e-Library Science Research Journal
Vol.2 | Issue.7 | May. 2014 **ISSN** : 2319-8435

Research Papers **Impact Factor : 0.109**

RADIO FREQUENCY IDENTIFICATIONS TECHNOLOGY FOR LIBRARIES: AN OVERVIEW

Amit Kumar

Project Fellow, Department of Library and Information Science,
Maharshi Dayanand University, Rohtak.

Abstract :

The goal of this paper is to provide an overview of RFID, advantages, limitation and standards of radio frequency identification in libraries. RFID technology can make such routine tasks as self reading, inventory control and item location considerably faster. Early RFID-based inventory systems were limited in the reliability of their high-speed scanning of shelved items. Newer systems with faster reading protocols allow for improved accuracy.

KEYWORDS :

Radiofrequencies identification, Libraries, Standards, Privacy.

INTRODUCTION

Radio frequency identification (RFID) system is a wireless technology. It is a new technology for libraries security system. But RFID system has been existence other sector more than 35 years ago. They have been extensively used for radio tracking application such as ticketing a public transport on motorway tollgates and in recent years, it is used many industry and academic organization. RFID is one of the latest, fastest and most wanted among the emerging technologies for efficiencies in the libraries. It is an automatic identification method relaying on storing and remotely retrieving data using various devices and is combination of the radio-frequency based technology and microchip technology. The information contained on microchips in the tags affixed to library materials is read using radio frequency technology; technology does not need an item within line-of-sight for identification. RFID is the latest technologies to be used in libraries for a combination and security activities as well as maintenance all documents either in library or outside of the library.

RFID is a combination of radio-frequency-based technology and microchip technology. The information contained on microchips in the tags affixed to library materials is read using radio frequency technology regardless of item orientation or alignment (i.e., the technology does not require line-of-sight or a fixed plane to read tags as do traditional theft detection systems) and distance from the item is not a critical factor except in the case of extra-wide exit gates. The corridors at the building exit(s) can be as wide as four feet because the tags can be read at a distance of up to two feet by each of two parallel exit sensors (BookTec Information, 2004).

2.RFID TECHNOLOGY IN LIBRARIES

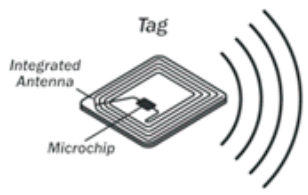
A library is an organized collection of sources of information and similar resources, made accessible to a defined community for reference or borrowing. It provides physical or digital access to material, and may be a physical building or room, or a virtual space, or both .A libraries' collection can include books, periodicals, newspapers, manuscripts, films, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Blu-ray Discs, e-books, audio books, databases, and other formats (Wikipedia, 2014). Boss (2004) said that RFID can be used library circulation operations and theft detection systems. RFID-based systems move beyond security to become tracking systems that combine security with more efficient tracking of materials throughout the library, including easier and faster charge and discharge, inventorying, and materials handling (as cited in Syed, 2005)

3.COMPONENT OF RFID SYSTEMS

RFID refer to Radio Frequency Identification, a technology which uses radio waves to automatically identify items. Most commonly component of RFID systems are

a)Tags

The tag can be paper thin or thick and flexible which allows it to be placed inconspicuously on the inside cover of each book in a library's collection and user's library card. RFID tags come in active and passive forms. Active RFID tags have their own power source. The advantage of these tags is that the reader can be much farther away and still get signal. Passive RFID tags, do not require batteries, and can be much smaller and have a virtually unlimited life span.



RFID tags are placed on the library items when these item comes under the range of antenna without requiring a line of sight, it transfer the information to the computer system.

b)Readers

RFID readers consist of a transmitter, receiver, antennae and a decoder. They communicate with RFID tags, identify them and retrieve data stored on the tag. Readers can read documents from 30 to 45cm. The reader is flat like a slate and it is necessary for it to be fixed to a desktop computer and configured with the library software. Since a passive RFID does not have its own power source, it draws power from the reader's magnetic field and uses it to power the microchip's circuits and antenna, which in turn enables the chip to transmit the identification information to the reader. The tag can be placed inside the book to reduce wear and tear. The read time for a tag is typically ,100ms. Additionally, multiple books with corresponding tags can be read at once rather than one at a time (Scire, 2003).

c) Antenna

The antennas are the channels between the tag and the reader, which control the system's data acquisitions and communication. RFID antenna produces radio waves that activate RFID tags; it can send the information or receive from the coupler.

d) Coupler

Coupler provide link between RFID tags and the PC. The coupler can send information in two directions: It can read information from a tag and send it to the PC (read mode), or it can read information from the PC and send it to an RFID tag (write mode).

e) Server

Server is the key component of RFID system. Reader communicates with the tags and it using an attached antenna capture data from tags then passed through cable or wireless to server systems in the same manner that data scanned from tags and passed to computer systems for interpretation, storage, and action.

4.RFID SECURITY AND PRIVACY CONCERNS

Security and privacy is a major issue for many elements of technology these days. RFID also brings up some security issues. Current RFID–transponders do not protect the unique identifier so that unauthorized readers in the proximity can gather IDs. The collected data could be accumulated and linked with location information in order to generate a customer profile. Other security objectives may also be at risk when standard mechanisms cannot be released due to the limited transponder resources

5.RFID ADVANTAGE FOR LIBRARIES

Rapid charging/discharging;

Circulation main function includes charging, discharging and renewal of the documents. It usually takes minutes to complete a single transaction when the task is performed manually, while the same transaction performs with help of RFID system within seconds. A further advantage is that if the user has four items to charging or discharging the transaction can be easily completed within single stroke.

