Preschool Teacher Education System Based on Remote Network System

Meng Xu1,*
1Wuhan Optical Valley Vocational College, Wuhan, 43000
*Corresponding author e-mail: xm799670799@qq.com

Abstract: How to achieve effective communication between school parents on online platforms, online office work on campus, and storage and sharing of massive learning resources will surely become important issues facing early childhood education. The purpose of this article is to design a kindergarten teacher education system based on the remote network system. This paper uses the increasingly perfect non-relational database technology to help store massive big data resources, and uses its characteristics to improve the access and operation speed of big data resources, which will effectively solve campus information management and improve the processing efficiency of resource storage and access. Develop a comprehensive platform for online office, communication, learning, and resource sharing for early childhood education. Research In order to realize the storage of massive data and the rapid operation of the system, the system database chose a complementary method of combining MySQL database and MongoDB database, using MySQL to store data involving operations such as relational lookup, and using MongoDB to store various file and photo resources. The system is developed using the SSH framework. First, the functional and non-functional requirements of the system are analyzed. The functional requirements use UML to establish the overall use case diagram of the foreground and background modules respectively. Through the complementary technology of MySQL and MongoDB, the storage and access efficiency of big data and the operating speed of the system's functional modules are greatly improved.

Keywords: Remote Network System, Education System, Kindergarten Teacher Education, Network Technology

1. Introduction
With the continuous improvement of science and technology and the arrival of the era of knowledge economy, the information management of elementary school kindergartens has developed into an increasingly important project for preschool education. Traditional contact methods, communication tools, and campus management systems can no longer meet the needs of schools and parents, and the
storage and sharing of massive amounts of big data and learning resources cannot meet user requirements either. Research and construction of a new, highly information-based, effective communication between school parents on the online platform, campus online office, and the storage and sharing of massive learning resources have become an important topic in the development of current early childhood education [1-2].

The construction of a communication platform for early childhood education will be able to effectively improve the level of education in kindergartens and primary schools, and create an additional channel for schools to communicate with parents. School teachers can also easily access the Internet and answer questions raised by parents in a timely manner. The computers in the school are connected to a local area network. The teacher’s paperless office is implemented. Plans, educational notes, observation records, etc. are stored in the office LAN with just one click. You can easily refer to it. The school forum has not only become a convenient channel for parents and teachers to communicate, it has also become a place for many parents to express their gratitude to the school teachers or to put forward their opinions and suggestions on the work of the school. Through real-time campus information release, parents and teachers can learn about school-related information more conveniently [3]. Through the BBS forum, the communication between the school and parents and between parents and parents can be smoother. Making full use of the convenience of network applications and the unlimited expansion of network space can establish a complete and rich online student file system for the school. Using the interactivity of network applications, paper-based communication between parents and schools can be transferred to the Internet, making the communication between teachers and parents more timely and effective [4].

Aiming at the development of early childhood education, the early childhood education software system designed in this article is a standard comprehensive platform for online office, communication, learning and resource sharing in the school. The early childhood education system is to study the early childhood education system through the research of network remote technology. It also includes traditional MySQL relational databases, non-relational database MongoDB technology, SSH framework, etc.

2. Methods

2.1 MySQL Technology

Relational database, using relational model to represent various entities in the real world and various entities between entities contact. The relational model is represented by relational tables, and all the relational tables are placed in the database. MySQL is an open source small relational database management system. Different tables are used to store data in the MySQL database, which can improve access speed. MySQL uses the SQL language to access the MySQL database. MySQL has many advantages, the most notable of which is open source, small memory usage, fast running speed, low investment cost, etc., so it is especially popular with small and medium-sized websites. This kind of websites often choose MySQL database for software development. Database [5].

NoSQL databases are non-relational databases. MongoDB is a type of NoSQL database. The advantages of MongoDB over the relational database MySQL: high concurrent read and write to the database; massive data. High-efficiency storage and access; high scalability and high availability of the database. MongoDB supports a very powerful query language. The syntax of the query language is very similar to the object-oriented query language. Almost all functions similar to single-table queries in relational databases can be realized by MongoDB. It also supports indexing of data [6-7]. MongoDB also supports complex data types, and the query function is also very suitable. Many problems with extremely large data volumes have been solved, and the speed of data query has been significantly improved.

2.2 SSH Framework
SSH is an integrated framework. This system uses the SSH framework in Web development. SSH framework is divided into presentation layer, business logic layer, data persistence layer and domain module layer. The SSH framework separates the view, controller, and model in MVC. The Struts framework is used to connect the data layer and the view layer, receive, process, and send data and control the process; the Spring framework glues the Hibernate framework and the Struts framework, transparently manages the entire framework, and provides the aspect functions of the AOP framework; the Hibernate framework is used to let JavaBean generate tables and associations in the database, and operate the database through operations on JavaBeans [8].

