

Analysis of New Library Borrowing and Returning Mode Based on Book Transfer System

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Abstract: With the rapid development of information technology and the widespread application of smart phones, more and more services can be implemented on smart phones, and the application in library field has also increased, resulting in the library lending system. Based on this, this paper puts forward a new theory of library borrowing and returning mode based on the traditional library borrowing and returning mode. The construction of the system is analyzed and studied by using the intelligent system operation platform. The results show that the use of self-service borrowing and returning books can effectively extend the library's borrowing and returning time and reduce the labor intensity of library staff. It has great application prospects in the daily management of the library. The final research results also show that the system has innovated the library service concept and the new business management model, which has transformed the library service model from traditional manual service and automated service to intelligent service mode, and strengthened the reader's self-service awareness and greatly improved. The efficiency of the library serving readers.

1. Introduction

The borrowing and returning system of library is the core of Library service. In the era of knowledge explosion, the growth of readers' demand has exceeded the affordable scope of libraries, especially the service of borrowing and returning books [1]. This makes the service mode of university libraries need to be constantly transformed with the progress and development of information technology, from traditional service to diversified and personalized development. In this case, the self-service mode of borrowing and returning books came into being [2]. In order to achieve self-service book lending, we must first solve the problem of automatic book recognition [3-4]. At present, the application of radio frequency identification (RFID) RFDI technology in libraries has developed rapidly. Self-service, as a new service mode with strong vitality in University libraries, is becoming more and more popular among many university libraries [5]. On this basis, make full use of modern technologies such as the Internet to integrate and share the vast amount of decentralized idle resources to meet the diversified needs of economic activities [6]. The library service model evolved from traditional manual service and automated service to intelligent service mode, which promoted the improvement of library service level and the improvement of document management level. It also gave the management of paper books in modern university libraries. The meaning of intelligence [7]. In this context, traditional libraries are no longer able to meet the needs of large, real-time, and efficient information or knowledge.

With the rapid development of information technology, smart phones are widely used in various fields, and they are emerging as mobile Internet [8-9]. With Diverse functions, Diverse platforms, provincial, convenient, and fast features, users can personally manage their own relationships [10]. In 2013, research on the use of Raqidil for book-to-chapter borrowing was conducted [11]. A topic closely related to the challenge of interlibrary loan for e-book borrowing has also been studied [12]. In 2015, a few years later, relevant researchers further carried out research on the development of library systems to achieve inter-library loan sharing [13]. As a development trend, digital libraries are gradually replacing traditional libraries based on paper media [14-15]. At the same time, users of

libraries have put forward new requirements for the service form and content of libraries (such as real-time, anywhere, fast and so on). Self-service mode is mainly open-shelf borrowing, book retrieval, network renewal, online reservation, etc. All borrowing procedures are carried out without librarians, readers. Through this system, we can help ourselves borrow and return books freely, simply and quickly [16]. They make use of the virtual data of mobile interconnection, realize encounter with real life, increase the intimate relationship between users and broaden the channels of information sources. In the traditional mode of borrowing and returning books, readers spend a lot of time traveling to and from the library, which results in the decline of readers' interest in borrowing books [17]. With the help of computer and network technology, it is possible to construct a new mode of library borrowing and returning books.

2. Needs Analysis and Construction of Book Transfer System

The number of books in the library is increasing continuously, but the circulation rate of books has not changed accordingly. How to improve the circulation rate of books by a large margin without increasing the investment of funds [18]. This is an urgent problem to be solved. If the library can't provide face-to-face "lending" system, it can't provide book publishing and retrieval system, so that the loan books scattered in all corners of the city can be displayed (of course, the reader has the right to choose), and the readers who need to borrow can search nearby books or specific books [19-20]. The traditional library borrowing and returning system must be realized through the intermediary of library. This system allows the library to repeat many unnecessary operations and reduce the circulation efficiency of books [21]. After the readers return the book, the library must be classified, put on shelves, and re-registered [22]. The readers borrowed on their own, which is equivalent to the readers of each book can be transformed into a library of micro-book collection points, such a collection of books with liquidity and timeliness, which is conducive to improving the breadth and depth of library collections [23]. At the same time, through the access control scanner, many college libraries use this mode, that is, when entering the library or reading room, use the library card to scan on the access control card, open the door and display the name and other information, and also count the people's library. Number of people, etc.

In the initial system construction simulation, we use Table 1 as a standard parameter to observe the changes of the network structure through computer random simulation, and analyze it accordingly with Figure 1.

