

Research on Circulation of Book Intelligent Management System

Wanmin Zhang

Library Tarim University, Alaer City, Xinjiang, 843300, China

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Abstract: At present, most university libraries that introduce radio frequency identification (RFID) technology adopt the management mode of "bar code + RFID electronic tag" dual circulation identification medium and dual system parallel. However, in the process of use, the immature RFID electronic tag technology and the parallel operation of dual systems have caused many problems. RFID system improves the service efficiency of traditional library and speeds up the circulation of books. However, there are some immature or imperfect aspects in the use of new technologies, which are mainly reflected in book circulation, self-service of borrowing and returning books, book editing, collection management, anti-theft function and so on. The improvement of RFID system requires not only the technical transformation of developers, but also the library's transformation of its service concept, adjustment of service and borrowing rules, and active cooperation with developers. With the advantages of RFID technology, the intelligent library management system corresponding to REID technology has greatly improved the breadth and depth of library services for readers.

1. Introduction

Although RFID has been around for decades, it has only received attention from all parties in recent years. At present, RFID is setting off a new revolution in the library industry, and many libraries are demonstrating intelligent RFID management solutions or preparing to use RFID systems [1]. With the widespread application of RFID technology in university libraries, the intelligent book management system based on RFID technology has replaced the traditional book management system that uses barcodes as the identification medium, making book management faster and more effective [2]. Reader self-service based on RFID technology, intelligent book inventory, intelligent book positioning and intelligent security and anti-theft, and 24-hour self-service library in urban blocks make the management of the library develop in the direction of intelligence and wisdom [3]. At present, more than 5000 libraries around the world have used RFID technology in their daily work to provide better services for readers. Since the beginning of 2006, Chengyi College of Xiamen Jimei University began to use RFID intelligent collection management system for the first time. So far, thousands of University Libraries in China have used RFID technology. The library intelligent management system corresponding to RFID technology greatly improves the breadth and depth of library service to readers with the help of the advantages of RFID technology. Quantitative management is suitable for all departments and links of the library [4]. For a long time, there were quantitative quota indicators for collection and editing, periodicals, reading and other links. The work of the circulation department seems to be a "blind spot" in quantitative management. At present, there is no ideal quantitative management model. On the one hand, due to the late start of the research on the quantification of circulation in Chinese library circles, and the vast territory of our country, the rest conditions of libraries in different places are different, so it is difficult to have a unified index to measure it. The analysis of its workload mostly stays in qualitative aspects, while the analysis of deposit is not satisfactory. Nevertheless, there are still some successful examples of quantitative management abroad and many years of experience adopted by some domestic libraries in different degrees for reference. On the other hand, quantitative management is linked with the personal interests of librarians. Therefore, it is very important and urgent to implement scientific, fair and rational circulation management [5].

2. Types of Book Intelligent Management System

In the intelligent book management system using RFID technology, according to the different circulation identification media, it is divided into the following two types.

(1) Intelligent management system of RFID single medium. The RFID single-medium intelligent management system refers to an intelligent management system that uses RFID electronic tags alone as the circulation identification medium. In 2002, the Xinjiapo National Library became the first library in the world to fully implement RFID technology. The RFID intelligent management system replaced the original bar code management method. The items with RFID tags in the library cover books, periodicals, CDs, DVDs and The video tape is stuffy. In 2006, the new library of Shenzhen Library fully adopted RFID technology and independently developed the "document intelligent management system" based on RFID technology. In terms of document acquisition, cataloging, collection and circulation, it replaced the original traditional technologies such as bar code and magnetic stripe with electronic tags. It has the advantages of document positioning, flexible shelving, random shelving inspection, intelligent shelving, self-service borrowing and return Collection and anti-theft integration and other functions to improve efficiency. This is the first large-scale Library in China to fully adopt RFID technology, and it is also one of the few large-scale libraries in the world to adopt this technology. Shanghai Afadi Intelligent Label System Technology Co., Ltd. took advantage of the overall upgrading and transformation of Qianxinan Library in 2018 to provide it with an intelligent management platform for cloud books. The system not only has common functions such as acquisition, cataloging, collection, circulation, periodicals and system parameters, but also has special functions such as intelligent equipment terminal control, big data analysis and electronic resource management.

