APPLICATION OF RADIO FREQUENCY IDENTIFICATION (RFID) TECHNOLOGY IN LIBRARIES

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ABSTRACT

Radio Frequency Identification (RFID) is a new generation of Auto Identification and Data collection technology which helps to automate business processes and allows identification of large number of tagged objects like books, using radio waves. RFID based Library Management system (LMS) Information and Communication Technology has transformed the format of information and work culture of libraries. Still libraries are trying to address various problems like qualitative information management, speedy acquisition and dissemination of information and security of information products. This paper gives brief idea about the RFID, its

importance in the library system, how it works and describes different components of the RFID technology. It also briefs about tentative budget to establish RFID technology in the library and finally its future in Indian libraries.
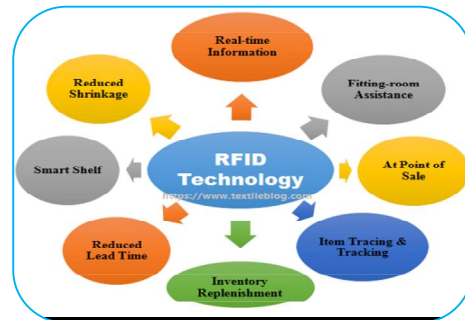
KEYWORDS : *RFID/ Information and Communication Technology.*

BACKGROUND

Radio Frequency Identification (RFID), well know as RFID, was mainly used in the laboratory research in the 1940s for replicated communication systems. Later in 1980s it was prominently used by the business organizations to manage their commercial items. In Library operation Radio frequency identification technology is used in library administration such as transaction of books, Journals in ventory control management book shorting security gate checks book whether it has been properly checked out of library. Recently, RFID technology has received attentions of library systems all around the world. It is basically a data acquisition and storage system which provides accurate and exact data without human intervention.

RFID is a combination of radio-frequency-based technology and microchip technology. The information contained on inbuilt microchips in the tags affixed to library materials is read using radio frequency technology regardless of item orientation or alignment and distance from the item. The tags can be read at a distance of up to two feet by each of two parallel exit sensors. The devices used for circulation are usually called "readers" while the ones used at building exits are usually called "sensors". The technology used in RFID systems can replace both EM (Electro-Mechanical) or RF (Radio Frequency) and even the barcodes theft detection systems.

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Advantages of Radio Frequency Identification (RFID) Systems

High-speed inventorying: Advantage of RFID systems is their ability to scan books on the shelves without tipping them out or removing them. A hand-held inventory reader can be moved rapidly across a shelf of books to read all of the identification information. Using wireless technology, it is possible not only to update the inventory, but also to identify items, which are out of proper order. This feature of technology is very helpful in stock taking where much time was wasted in manual entries.

Fast Circulation Transactions: The use of RFID definitely reduces the amount of time required to perform circulation operations. The most significant time saving fact is that information can be read from RFID tags much faster than from barcodes and that several items in a stack can be read at the same time. The time savings are less for charging than for discharging because the time required for charging usually is extended by social interaction with patrons.

Self-charging/discharging: For patrons using self-charging, there is a marked improvement because they do not have to carefully place materials within a designated template and they can charge several items at the same time.

Disadvantages of Radio Frequency Identification (RFID) Systems

Cost: The major disadvantage of RFID technology is its cost. The readers and sensors used to read the information are costing between Rs.100, 000/- to Rs.1, 50,000/ a server costing as much as Rs.5,00,000/- to 6,00,000/- and the tags cost Rs.30 to Rs.45 each.

Removal of tags: The RFID tags are typically affixed to the inside back cover of the book and are exposed for removal. This is a rare case but that does not mean that there won't be problems when patrons become more familiar with the role of the tags. If a library wishes, it can insert the RFID tags in the spines of all except thin books; however, not all RFID tags are flexible enough. A library can also imprint the RFID tags with its logo and make them appear to be bookplates, or it can put a printed cover label over each tag.