The basic business process of each layer in the SSH framework is: In the presentation layer, the user operates on the web interface, JSP receives all the requests issued after the user operation on the page, and transmits responses to these requests, and then the Struts framework according to the configuration file Assign the request to the corresponding Action for processing; in the business layer, the Spring IoC container makes the code loosely coupled; in the persistence layer, the object mapping and database interaction operations of the Hibernate framework are used to process all the requested data from the DAO component. And return the processing result to the upper layer [9-10].

3. Experiment

3.1 System overall design

The architecture mainly expresses the specific functional component composition of the system and the communication status between each other, which is an important basis for coding implementation and detailed design. The overall architecture design is divided into five layers, from top to bottom are presentation layer, business logic layer, basic component layer, data access layer, and data layer.

According to the structure and function of the system, the HPS system is divided into: personal center module, information notification and instant messaging module, electronic album module, document management module, class information management module, personnel file management module, system setting module, forum communication module, etc. Nine large modules.

The database design of the system studied in this paper adopts a complementary way of combining MySQL and MongoDB. Various file and photo resources are used for user sharing, forming a friendly learning and sharing environment for sharing resources, learning together and making progress together. There are various resources and formats stored in the system. In view of the large amount of data generated in the future, MongoDB is used as the database for resource storage. However, since MongoDB is a non-relational database, performance does not have an advantage for complex search. Therefore, the data involved in the entire system is stored in a way that MySQL and MongoDB have complementary advantages. Use MySQL to store data involving operations such as relational lookup, and use MongoDB to store various file and photo resources.

3.2 System Module Design

The user enters the user name and password in the login interface to log in to the home page of the background. The login method provides the default user name, bound mobile phone number, and bound mailbox; the password is retrieved through the bound mailbox. The first login can only be done through the account. After the first login, you need to fill in the personal information before you can enter the background homepage. The information notification module is to realize information notification between users' PC platforms, PC and mobile terminals, and mobile terminals publish, receive and reply functions. Unread messages are indicated by numbers in the upper right corner of the function icon. Information notifications are mainly text messages, support attachments, and attachments have size restrictions. The sending and receiving of information notification adopts the real-name system, just check the name of the object in the personnel interface. Information notification includes writing information, receiving information, sent, trash can. Document management can save, share, query, and download user work materials and courseware materials. Documentation by default,
the system administrator establishes a classified directory, and the user can place and open the folder or file content in the corresponding directory; the system administrator can set the viewing, read and write permissions of the classified directory, and the user self-uploaded folders and files are controlled by The user himself sets open permissions. This article is designed according to the modules needed for preschool teacher education.

4. Discussion

4.1 User Interface Design

The functional structure of the user management module is relatively simple. The user management module is mainly used to manage user information and the registration and login of new users. Its functional structure mainly includes three parts, namely role management, authority management and user information management. The system administrator can assign operation permissions to user roles. Users can be divided into multiple roles, such as tourists, bloggers, members, and moderators. Several part of the users of the administrator submit the user name and password for registration and login through the registration and login page of the user management page, and authorize users through user roles. As shown in Table 1, the database design of user information is divided into user number, user name, and password. In this way, users can log in to their account with their ID and password to query and modify information.

Table 1. User information table

| Serial number | Field name | Field description | Data type | Data length | Whether the primary key |
|---------------|------------|-------------------|-----------|-------------|------------------------|
| 1             | CUS_ID     | User number       | CHAR      | 10          | Yes                    |
| 2             | CUS_NAME   | User name         | CHAR      | 50          | No                     |
| 3             | PASSWORD   | Password          | CHAR      | 10          | No                     |

The personal center module is mainly used to maintain the basic information of registered users so that students, parents, class teachers, and the Academic Affairs Office can view their related information. In the interface, data dictionary and data query components are placed. The interface is divided into left and right sides. The left side is used to display basic account information, and the right side is used to display user-related pictures and information notifications. After the user logs in, he enters the personal center. The user can view basic account information, basic student information, and family information, which can be hidden and expanded. After unfolding, you can modify the information content by editing the information. The user can view the class information of the user, click to enter the album to view the photos, or click to enter the information notification, and check the email.