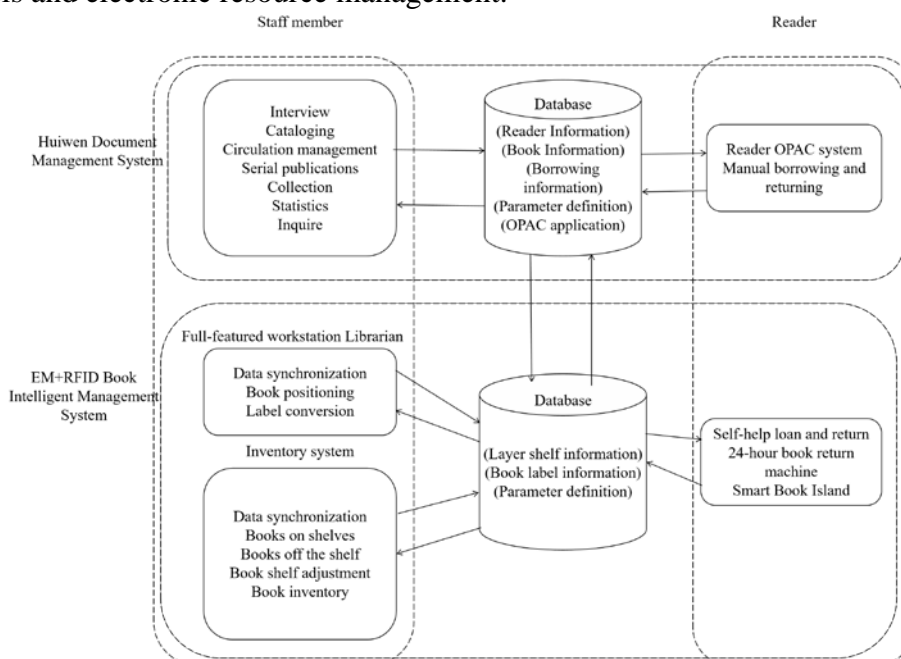


Fig. 1 Book Intelligent Management System

(2) "Barcode + RFID" dual-media intelligent management system. "Barcode + RFID" dual circulation medium intelligent management system refers to an intelligent management system that uses both barcodes and RFID electronic tags as circulation media. For large-scale libraries that have always used barcodes as the circulation identification medium in the early stage, most of them use this method. Such as Shandong Agricultural University Library", Nanjing University of Aeronautics and Astronautics Library Network, Beijing Institute of Technology Library, Inner Mongolia University Library, etc., a large number of university libraries adopt this management method when introducing RFID technology. The conversion system binds RFID identification information with barcode information, connects RFID technology with the existing library management system, and realizes access to the detailed information of books and readers, thereby integrating RFID

technology into the current library management system[6] .

The connection between RFID hardware and computer related hardware equipment is either completed by standard serial port or through USB interface, which becomes the terminal part of the system. The terminal is directly connected with the service center of the system. There are two ways of connection at the physical level, namely data replication, exchange and network connection. The connection between the two is in strict accordance with the standards of computer related network protocols and library related protocols. The advantages of RFID book information acquisition technology are shown in Table 1.

Table 1 Analysis of the advantages of RFID book information acquisition and recording technology

Function	QR code	RFID
Identify	Scan QR code	Automatic Identification
Borrow books	Read the QR code and demagnetize	Automatic borrowing
Return book	Read the QR code and magnetize	Automatic return
Inventory	Read the QR code one by one	Reader batch scan
Anti-theft	Use electromagnetic wave to detect the door, easy to fail	Using radio waves, high reliability

3. Circulation work of intelligent library management system

3.1. Circulation work

At present, the mode of quantitative management of circulation in most libraries is nothing more than two modes: fixed management and investigation and statistics, while the quantitative indicators of quantitative management cannot be determined scientifically and accurately due to too many constraints. Investigation and statistics are subjective and difficult to operate. Therefore, according to the actual situation of the library, it is very necessary to work out a set of quantitative management model suitable for the circulation work of the library scientifically, fairly and reasonably. Circulation business mainly involves literature resources, shelving and readers. After the introduction of RFID technology, the traditional service efficiency of the library has been improved, the circulation of books has been accelerated, and the satisfaction of readers has been greatly improved. However, the dual system makes the circulation business face the problems of how to avoid repeated operations, improve work efficiency, and comprehensively improve the quality of circulation services [7]. Therefore, only by reorganizing the circulation business, adjusting and planning the work process, and finding a suitable current work mode, can the library's automation and service level be comprehensively improved. The specific solutions are as follows. (1) Re-adjusted the collection workflow, as shown in Fig. 2.