Table 1 Standard parameters for computer simulation of book lending system

Parameter	Numerical value	Parameter weight
Volume of books	60	0.9
Readership	30	0.8
Borrowing volume	15	0.5

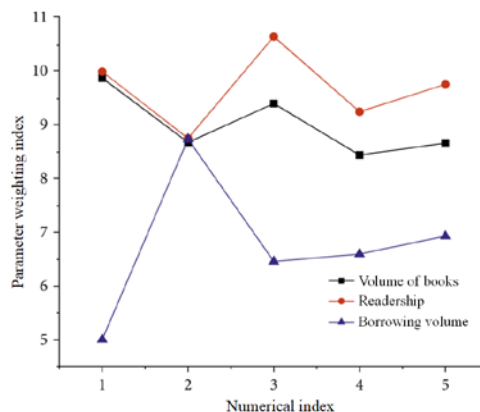


Fig. 1 Analysis of Standard Parameters for Computer Simulation of Book Loan System

Based on the above analysis, we give a summary comparison of the main performance indicators of RFID and Color Bit in the system for automatic identification of tags. As shown in Table 2 and Figure 2:

Table 2 Comparison of main performance of RFID and color bit

Performance index	RFID coefficient of performance	Color Bit Coefficient of performance
Tag read capability	1.04	0.96
Information search speed	0.88	1.15
Anti-jamming capability	1.24	0.41

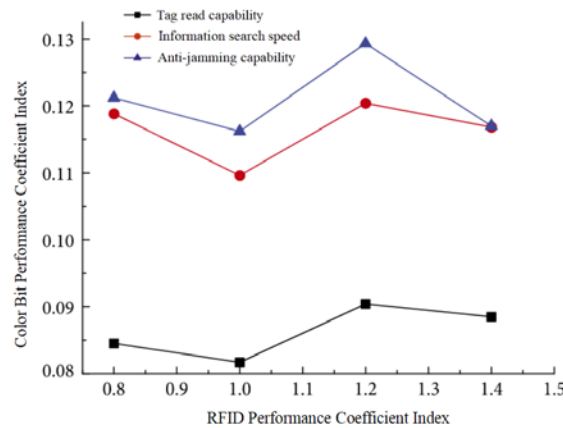


Fig. 2 Comparison of main performance of RFID and color bit

By receiving intelligent operation platforms such as portal, Wechat and APP, the lending system realizes the simplest way to make a reader who does not want to return a book to the library, while another reader just wants to read the book. The borrower clicks on the "book lending" function on the Wechat terminal, and the book generates two-dimensional codes, and the borrower opens the micro-mail terminal. If you sweep it, you can borrow it. This model requires readers of "out" books to publish their location information and contact information. This is the same as some existing second-hand trading applications, such as catching up with the market network, transfer and so on. At the same time, the mode also makes the book borrowing not need to go through the library, through certain procedures among readers, form a book borrowing network, and through the public electronic platform to achieve bibliographic borrowing. The speed of borrowing and returning through the self-service loan system depends to a large extent on the reader's familiarity with the system used, and the bar code label recognition principle determines the position, orientation, and position of the bar code on the book. The requirements are very strict, and the average reader needs to be proficient after a long period of use. The lending system relies on smart phones and the Internet. It can be done through a mobile app, either as an independent book lending app or as part of a library app. It is worth noting that the lending system must be approved by both parties before being transferred in the system. And the book must be out of date.

3. Functional Benefits of New Type Book Transfer System

The service mode of the new book lending system can enhance the communication among readers by searching, pushing, publishing and lending nearby books. It may produce new discoveries and improve creativity after the communication among readers in the same subject area. Substantive libraries (except self-service libraries) have limited service time. Readers may need to borrow or return books when the library is closed, while the "lending" mode is not subject to time constraints. Information can be released at any time, and face-to-face "lending" books can be agreed at any time. For the people who are inconvenient to travel to and from the library, the system can save more time and arouse readers' wider interest in reading. In turn, the circulation and the rate of borrowing of

books are greatly increased, and the low-level and repetitive labor of librarians is reduced, and time is spared to provide readers with more and deeper services. Moreover, since the new book lending system has a strong Multiple labels reading capability, in the self-service lending system, multiple books can be refilled at one time, and the work efficiency is obviously improved compared with the bar code mode self-service lending system. . Therefore, this service model is the most popular and most convenient service method for readers, and the reader satisfaction will also increase.

The use of the self-service loan system compares the good results with the manual service method. The use of the system makes the self-service loan system greatly extend the service time of the borrowing and returning books. At the same time, the reader can freely choose the manual and machine service modes to avoid borrowing. At the peak of the book, readers wait in line to wait for the phenomenon, greatly improving work efficiency and speeding up the flow of book lending. Table 3 below and Figure 3 are specific comparative analyses performed on it.

Table 3 Efficiency comparison between self-service lending system and manual service mode

Book borrowing method	Lending volume(%)	Return amount(%)
Self help loan system	75.36	66.89
Manual service mode	55.17	47.82

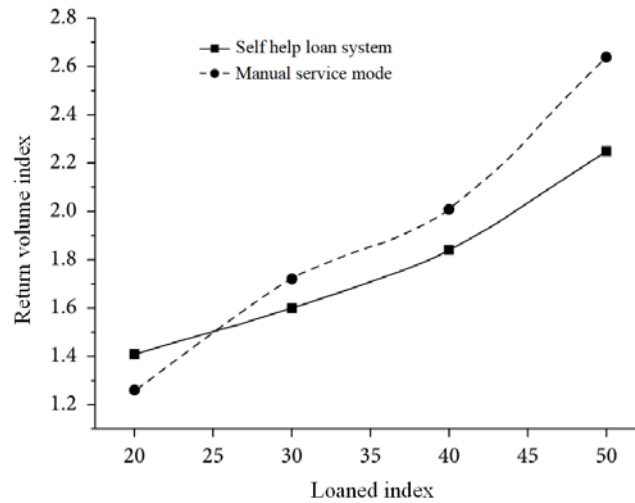


Fig. 3 Efficiency comparison between self-service lending system and manual service mode

