RFID System in Library: Application of Library Management System

Vipul Bansal
Jaipuria Institute of Management, Indore
vitm_library@rediffmail.com

ABSTRACT

Radio Frequency Identification (RFID) is one of the exciting technology that revolutionized the working practices by increasing efficiencies and improving profitability. Deployment of RFID system is rapidly growing and has the potential to affect many different libraries. The article provides details about RFID, its components, how it works, and its usage in library.

Keyword: Radio Frequency, Library Security.

INTRODUCTION

Radio Frequency Identification (RFID) is a rapidly growing technology that has the potential to make great economic impacts on many industries. While RFID is a relatively old technology, more recent advancements in chip manufacturing technology are making RFID practical for new applications and settings, particularly consumer item level tagging. These advancements have the potential to revolutionize supply-chain management, inventory control, and logistics.

RFID tags may soon become the most pervasive microchip in history. When wirelessly interrogated by RFID transceivers, or readers, tags respond with some identifying information that may be associated with arbitrary data records. Thus, RFID systems are one type of automatic identification system, similar to optical bar codes. There are many kinds of RFID systems used in different applications and settings. These systems have different power sources, operating frequencies, and functionalities. Some of the most familiar RFID applications are item-level tagging with electronic product codes, proximity cards for physical access control, and contact-less payment systems.

Many more applications will become economical in the coming years. While RFID adoption yields many efficiency benefits, it still faces several hurdles. Besides the typical implementation challenges faced in any information technology system and economic barriers, there are major concerns over security and privacy in RFID systems.

History

It's generally said that the roots of Radio Frequency Identification Technology can be traced back to World War II. The Germans, Japanese, Americans and British were all using radar—which had been discovered in 1935 to warn of approaching planes while they were still miles away. The problem was there was no way to identify which planes belonged to the enemy and which were a country's own pilots returning from a mission. The Germans discovered that if pilots rolled their planes as they returned to base, it would change the radio signal reflected back. This crude method alerted the radar crew on the ground that these were German planes and not Allied aircraft (this is, essentially, the first passive RFID system). Since the 1980's, RFID has established itself in a wide range of markets including livestock, retail sales, wireless transactions, courier and logistics, publishing, automated vehicle identification systems, etc.

OBJECTIVES

- To study the security systems in libraries.
- To study the different types of electronic security systems in libraries.
- To know the advantages of RFID technology in libraries.
- To study the application of RFID technology in library management system.

SCOPE

This document is intended to provide general information and references regarding the current status of, and potential for, RFID technology in libraries. The information contained will be of value to Library Directors and Managers other library team members who are involved in the process of developing library strategic plans and related budgets.

Why RFID

The task of receiving, transporting, sorting and shelving materials has exploded in recent years. Library staff size remains constant at best while circulation and materials management continues to grow. Librarians are now in the business of moving books around rather than practicing librarianship, reference and patron service. RFID provides a solution to automate much of this handling and return staff to the business of customer service.

The use of RFID reduces the amount of time required to perform circulation operations. The most significant time savings are attributable to the facts that information can be read from RFID tags much faster than from bar codes and that several items in a stack can be read at the same time.

RFID in Library Management System

The patron self check-out station: It is basically a computer with a touch screen and a built-in

RFID reader, plus special software for personal identification, book and other media handling and circulation. After identifying the patron with a library ID card, a barcode card or his personal

ID number, the patron is asked to choose the next action (check-out of one or several books). After choosing check-out, the patron puts the book(s) in front of the screen on the RFID reader and the display will show the book title and its ID number.

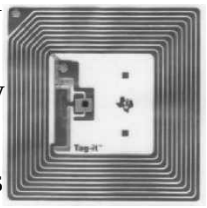
Book drops: The Book Drops can be located anywhere, within or outside the library. Possible locations outside the library is hostels, shopping centers, schools, etc. This offers unprecedented

flexibility and convenience of returning library items at any time of the day, even when the library is closed.

RFID Tags: RFID tags have been specifically designed to be affixed into library media, including

books, CDs, DVDs and tapes. While there are a range of tag types they generally fall into two categories:

Standard Tags : Standard tags are used on books, magazines and can be affixed to cases for those

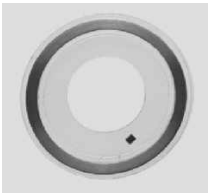


CDs and DVDs that have metallic content. RFID tags are not designed to be placed directly on

audiocassettes (not an attractive option from an economy standpoint). Standard RFID tags should

be placed on audiocassette cases and audio book albums.

CD/DVD Tags : These form factors are circular tags, which are used on CDs or DVDs. They are also



called dough-nut. These tags are used because the metallic content of CDs and DVD's may affect the

signal of a standard tag. They can be directly affixed to the inner circles of CDs and DVDs that have

no metallic content in their inner circles (ie, where no data is stored).

RFID Transponder or Tagging: It is the most important link in any RFID system. It has the ability to store information relating to the specific item to which they are attached, rewrite again without any requirement for contact or line of sight. Data within a tag may provide identification for an item, proof of ownership, original storage location, loan status and history.

Work Station: It is a staff assisted station on services such as loan, return, tagging, sorting etc.

