

Design of Campus idle Book Leasing system

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Abstract — At present, there are a large number of college students all over the world, but the utilization rate of idle books on campus is relatively low. Under the background of the current information age, it is realized to form a platform to promote the recycling of idle book resources with the support of control technology and data communication technology. The platform is composed of a mobile login module, upper computer operation interface, and lower computer control part. At the same time, a database function is needed to complete the storage and acquisition of user and book resource data. The purpose of this system is to improve the utilization rate of idle book resources.

Keywords — Book resources, Intelligent control, Data structure

I. INTRODUCTION

The number of university campuses is large, and the total number of books owned by students is also very large. [1] Relatively speaking, the book resources belonging to students in the same school are likely to be forgotten on the shelf after they have been used. This phenomenon forms the waste of resources, which is not conducive to the promotion of academic atmosphere and professional knowledge. [2] Therefore, it is particularly important to develop an idle book rental system suitable for college students.

The system exists in the form of a physical bookcase in the school, even in the dormitory hallway, so that students can find the books they need and rent them. Through this form, the idle book resources of the students will be aggregated on the platform to form a special library with all the idle books as the main body of the resources. Each user can store the idle books in his or her own hands on the platform and get the corresponding reward according to the number of people borrowed and the length of time he borrows. Similarly, users who obtain a book through the rental system need to pay a certain amount of compensation to obtain the reading rights of the book. In this way, the value of all students' book resources will flow among all students in the form of cash flow, the purpose of which is to promote students' use of leasing system and learning enthusiasm. [3]

II. SYSTEMS ANALYSIS

A. Structure and requirements of Book Leasing system

The operation process of the system is as follows: the user first scans and logs in through the mobile device, and then the user can send access operation commands to the book rental system through the touch screen or keyboard, or mouse. The book rental system will first confirm the identification number of the device where the book is located to provide the corresponding location information and open the cabinet door corresponding to the device according to the instruction. After completing the lease transaction, the user is required to close the cabinet door by himself. after closing the cabinet door, and the display screen will show that the transaction is completed and automatically log out of the login interface and enter the initialization interface to stand by.

According to the above functions, the system can be divided into three modules, as shown in figure 1.

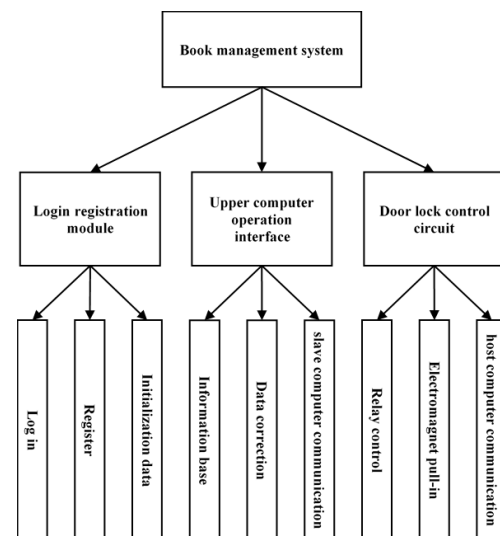


Fig.1 System structure design diagram

B. Login registration module

This module is mainly used to complete the login operation of the user. The application of the IM consulting robot in the module aims to provide readers with reference services without time and space restrictions and to provide real-time and uninterrupted consulting services throughout the day so as to assist customer service staff and automatically deal with readers' information. [4] The main work can cover book retrieval, reader rental information,



electronic library resources, FAQs, and other services. Through the use of IM consulting robot, the work pressure of library reference staff is reduced, the service time is prolonged, and the quality and efficiency of real-time online work of library reference service are improved. At present, the commonly used IM consultation system software are MSN, QQ, Wechat, and so on. Because the communication interface of MSN is more open and more convenient for development users, this system mainly chooses the MSN robot technology scheme. The functional architecture of the IM consulting robot starts from the user interface, application configuration, data matching, and service functions, as shown in Table 1.

User interface	Application configuration	Data matching	Service function
List of nearby equipment	Account password	Rental book resource information	Fault report
The latest rental book information	Basic information	Lease book resource information	User communication

Table.1 Structure of IM consulting robot

C. Upper computer operation interface

The hardware of the upper computer adopts the combination of the host computer and the display, in which the host computer should have the corresponding display interface and power supply device.

The upper computer operation interface adopts a visual studio platform .net framework editing interface under the windows system. The interface functions include initializing interface, storing book resource information display, scanning code into storage. The background process includes API book information query, database resource access, and upload. The leasing operation of the user must connect the equipment and the user through the upper computer operation interface as an intermediate medium.

D. Door lock control circuit

The door lock circuit is mainly composed of a single-chip microcomputer, relay, electromagnet, scanning equipment, and serial communication interface. [5]The electrical components of the door lock need the cooperation of the mechanical door lock structure, and the purpose of the control circuit is to cooperate with the host computer interface to execute the instructions transmitted by the host computer. After the login operation of the host computer is completed, the corresponding instructions will be sent. At this time, as the lower computer, the single-chip microcomputer will enter the state of reading the instruction information of the scanning equipment and send it to the upper computer after obtaining the valid book ISBN string. After receiving the ISBN code, the host computer calls the corresponding book retrieval API interface to obtain the basic information of the book and input it into the interface, and at the same time upload the

database to complete the data upload. The process is shown in figure 2.

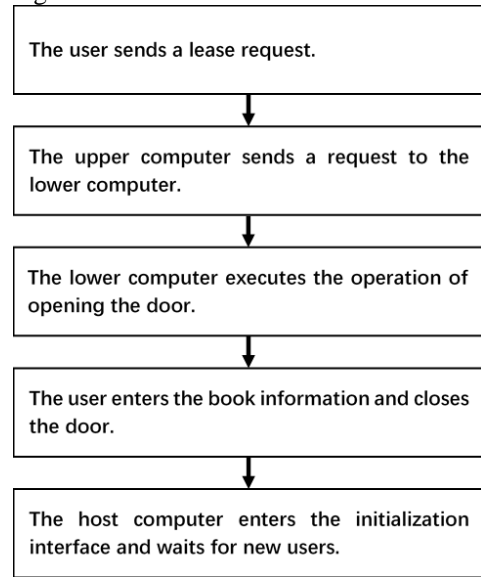


Fig.2 System operation flow

III.DATA MODEL CONSTRUCTION

The idle book rental system adopts SQL Service database, which supports the new construction, deletion, query, and connection with other databases of data records. Data acquisition methods include uploading sub-equipment under the system and intelligent identification of equipment terminals. The data of the data layer and the user layer are checked and inputted by the background staff of the system, and the data of the business layer is transmitted by the reader to the control center server through the network. The data stored in the database has various types, large capacity, and fast update speed, which will produce a lot of redundancy. It is necessary to clean, summarize, store and mine the data to improve the operation efficiency of the system [6].

When the server processes the business functions, it can analyze the matching between users and book resources, the rental status and circulation frequency of book resources, and the rental information of tourists by calling data, and push the functions to Client and Server. Tourists to query and match personal information and idle book information on the terminals distributed in the rental area. The backstage staff of the system can provide system maintenance and a variety of software application services on the PC of the control center.

IV.CONCLUSION

Under the Internet operation mode, the data transmission becomes convenient, which limits the book rental system to replace the traditional web page to publicize the complexity of manual offline transactions, and provides more convenient and more valuable access to professional book resources. The idle book rental system provides users with the interface for inputting book information and the function of information feedback. At the same time, the system is based on the premise that users define the value of books and gives the corresponding reference value to

those who need books. The design framework proposed by this system has a certain reference value in the current idle book resource management.

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