In order to predict the use of library books by school teachers and students, it is necessary to mine and analyze the data, and the exponential smoothing method can be used to complete the prediction. The prediction function model is as follows:

$$D_i = a + \sum_{j=1}^n b_j \ln(p_j) + r_i \ln(Y) + u \quad (1)$$

At the same time, the above formula can be rewritten into the form of the following:

$$D_i = a + \sum_{j=1}^n b_j p_j + r_i Y + u \quad (2)$$

If the time series D_i changes because of its own factors, D_i can be regarded as a multivariate regression model, and the parameters affecting D_i are the historical data of d_i . Thus, the following models can be obtained:

$$d_i = \sqrt{(T_{xi} - x)^2 + (T_{yi} - y)^2 + (T_{zi} - z)^2} \quad (3)$$

Among them, the autoregressive moving average data mining model is a prediction model with

high accuracy in short-term prediction, which is established by the effective combination of Di and di models. Then the formula of the model is:

$$f(t) = \sum_{j=1}^N \sum_{k \in Z} d_k^j \varphi_{jk}(t) + \sum_{k \in Z} c_k^N \varphi_{Nk}(t) \quad (4)$$

Considering the point in time during the book lending process, if $f(t)$ is defined, the qualified S should satisfy the following formula:

$$S = 2L + W = \frac{c}{2f\sqrt{\varepsilon_{eu}}} \quad (5)$$

When lending and expiration reach a balance, you can get an average lending speed, expressed as a formula:

$$P_i = \frac{f_i}{\sum_{i=1}^N f_i} \quad (6)$$

According to the above calculation and analysis results, we can get the trend model of library application data, compare with the actual value and observe the error to determine whether the construction of the new book lending system is qualified. As shown in Figure 4 below:

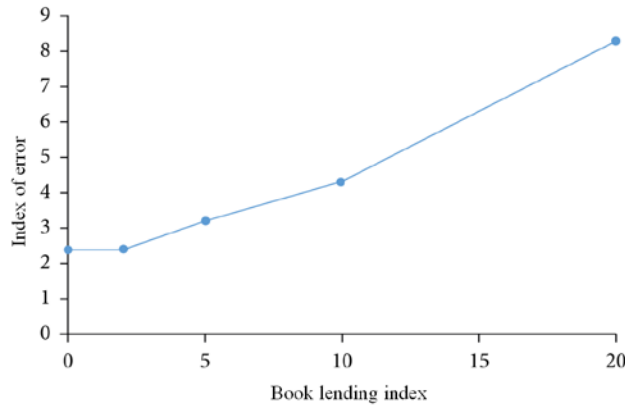


Fig. 4 Comparison of Trend Model and Actual Value of Library Applied Data

Readers can borrow books by themselves without the participation of Library staff. It increases the number of books borrowed, reduces the workload of staff and reduces the loan equipment of Library buildings. And through the "lending" system, we can know who the readers are who read a Book together. These readers can communicate with each other through the platform provided by the "lending" system, and carry out reading sharing meetings. More importantly, this mode is controlled by readers, omits the pressure of contacting with the borrowing librarians, and can carry out inquiries and retrieval activities in a relaxed state. Librarians also omit unnecessary communication and create a quiet and harmonious learning atmosphere. This self-service and accessibility operation enables readers to have a deeper understanding and understanding of the library's service work, thus reducing the friction between librarians and readers, and also experiencing self-management and self-service. Fun, while making their own behavior more standardized and more conscious. Because they save time and transportation costs, they will be more interested in borrowing a large number of books from the library to increase the circulation rate of books. Through the book lending system, books can be fully borrowed and used, which greatly improves the efficiency of the use of books, and avoids the situation that many books in the past have been "sheltered and raised in the depths of people".

4. Conclusion

“The lending mode is a new borrowing and returning mode based on the mobile Internet. It is a new application mode of the Internet + library. The system is simple to implement, and the readers are convenient to use, which saves readers' borrowing costs and improves library resources. The efficiency of use extends the opening time of the library; increases the reader's viscosity, etc. University libraries can vigorously promote the use of this model, thereby saving a lot of manpower, material resources and financial resources in library management and service. The self-service mode of borrowing and returning books can also optimize the library's reader service to a certain extent and improve the quality of service. Therefore, it has great potential for development. This requires our librarians to constantly strengthen the consciousness of science and technology and humanized service, improve their comprehensive quality in many ways and channels, and meet the needs of the development of the times. Although it still has some problems, I believe that with the continuous progress and development of modern information technology, the self-help lending and returning system will continue to improve. The self-service mode of borrowing and returning books will play its due role better and become an indispensable and important way of self-service in libraries.

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