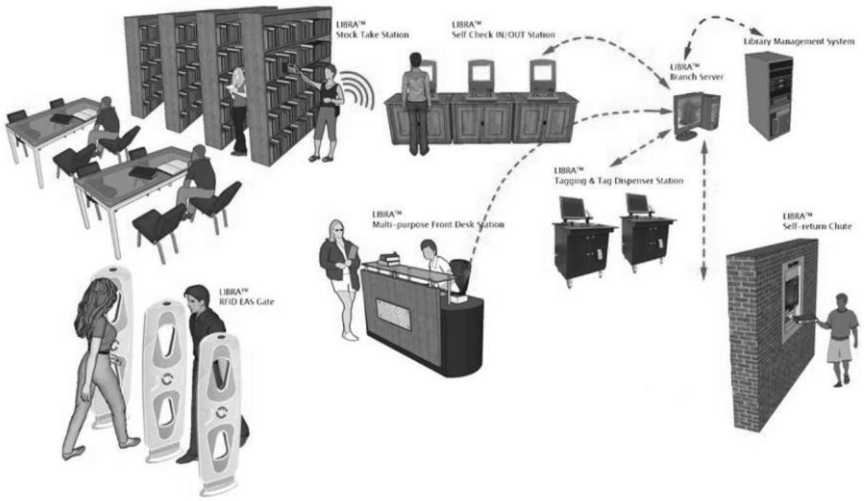
Shelf Management: This solution makes locating and identifying items on the shelves an easy task for librarians. It comprises basically of a portable scanner and a base station.

The solution is designed to cover three main requirements:

- Search for individual books requested.
- Inventory check of the whole library stock.
- Search for books which are miss-shelved.

How RFID Works

Each RFID tag has a non-powered radio antenna which can be communicated to by a powered antenna belonging to a tag reader on a scanner or security gate. Although it is not necessary that the two antennas "see" each other as is needed with a traditional bar code, it is necessary that they be relatively close to one another since the wattage used by the powered antenna is very low for health and safety reasons.



The RFID reader sends out electromagnetic waves and the tag antenna is enabled to receive these waves. "When the tag antenna enters the RF (radio frequency) field, the tag's microchip circuits are powered by signals from this RF field created by the reader. The chip then modulates the waves and the tag sends them back to the reader. The reader converts the signals received from the tag into digital data and sends it to a computer."

RFID Benefits for Libraries

- **Stock management:** Operations such as managing material on the shelves, identifying missing & miss-shelved items are streamlined and taking stocks regularly will be feasible.
- **Improved patron services:** Spending minimal time on circulation operations allows library staff to assist patrons routine services are not disturbed even when libraries are facing staff shortages & budget cuts.
- **Security:** Library item identification & security bit is combined into a single tag, thereby laminating the need to attach an additional security strip.

RFID Benefits for Staff:

- **Less time needed for circulation operations:** Implementing RFID will considerably reduce the amount of time required to issue, receive, transport, sort & shelve library materials.
- **Efficient Inventory management:** Inventory management can be done using a handheld reader without closing the library.
- **Reducing Repetitive Stress Injuries (RSI):** RFID based system reduces repetitive scanning of individual items at the circulation desk during check in, check out.

RFID Benefits for Patrons:

- Patrons will spend less time waiting in check-out lines by using self check in - check out systems.
- Patrons find what they are looking for quickly & easily.
- Reminders for due dates allows patrons to submit borrowed materials in time.
- Use of book drops & return chutes for returning library material, allows for flexible timings.
- RFID enabled patron cards allows for easy patron identification.

CONCLUSION

RFID technology is taking off in libraries at an increasingly rapid pace. Though there are few libraries employing this technology today, but due to its customizable feature and continuing improvement the library communities are beginning to get involved in its development. RFID Systems plays a significant role in bringing patron satisfaction, convenience and efficiency in library resource management through automation of workflow processes. RFID technology promises to change our world. It has the capability of making our personal lives and our work lives in the library more convenient. However, every new technology comes at a cost. In order to remediate those costs, efforts must be undertaken to guide its development and implementation. RFID is a technology that is sparking interest in the library community because of its applications that promise to increase efficiency, productivity and enhance user satisfaction.

REFERENCES

1. http://www.eecs.harvard.edu/cs199r/readings/rfid-article.pdf
2. Radio Frequency Identification (RFID): Its Usage and Libraries by Muhammad Rafiq, Librarian, National Textile University, Faisalabad, Pakistan. http://eprints.rclis.org/6179/1/RFID.pdf
3. http://www.eurosmart.com/Update/07 10/Eurosmart_White_paper_on_RFID_Oct07.pdf
4. http://www.technovelgy.com/ct/Technology-Article.asp?ArtNum=28
5. Rajeshwar Kumar, Gunda and Niranjan M (2011). RFID Technology: Application To Library And Information Centers, Proceedings of National Conference on Library Security Management In Digital Era, Feb 4-5th, 2011, Pp. 453-461
6. Syed, S. (2005). Use of RFID Technology in libraries: A New Approach to Circulation, Tracking, Inventorying and Security of Library Materials. Library Philosophy and Practice. 8(1), 15-21.
7. Dr. G. Rajeshwar Kumar (2014). Electronic Security System in Libraries: Application of RFID In Library Management System, *International Journal of Information Sources and Services*, 1 (3), p. 36-44