Sensor Problems : The performance of the exit sensors is problematic. They must read tags at up to twice the distance of the other readers. If the library install a smaller antenna at checkpoint than there can be problem for sensor to check every patron, because it will not work properly. The performance of exist sensors is better when the antennae on the tags are larger.

Component of Radio Frequency Identification (RFID) Technology:

The following are the important component of RFID Technology

RFID Tags:

A tag is most important link an any RFID system. It has ability to store information. It consists of a Chip attached to an antenna. It identifies and tracks materials.It Store security strips and barcode. It Has ability to handle material without exemption for vidio and audio tapes. High speed in ventory and identify item which are out to proper order.

RFID Reader:

A typical system includes several different kinds of readers, also known as sensors when installed at library exits. These are radio frequency devices designed to detect and read tags to obtain the information stored thereon. The reader powers an antenna to generate an RF field. When a tag passes through the field, the information stored on the chip in the tag is decoded by the reader and sent to the server, which, in turn, communicates with the automated library system when the RFID system is interfaced with it. Can be fixed or handled and is usually connected to computer. The RFID Reader handles the communication between the information system and RFID Tag.

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RFID Station:
It made up of an RFID reader and an antenna. It can read information stored in the RFID tag and update this RFID Tag with new information.

RFID Antenna:
IT is connected to the RFID reader, can be of varying size and structure depending on communication distance required or a given systems performance. The antenna activates the RFID tag and transfers data by emitting wireless pulses.

Radio Frequency Identification (RFID) in Libraries
Libraries have several activities that can benefit from Radio Frequency Identification RFID). These include:
- Circulation: checking out books and other items, and checking them back in again
- Book processing: adding items to the library's collection
- Inventory management: ensuring items are properly located in the collection

RFID offers the following improvements to library services:
Facilitating self-check. Self-check, or checking out your own books, is much easier with RFID technology because the book does not have to be positioned or angled under a barcode scanner, but can be simply moved within range of an RFID reader. Self-check saves money directly, by reducing labor costs for circulation (check-out) activities, and indirectly, by reducing opportunities for repetitive stress injuries. Furthermore, self-check is inherently more private than requiring another human to handle and inspect the items you wish to check out of the library.

Reduction in workplace injuries. Workplace injuries caused by the repetitive motions related to flipping books and angling books under barcode readers cost libraries millions of dollars every year, and lead to pain, limited physical range, and other problems familiar to a feminized workforce.

Streamlined in-processing. Acquisitions—the library activity associated with purchasing books and adding them to the collection—can be streamlined with RFID.

Streamlined inventory management. Libraries spend a lot of money ensuring books are where they need to be. Books with barcodes require humans to physically remove and handle every item to ensure it is in the correct location. RFID offers the ability to analyze and correct library inventories without handling the items.

Radio Frequency Identification (RFID) System implemented in some Indian libraries:
The following are some Indian libraries where RFID systems are implemented.
- NIT Rourkela
- IIT Kharagpur
- IMSc Chennai
- Jadavpur University
- LRC,BOB Mumbai
- PRL Ahmadabad

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Financial Commitments for Implementation:

S.No.	System	Quantity	Cost
1	RFID tag reading materials 50,000 Members 15,000 @25 per tag	80,000	2,00,000/-
2	Computer- IBM thin client Nodes (according to the library requirement)	05	1,50,000/-
3	RFID Reader	2	3,50,000/-
4	Server Configuration IBM data Work Station	01	2,50,000
5	Automation Software	-	4,00,000/-
		Total	15,00,000/-

CONCLUSION

Radio frequency identification systems provide head- to- toe protection for all type of print and non-print materials. Most of the RFID solutions available today are expensive. Librarians have to budget at least 15 to 20 lacks for an RFID based solution for a medium size library. The technology is set to become more popular in India with more deployment in the coming time in different sectors. It has been proved that this technology reduces the labour, costs and provides efficient results, which leads to foolproof security and access control. One of the main reason for this is most of these systems are developed abroad and directly imported here without any consideration to what really suites Indian libraries.

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