Design and Implementation of a Novel Student Information Management System

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***Abstract*—With the continuous development of information technology, the means of information technology in the student management system continue to popularize and promote. It can make management efficient, fast and convenient. In view of the problems existing in the current student information management system, such as long development cycle, difficult maintenance and poor user experience. This paper design and implement a novel student information management system. Based on the mode of Client/Server, the design of mobile terminal is added that WeChat mini-program is used for development. At the same time, Development of client based on Qt Quick. The interface is simple and easy to implement, also easy to transplant in different operating system platforms. The system is simple to implement, the system developers only need to be familiar with QML, JavaScript, CSS and other front-end development technologies to complete the development of the system. The practice shows that the system is more scientific and institutionalized student information management, reducing the labor intensity of the management personnel, with low cost, easy maintenance, low development threshold, short development cycle and other advantages, with a certain promotion value.**

Keywords—Management System, QML, MYSQL, CSS.

I. INTRODUCTION

With the continuous development of information technology, colleges and universities have gradually implemented the information management mode. The information system can be very convenient for teachers and students to learn and live. The student information management system of colleges and universities can realize the management and sharing of information colleges and universities, and make the management of students more efficient, standardized and standardized. In view of the existing student information management system is too complex, information maintenance is tedious and difficult. This paper design a simple student information management system, which not only realizes the basic functions of the system, meeting the basic requirements of managing students. From the perspective of users, the interface is friendly, convenient and practical. On the other hand, as the perspective of developers and maintainers, the development process is simple to protect.

In this paper, the arrangement of the paper is as following: Section 2 introduces the overall design of the system; Section 3 needs analysis and database design; Section 4 Client application development and run; Section 5 mobile software development and run. Finally, Section 6 concludes the paper and points out further work.

II. THE OVERALL DESIGN OF THE MANAGEMENT SYSTEM

At present, the architecture of information management system basically adopts mode of Client/Server (C/S) and Browser/Server (B/S) mode. There is no great difference between C/ S mode and B/S mode at all. The traditional C/S mode has one disadvantage: Different clients need to develop different platforms, software development cycle and large cost. Meanwhile the managers need to spend a lot of time and energy on development and maintenance .When the number of users increases, the addition and configuration of clients are more complex. In this paper, QT quick is used to develop the client application, which is based on the development environment of scripting language and supports cross platform migration. So as to reduce the problem of different versions of different platforms. Because Wechat is the most popular application in China, most people have installed this application. So in this paper, on the basis of C/S mode, we add the function of mobile terminal what is Wechat small program. Users do not need to install other applications and they can enter the system from Wechat application, which reduces the problems of mobile terminal application software installation and software development brought by different operating systems.

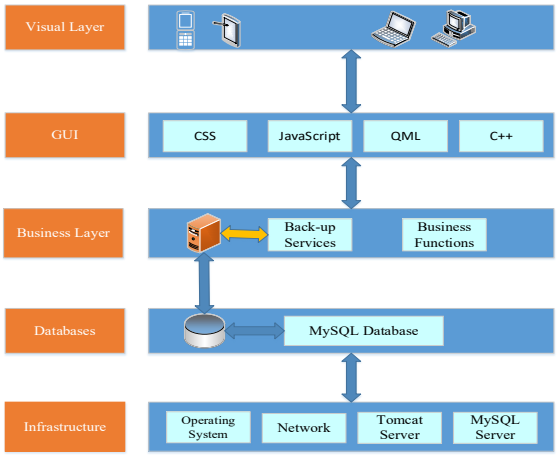

Fig. 1. The overall framework design drawing of system

A. The Overall Framework Design of System

The design diagram of the system can be divided into five parts: The Visual Layer, UI Layer, Business Layer, Database and Infrastructure. As shown in Figure 1, the overall visual layer is presented in the form of mobile Wechat applet and Client application. Users can control and access the system through different device programs, including various popular Internet devices. The front-end UI is the encoding method adopted by the application program, Wechat applet and PC application program. The system business layer is closely related to the front-end UI and the front-end database. In order to connect the bottom-level database and the visual layer, it

encapsulates and reads the data in the database layer, and converts it into the granularity service. Through assembly and application, the bottom data of the database is applied by the visual layer. Under the application layer is the database layer, which is the data storage and access of the whole system. At the bottom is the infrastructure, which provides the hardware support, basic data, network, etc. of the whole system, and can effectively ensure the stability and security of the system.

B. The Main Functions of System

The main function diagram of the system is shown in Figure 2, in which the school educational administration management personnel, counselors and teachers as well as all have the right to access and use the system. People with different identities have different access rights. The main functions of the system include user management, role management, student status information management, logistics service management, course selection management and score management.

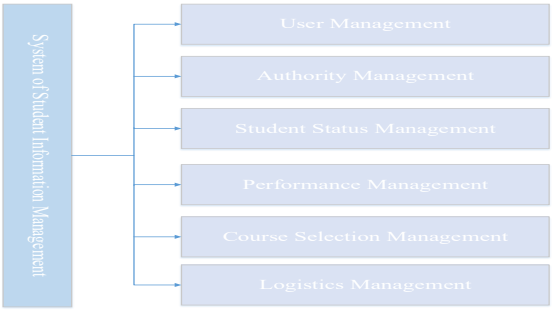

Fig. 2. The forms of function design of system.

III. Database Design Of System

Database design is generally divided into the following stages:

1) In the demand analysis stage, conduct detailed investigation and analyze user data requirements;

This student information management system has the basic information management, student status management, logistics management, course selection management and performance management requirements. Based on the analysis of requirements, the conceptual structure design is established according to the actual requirements of the system.

