each module has different functions and does not interfere with each other.

After the steps of system requirements analysis, system design, and database design, this paper introduces the core functions of the web multimedia teaching equipment management system. During the implementation of the system, the user logs in to the multimedia teaching device management system through the user name and password, the system enters different management pages according to different permissions of the user name, and the functions that can be used by users with different rights are also different. All users must first be instantiated into three different types of users after logging in. By using Session to generate a Session object for each user, this object is stored in the memory of the web server; at the same time, the system needs to determine the inactivity time during the user access process and the time of each session. The user enters the URL address file through the web client, and the system uses the posttransmission data to enter the business logic layer in this process and enters different user operation interfaces on the client according to different data returned by the business logic layer. After logging in, the system also writes a cookie in the user's browser to record the information used by the user when logging in, which is convenient for the next log-in.

(1) The system administrator enters the log-in page and logs in by entering the administrator account and password. The multimedia lesson device system has only one system administrator. The display of this module requires the user to click on the user name in the user information area or the view button below. On the page of this module, the administrator can view and modify the function submodule of the personal information, as well as the classroom and maintenance information; after the system administrator enters the system, the following operations can be performed: classroom management, user management, and device management. The interface of the entrance is as shown in Figure 5.

(2) The entire system runs in the campus network environment, and the system administrator can log in to the system through any PC on the campus network, realize equipment information entry and remote query (part of the data), report generation of obsolete equipment and equipment failure information processing, create campus management personnel and distribution authority, review equipment fault information processing procedures, manage school districts and classrooms, protect data security, and set different operation permissions for different users. For example, the school district administrator has the permissions to enter and modify the teaching equipment management system, and other authorized maintenance

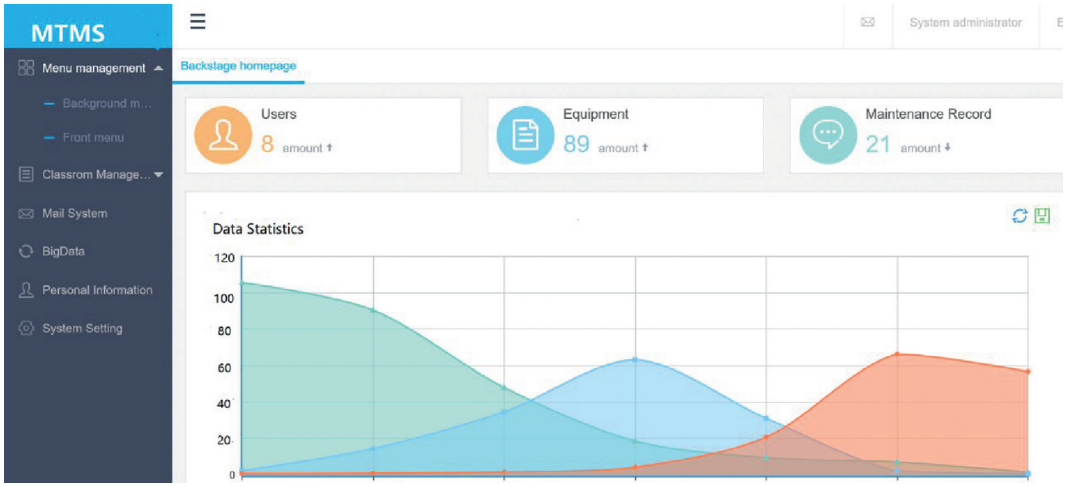

Figure 5: The interface of system administrator management

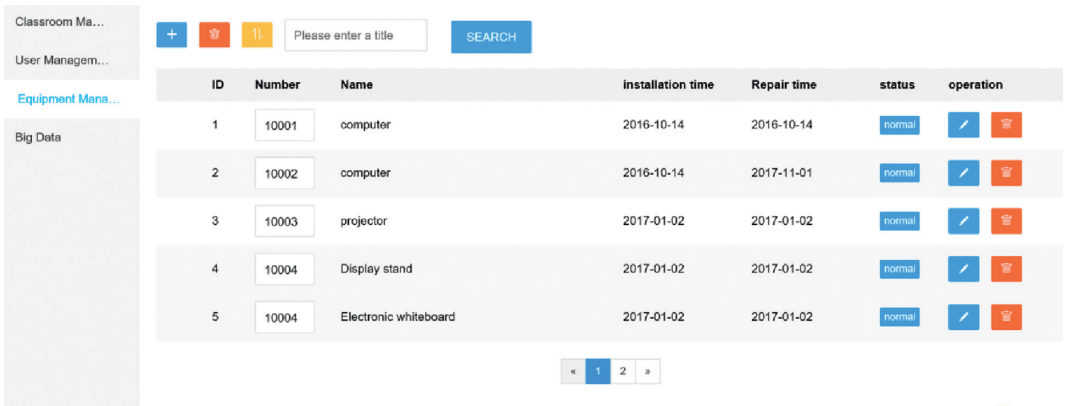

Figure 6: The interface of multimedia classroom management staff.

personnel only have the browsing rights and query functions and the input equipment fault handling information function. The multimedia classroom management personnel belong to the secondary administrator, and the multimedia classroom, multimedia teaching equipment, and multimedia teaching equipment maintenance personnel can be managed through the system. The management function submodule of the multimedia classroom administrator has a function selection area in which the device name and related information in the classroom can be viewed and modified. It includes operations such as viewing, adding, deleting, and modifying maintenance operations related to classrooms, multimedia teaching equipment, and maintenance personnel. The specific interface is shown in Figure 6.

(3) Multimedia equipment maintenance personnel: for each failed multimedia teaching equipment or transmission line, the maintenance personnel need to record the fault description information and register the equipment fault information in the record table in the system to implement backup. The model selection and equipment update of the equipment provide a reliable basis. The specific operation interface is shown in Figure 7.

5. Summary

In order to deal with the problem of insufficient management personnel as the multimedia classrooms and multimedia devices are increasing, it is necessary to automate the tedious operations and complex management intelligently. In order to realize the intelligent management of multimedia teaching equipment in multimedia classrooms, this paper adopts jQuery, Ajax, and Spring MVC technology to design and develop a database of multimedia teaching device management systems based on the web environment, which improves the multimedia management personnel. Work efficiency: the selected system has the same features as below. In line with the demand for the information management of multimedia classrooms and teaching equipment, the system serves as an auxiliary means to assist the management of multimedia classrooms, improves work efficiency, and speeds up the process of school information teaching. The system adopts the B/S architecture mode and runs on the

Figure 7: The register maintenance records of multimedia devices.

campus network. The system has good scalability and stability. The system uses Oracle as the back-end database, which has security and integrity, supports a large number of users to access data at the same time, and guarantees the consistency of the data.

(1) The system adopts the web-based B/S architecture mode, which supports a large number of users to access data at the same time and ensures data consistency, and the system has scalability and stability.

(2) Many functions in jQuery are called during the development of this system, which improves the reusability of the code.

(3) The system finally realized the management personnel's demand for information management of multimedia classrooms and teaching equipment, improved work efficiency, and accelerated the process of informationized teaching.

(4) The system interface is simple and generous, and the operation is convenient. The maintenance personnel of the system can also quickly grasp the usage method of the system.

The future work of this multimedia teaching equipment management system will be to design and implement the docking work with other management systems under the premise of perfecting the functions of the system, making the use of multimedia teaching management simpler, and making it play an active role on the road of the development in campus informationization ultimately.

Data Availability

This article does not cover data research. No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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