

*Original Research Article*

# The Application of RFID Technology in the Work Mode of Library Acquisition and Cataloging

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**Abstract:** In the 21st century, with the continuous development of Radio Frequency Identification (RFID), more and more libraries have begun to apply this technology. Due to the many restrictions of the traditional editing model, RFID technology, with its characteristics, has improved work efficiency and service quality of library acquisition and cataloging work. Therefore, the application of RFID technology in library work has great prospects. The application of RFID technology to the intelligent process of libraries has been promoted.

**Keywords:** RFID Technology; Library Application; Library Cataloging

## 1. Overview of RFID technology

RFID (Radio Frequency Identification) is an automatic identification technology, which uses radio frequency signals to realize contactless information transmission and achieve the purpose of item identification<sup>[1]</sup>. The RFID system consists of two parts, namely a tag (Tag) and a reader (Reader), but in practical applications, a background computer can also be used to analyze and process information. In the application process, a dedicated RFID reader is used to identify a tag of the target, and a frequency signal is used to transmit various information contained to the reader, which can then be transmitted to background computer through the reader.

## 2. The necessity of applying RFID technology to the work mode of library acquisition and cataloging

With the development of information technology, traditional acquisition and editing methods can no longer satisfy the needs of the digital age. Because of the diver-

sification of acquisition and editing objects, librarians also need to face a very large workload and online procurement has begun to become the main way. The work model of acquisition and editing based on RFID technology can make library management more convenient, reduce library management staff, and improve the overall efficiency of collecting and editing work.

## 3. The disadvantages of traditional library acquisition and cataloging work mode

### 3.1 Problems in the application of traditional bar code technology in book self-service borrowing and returning

When using the traditional bar code borrowing and returning mode, because the self-service borrowing and returning system relies on recognizing the bar code pasted on the book, the clearness and completeness of the bar code is quite important to ensure normal operation of self-service borrowing and returning. However,

for some popular books, the frequency of borrowing and returning is more than that of normal books. The barcodes on the book will inevitably show different degrees of wear after repeated borrowing, resulting in the equipment not being able to effectively identify the book and readers' information, and even more errors will occur, like borrowing the wrong book, returning the wrong book or forgetting to return.

### **3.2 The shortcomings of traditional acquisition and editing work mode in protecting the safety of books**

In the past, when books were borrowed from the library, they had to pass through the security door at the door. If there are books that have not been scanned and demagnetized by the barcode reader, the security door will alarm. Although this solution has been proven to effectively ensure the safety of the books, there are also problems: if readers have borrowed many books and cannot immediately know which book or books have not been demagnetized by the security gate, they need to recheck them one by one, which greatly affects the borrowing efficiency; and magnetic stripe may also be possibly affected by bank cards or other magnetic objects, causing false alarms of the security door.

### **3.3 Disadvantages of traditional library management**

Traditional library management of books requires a lot of manpower. The work of staff is mainly concentrated on the classification of books, borrowing management of books, arranging and listing of books. Manual operation is not only difficult to improve efficiency, but also easy to make mistakes<sup>[2]</sup>. Since the Nanjing Library moved into the new library in 2007, the collection of bookshelves has undergone two large-scale shelving. Although the shelving work is to ensure the orderly circulation of books in the library and increase the effective utilization of books and it is a necessary work to make the library tidier and more orderly, the work consumes a lot of manpower and material resources, such as shelving, and it relieves the pressure on the library in a short period of time. However, it still cannot fundamentally change the phenomenon of the library that there are too many books<sup>[3]</sup>.

## **4. Application of RFID technology**

## **to realize library intelligence**

### **4.1 User self-service borrowing and returning**

In addition to wear and tear of bar code, using barcodes for self-service borrowing and returning of books, readers also need to put the borrowed books one by one on the self-check machine when borrowing or returning them. If the borrowed books are demagnetized, even if they pass through the security door, there will be no alarm. In addition, both demagnetization and magnetization require a certain amount of time. If the time is not sufficient, insufficient demagnetization will cause the safety door to alarm and cause unnecessary trouble. If RFID is used for borrowing and returning, there will be no such problems, because RFID readers can recognize multiple tags at the same time in a short period of time. Then readers only need a few seconds to borrow and return books.