2) Structure design stage: give the conceptual model of description, i.e. E-R diagram;

3) The stage of logical structure design: transforming the designed conceptual model into the required data model;

4) Database implementation stage: establish database on the basis of logical design and physical design; the system adopts MYSQL database, designs tables with different relations according to the established ER diagram, and sets different data types for the attributes in the tables.

6) In the stage of implementation, operation and maintenance, the database system after completion is continuously evaluated, debugged and modified..

IV. Development and Operation of Client Application Software

A. Development of Client Application Software

The client application program is written by QML in QT quick, which can help developers easily design modern GUI and API suitable for application program. QT quick uses QML script language to design gui, which can run and transplant across platforms. Beautiful interface supports touch screen operation. In the world of QT quick, user interface and user behavior can be described by QML. QML language is an extension of JavaScript, which allows developers to use declarative syntax to specify each user interface with QML elements. These elements are a collection of graphics and behavior building models, which can form different components. At the same time, QML can be connected with background through C + + language. Realize the direct intercommunication of different programming languages.

B. Operation of Client Application Software

The design of the application software meets the basic functions of the student information management system. The login interface realizes the permission login. Users of different levels can login to different interfaces. The administrator has the highest permission and can realize the distribution and management of the permission. As shown in Figure 3, after login, the main interface to realize different user functions. Figure 4 shows the main interface after operation, which can support touch screen display and operation.

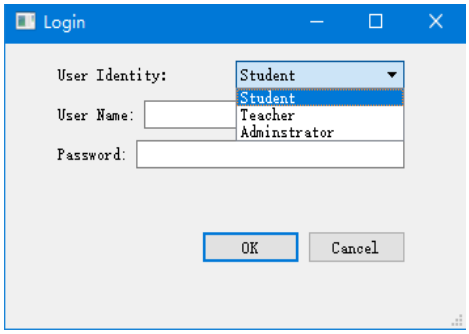

Fig. 3. The forms of user login interface

Fig. 4. The forms of application main interface

V. Development and Operation of Mobile Application Software

A. Development of Mobile Application Software

The mobile application is developed by Wechat small program. Users can enter the system through Wechat without installing the mobile terminal application. Developers only need to master the WXML, WXSS and JavaScript languages similar to the HTML language to quickly implement. Wechat applet framework includes WXML, WXSS language and native interface defined by the applet itself. WXML language is similar to the traditional web front-end development language HTML, which is mainly responsible for building the

component structure of the applet interface; WXSS language is similar to CSS language,

It is mainly responsible for defining the style of interface components; using JavaScript language to write the native interface, server interface function and cloud SDK of the applet, JavaScript language is mainly used to realize the business function of the applet and connect with the background and database. The system uses three-tier architecture design ideas, three-tier architecture are respectively performance layer, business logic layer and persistence layer.

(1) Presentation Layer. The presentation layer mainly includes the applet interface, which is implemented by WXML and WXSS ; WXML is responsible for writing the interface structure control, and WXSS is responsible for defining the style and layout of the structure components.

(2) Business logic layer. The business logic layer is the core of the system, including the business function module of the system, which is implemented by the native interface of the applet. According to the system function design, the system users mainly include teachers and students users and administrator users. In the system, the teacher user can assign homework, log in student scores, etc.; the student user can register to modify the account, manage his personal information, query scores, logistics services, etc.; the administrator user can manage the teacher and student users and his personal information and management system; the teacher student and the academic administrator can communicate with each other.

(3) Persistence layer. The persistence layer includes the storage function of system data and file resources, which means that the image and file resources of the system are persisted to the cloud storage, mainly using the cloud SDK; The data storage function of the system needs to be implemented by the native interface of the applet, the cloud function and the cloud SDK. The native interface of the applet does not support batch writing and deletion of data. Batch writing and deletion need to call the function through the native interface, and then the cloud function calls the cloud SDK.

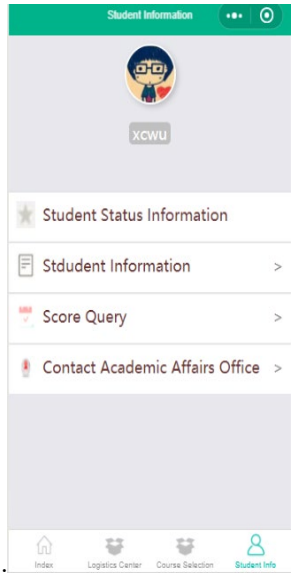

Fig. 5. The forms of min_program main interface

B. Operation of Mobile Application Software

After entering the small program through Wechat, enter the main interface of the system. According to different roles, the interface displayed after users log in to the system is also different. The main interface of the system is shown in Figure 5, and Figure 6 is the page of modifying personal information.

VI. Conclusions

This paper designs and implements the student information management system. Based on the traditional C / S mode, the client design is modified. In the front-end design, the client uses QML programming. At the same time, the design of mobile terminal is added. It is implemented by the popular WeChat applet. This simple design method reduces the coding amount of developers and the maintenance work of maintenance personnel, and provides better user experience for users. The practice shows that the student information management system is more scientific and institutionalized, which reduces the labor intensity of the management personnel. It has the advantages of low cost, easy maintenance, low development threshold, short development cycle and so on. It has certain promotion value.

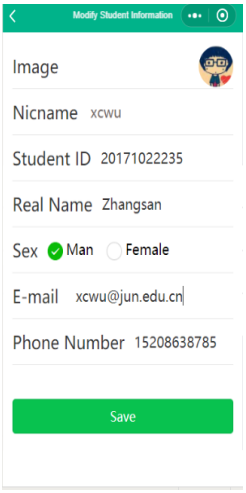

Fig. 6. The forms of personal information modification

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