4.2 User Access Records

After the teacher logs in to his account, he can query the information. As shown in Table 2, the database design for teachers to query information. The document management module is mainly used to maintain the basic information of the class, so that students, parents, class teachers, and the academic affairs office can upload, download, delete, and share documents, set the document directory and permissions, and the system administrator can delete classes, download documents, and document directories and permissions setting. In the interface, data dictionary, data query and document transmission components are placed. The interface mainly displays two sections of personal network disk and shared documents, and the resources of learning documents are displayed in each section. After the user logs in, he enters the document management. The user can create a new folder, rename the folder, and delete the folder. You can view the list of documents in the folder, browse the content of the documents, and at the same time upload documents, share documents, download documents, and delete documents.
Table 2. User query data access records

| Serial number | Field name | Field description | Data type | Data length | Whether the primary key |
|---------------|------------|-------------------|-----------|-------------|-------------------------|
| 1             | DATE       | Access time       | Date      | 20          | yes                     |
| 2             | DATA_ID    | Material number   | CHAR      | 10          | No                      |
| 3             | ACC_USE    | Access user number| CHAR      | 10          | no                      |

Put the system into experiments and tests. After five months of user experience testing, it is found that the number of users and visitors of the system is increasing, as shown in Figure 1. It shows that the remote multimedia network innovation platform has many advantages, including the design of the preschool teacher education system. It can be applied to multiple professions. At the same time, the system can enhance teacher management ability, train and cultivate the educational ability of kindergarten teachers, and improve the employment competitiveness of kindergarten teachers.

Figure 1. Test user visitor volume

The “Golden Pig Dolls” and “Olympic babies” born in 2017-2018 have followed one after another. There are about 27 million newborns in China each year. The urbanization process continues to accelerate, the disposable income is growing, and the middle class is rising. The country has begun to increase investment in early childhood education. Following the informatization construction of middle and primary schools, the informatization of elementary school kindergartens has also entered a new climax. In 2018, there were 129,100 kindergartens nationwide, and in 2019 it reached 138,000. There were 23,488,300 children (including preschool), and 26.578 million in 2019. There were 951,900 kindergarten principals and teachers. The proportion of urban children’s consumption in total household expenditures accounted for more than 33%, accounting for 90% of the total household expenditure. 44.29% of households spend between 500 yuan and 1,000 yuan for raising children each month, and pay more and more attention to children’s education. Through this system, early childhood education can be improved, and teachers’ work efficiency will also be greatly improved.

5. Conclusions

In this paper, by studying the remote network system, we have developed a very timely preschool teacher system that meets the needs of kindergartens and primary schools for online office and timely communication between parents and schools. It integrates the traditional MySQL relational database and MongoDB non-relational database thinking. Give full play to MySQL’s small size, fast speed, low
total cost of ownership, and good open source features, as well as MongoDB's high concurrent read and write to the database, efficient storage and access to massive data, and high scalability and high availability of the database. Features complement each other. System development uses SSH architecture. SSH (Struts+Spring+hibernate) architecture divides the system into four layers in terms of responsibilities during the development process: presentation layer, business logic layer, data persistence layer and domain module layer. Using Struts can separate the presentation layer and business logic, making the structure clear and easy to maintain. Struts custom tags make the Jsp page and java code better integrate. The advantage of using hibernate is to make the database persistent, and the advantage of using Spring is that you can use transaction processing and inversion of control. Many friendly interfaces are designed in the system to facilitate the user's operation and browsing of the preschool education software.

References

[1] Zhang Z, Wu P, Han W, et al. Remote monitoring system for agricultural information based on wireless sensor network[J]. Journal of the Chinese Institute of Engineers, 2017, 40(1):75-81.
[2] Bashir B. E-Health system: A tool for investigating pattern of dermal diseases in remote beneficiary network of telemedicine under Mayo hub[J]. Journal of Pakistan Association of Dermatologists, 2019, 28(4):489-494.
[3] Miao R. Hydraulic network remote control system of computer numerical control milling machine[J]. Academic Journal of Manufacturing Engineering, 2018, 16(1):88-96.
[4] Matsutomo S, Manabe T, Cingoski V, et al. A Computer Aided Education System Based on Augmented Reality by Immersion to 3-D Magnetic Field[J]. IEEE Transactions on Magnetics, 2017, 53(99):1-4.
[5] Loveday V. The Case against Education: Why the Education System Is a Waste of Time and Money, by Brian Caplan[J]. Journal of Cultural Economy, 2018, 12(1):1-4.
[6] Li H B, Yang L F, L.-S. Lü, et al. Analysis and Key Technologies of the Chinese Exhibition and Education System of Petrology[J]. Acta Geoscientica Sinica, 2017, 38(2):256-264.
[7] Mathews S P, Gondkar R R. Solution Integration Approach using IoT in Education System[J]. International Journal of Emerging Trends & Technology in Computer Science, 2017, 45(1):45-49.
[8] Blmeke S, Jenen L, Grassmann M, et al. Process mediates structure: Relation of preschool teacher education to preschool teachers' knowledge[J]. Journal of Educational Psychology, 2017, 109(3):págs. 338-354.
[9] Tekmen B. Preschool Teacher Education As An Example Of Open Social System[J]. cypriot journal of educational sciences, 2017, 12(2):81.
[10] Fatma Betül enol, Asl Yüksel, Akyol T. EVALUATION OF PERCEPTIONS OF PRESCHOOL EDUCATION TEACHER CANDIDATES TOWARDS DRAMA[J]. Turkish Studies, 2019, 14(1):873-891.