### **4.2 Book security**

When a book passes through the security door with the help of RFID technology, the security door can read the book information in the book tag and compare it with the lent book list in the background database to check whether the book has been lent. If the book is not found on the lent book list, then the safety door will alarm, and librarian can inquire which book has not been lent, and it will not cause demagnetization and alarm. The check speed of this method is more than ten times faster than that of the traditional barcode method. And if criminals destroy the RFID tags in the books in the library to carry out theft, the RFID card can also send the information of last location and time to the receiving aerial in the library before it is broken and the subsequent staff can use this information to compare the surveillance video and lock down criminals to ensure the safety of books<sup>[4]</sup>.

### **4.3 Library management**

The application of RFID technology to the management of the library can effectively deal with issues such as the collection and circulation of the library. Firstly, because the RFID reader has multiple tag read and write capabilities and fast read and write characteristics, it greatly improves the work efficiency of the staff and saves time and labor. Secondly, management staff can properly remove or move unpopular books from the

shelves or move shelves by analyzing the back-end data on the borrow rate, which can increase the orderly circulation of books. And RFID technology is very helpful to locate the book<sup>[5]</sup>. It is necessary to add a receiving antenna in the library. When the book moves within the customs, the location of the book is judged according to the time when the book arrives at each location, so that the administrator can check, organize and make an inventory of books.

#### 4.4 Library personalized service

The library can issue RFID cards to readers. The basic information such as reserved books, borrowed books, returned books, and contact information can be queried in the card. When the staff gets the reader's RFID card, they can know the information in the RFID card<sup>[6]</sup>, which is convenient for the staff to obtain the information of the borrowed books and remind readers how much time is left for borrowing<sup>[7]</sup>. If the reader loses the RFID card, he can also go to the library to let the staff report the card loss to prevent the leakage of his own information.

### 5. Conclusion

It is no doubt that the introduction of RFID technology into libraries has improved the work efficiency of libraries, changed the traditional working mode of libraries, and greatly promoted the digital development of libraries<sup>[8]</sup>. The library's self-service borrowing and returning system also makes the library intelligent and library services more humanized<sup>[9]</sup>. However, there is still a lot of room for development in RFID technology. Although China has basically mastered high-frequency RFID technology, it has not yet perfected RFID for UHF and microwave segments, and most of the electronic tags and RFID readers used are not designed independently in China, and its internal chips and technology are provid-

ed by foreign countries, which greatly restricts the development of domestic RFID technology<sup>[10]</sup>. Therefore, it is necessary for high-tech talents to develop new ideas, promote the development of RFID in the UHF and microwave range, transform China from a demander to a manufacturer, and strive to make RFID technology more suitable for libraries.

### References

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1. Hu Y. Radio frequency identification development internals. Beijing: Posts & Telecom Press; 2011.
2. Zhang T. The establishment of intelligent library collection and editing working mode based on RFID technology (in Chinese). *Science & Technology Information* 2013; 20(15): 255–256.
3. Li Y. Exploration on problems and solutions of utilization of stack rooms for book reservation. *Jiangsu Science & Technology Information* 2016; 480(3): 11–12.
4. Fu X. Research and designing about application of RFID technology in logistics and warehousing [Master's thesis]. Huainan: Anhui University of Science & Technology; 2015.
5. Wu X. Application and research of RFID in library [Master's thesis]. Huainan: Anhui University of Science & Technology; 2017.
6. Shi B. Intelligent library management system based on RFID [Master's thesis]. Changchun: Jilin University; 2017.
7. Yao X. A brief analysis of the management of the optimization of book collection and editing (in Chinese). *Office Operations* 2014; (1): 135–136.
8. Li Y. Design of the library collecting and editing system based on RFID. *Journal of Luliang Higher College* 2017; 7(3): 85–87.
9. Zhang X. On the application of RFID intelligent management system in the library. *Library Development* 2009; (10): 69–70.
10. Li K. Research on information interaction application of NFC Technology in RFID intelligent library system (in Chinese) [Master's thesis]. Guiyang: Guizhou University of Finance and Economics; 2017.