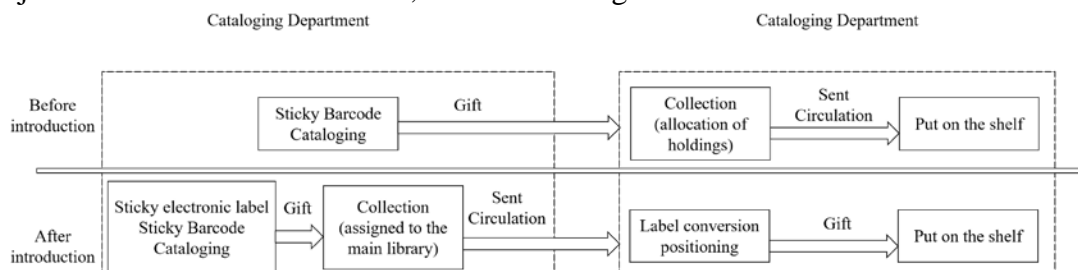


Fig. 2 Changes in the collection workflow before and after the introduction of RFID

After the introduction of RFID technology, the electronic label pasting, bar code pasting and cataloging of new books are completed in the cataloging department and sent to the dictionary, and then pre allocated to the "general library" according to the cataloging batch in the collection module of Huiwen system and sent to the circulation. After receiving the new books in the circulation department, the label conversion is directly carried out in the full-function librarian workstation. When the label conversion is completed, the book positioning is completed (2) Simplify the book

positioning process (3) Simplified inventory workflow.

3.2. Problems and Countermeasures

The advantages of RFID system are obvious to all, but there are some holes in its technology, such as no magnetic stripe hidden. At present, although RFID system is used to manage the circulation and anti-theft magnetic stripe is added, from the use point of view, if readers can strictly follow the instructions, the effect will be very good. However, since the current self-service borrowing and returning machine (which can be charged and demagnetized) can only consume 1-5 normal books at a time, the compatibility with RFID system for borrowing and returning and anti-theft is not good. For example, at present, the self-service borrowing and returning machine with the function of charging and charging magnetism is unsuccessful when the reader fails to stick the book tightly when borrowing the book or the spine of the old book is uneven and cannot stick tightly. In addition, the self-service borrowing and returning machine can't compare whether the number of books and RFID tags is uniform, resulting in certain loopholes in the self-service borrowing and returning of readers. For example, as long as a book is successfully lent, the other labels lent with it are torn, or there is a problem with the label during processing, or a book with missing unprocessed labels may be lent and not left in the RFID system. record. Although the current RFID system still has problems of this kind, but as the library becomes more and more intelligent, I believe that readers will become more and more adaptable to the RFID system and operate strictly in accordance with the procedures. After the introduction of RFID technology, it has had a great impact on the personnel of the circulation department, which is manifested in: On the one hand, the emergence of new technologies not only improves the service quality, but also has higher requirements for the working skills and professional level of circulation staff. On the other hand, the daily workload of the staff of the circulation department caused by book positioning has not decreased, but increased. For example, the positioning operation is added before the new book is put on the shelf, and each adjusted book needs to be repositioned during shelf position adjustment. In view of this situation, circulation staff need to change their roles, strengthen service concepts, improve service skills, and invest more time and energy in innovating service methods, so as to improve service quality.

4. Conclusions

In the application process of RFID technology, there are still some problems in libraries that can not find a good solution, which should attract the attention of librarians. For example, the use of self-service equipment can't monitor the damage of books, which leads to an increase in the damage rate of books. Workers can't know the situation of returning books at the first time, and they can't judge which readers are responsible for defaced, smeared and damaged books. There is also the impact of RFID on health, and whether UHF has an impact on human health needs to be studied. How to protect readers' privacy when reading or calling information during the use of smart devices. The library can realize the readjustment of human resources, and use the saved human resources to further meet the needs of readers in other aspects or provide other value-added services. In addition, RFID technology also requires the reform of the library's service concept and document management model. The gradual improvement and standardization of the RFID system will enable it to provide readers and libraries with more complete services and apply them to a wider range of library fields. With the continuous progress, improvement and maturity of network technology and RFID technology, some operation problems caused by immature technology will be gradually solved. For example, the volume of emid tag will be smaller and smaller, and its anti-interference ability will be gradually strengthened. I believe that in the near future, with the strengthening of library staff's service concept and the deepening of service consciousness, we can constantly explore and improve the problems and deficiencies in the work, break through the bottleneck of library management service, make continuous innovation in circulation service and provide better services for readers.

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