Theft detection

The pedestals have been installed at the entrance and exit gates of the library. These pedestals are independent of each other and also have overlapping protection zones providing additional security. Any item that has not been checked-out is detected as it passes through the pedestals then an alarm sound alert library staff.

Stock verification

Stock verification is an important function in all libraries in every year. But is a major issue for those libraries, who have large collection. Performing stock verification manually is practically impossible for theses library. But nowadays with the help RFID system library can regularly perform these tasks. The PDA-based hand reader can scan thousands of books/CDs lying on shelves without even a single book being pulled out, as would be the case with a barcode reader. Data is then updated instantly on the server for stock verification with the database. At the end it shows a list of matched and unmatched items. This device also helps in sorting shelves and searching for specific items.

Self-charging/Discharging

RFID reduces the amount of time required to perform circulation operations. This technology helps librarians eliminate valuable staff time spent scanning barcodes while checking out and checking in borrowed items. For the users, RFID speeds up the borrowing and return procedures. Library employees are released for more productive and interesting duties. Staffs are relieved further when readers are installed in book drops.

The libraries provide book drop boxes outside the libraries. This facility offers unprecedented flexibility and convenience for returning library items at any time of the day, even when the library is closed. This system will display the return status and print receipt showing that books are returned.

Automated Materials Handling

Another advantage of RFID technology is automated materials handling. This includes conveyor and sorting systems that can move library materials and sort them by category into separate bins or onto separate carts. This significantly reduces the amount of staff time required to ready materials for re-shelving

6.LIMITATIONS

Reader Collision

One problem encountered with RFID is the signal from one reader can interfere with the signal from another where coverage overlaps. This causes two different problems:

The radio frequency fields of two or more readers may overlap and interfere.
Same tag is read one time by each of the overlapping readers.

Tag Collision

Multiple tags are energized by the RFID tag reader simultaneously, and reflect their respective signals back to the reader at the same time.

Removal of pasted tags

The tags pasted on the item can be easily removed which may disastrously effect the services and create problems for

the library staff.

7.RFID STANDARDS FOR LIBRARIES

Standardization is an important factor that cannot be ignored in RFID technology.
ISO 28560 RFID standards in libraries consist of:

a) ISO 28560-1 standards

Specifies a set of data elements and general guidelines for implementation, to meet the needs for:

Circulation of library items;
Acquisition of library items;
Inter-library loan processes;
Data requirements of publishers, printers and other suppliers of library items;
Inventory and stock checking of items

b) ISO 28560-2 standards

ISO 28560-2 offers libraries a completely different way to use RFID. It is the only international standard for RFID in libraries that achieves interoperability plus flexible encoding. Since publication in March 2011, the standard has been adopted in Australia, United Kingdom, United States, and elsewhere (Convergent Software, 2007).

Standardization will allow the RFID tag to be used in the entire lifecycle of physical library materials, including the upstream processes of acquisition and distribution. Libraries can procure tags and equipment from different vendors, merge collections containing different manufacturers' tags, and, for the purposes of interlibrary loan, read the tags on items belonging to other libraries. (Chachra, 2013)

c) ISO 28560-3 standards

Provide a data model and encoding rules of radio frequency identification tags for item appropriate for the needs of all types of libraries, including academic, public, corporate, special and school.

8.CONCLUSIONS

Libraries use RFID tags on books and other items to provide identification during check-out, check-in, and inventory and for theft deterrence. The pedestals have been installed at the entrance and exit gates of the library. These pedestals are independent of each other and also have overlapping protection zones providing additional security. Any item that has not been checked-out is detected as it passes through the pedestals then an alarm sound alert library staff. Another advantage of RFID technology is automated materials handling. This includes conveyor and sorting systems that can move library materials and sort them by category into separate bins or onto separate carts. This significantly reduces the amount of staff time required to ready materials for re-shelving.

"RFID is increasing in popularity among libraries, as the early adopters of this technology have shown that, it makes good economic sense, both for large and small libraries." The RFID technology is very new for library community. The use of RFID in the library speeds up borrowing, monitoring, books searching processes and thus free stuff to do more user-service tasks. But each library needs to make an individual decision regarding the risk/benefits of a migration to RFID and should ensure that the public is aware of the project and that opportunities to address any security concerns that borrowers might have are provided for. The need for education for library staff and borrowers to enable them to accurately assess the real risk factors is ongoing. Library professional bodies can do much to assist in raising awareness of the issues and perhaps in working toward a code of best practice for RFID enabled libraries, mirroring work that continues in other RFID application areas (Lahari, 2006).

REFERENCES

1.LibBest. (2007). In LibBest Library RFID management system. Retrieved April 8, 2014, from http://www.rfid-library.com/
2.Syed, Md. Shahid. (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), 1-9.
3.Convergent Software. (2007). RFID in Libraries Software. Retrieved Jan. 12, 2014, from https://www.convergent-software.co.uk/libraries.htm
4.ISO. (2011).Data elements and general guidelines for implementation. Retrieved March 15, 2014, from http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50996
5.ISO. (2011). Fixed length encoding. Retrieved Dec.15, 2013, from http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=50998
6.Lahari, S. (2006). RFID Sourcebook. Armonk, NY: IBM Press
7.Scire, T. (2003). What's next for the radio frequency library? Library and Archival Security, 18 (2), 51-8.
8.Wikipedia. (2014). Library. Retrieved Jan 17, 2014, from http://en.wikipedia.org/wiki/Library