

Applications of RFID Technology in Library A Study

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ABSTRACT

In a present day, RFID has shift from dimness into popular applications, helps to manage materials in speedy way. RFID allow recognizing the material from a distance, and similarly like bar-code system, it does so without requiring a line of sight. In this article, we introduce the concept of RFID, its technological role and applications, and to reviews the challenges will face while deploying this technology.

In a library dissemination and shelving of the reading materials is quite a hefty work which kills most of the time of the library staff. RFID gives an answer to such type of situations or problem, by reduce the amount of time required to perform circulation activities. This paper explains the RFID components, technical features, its advantages and disadvantages related to use of RFID in libraries.

KEYWORDS: RFID, Smart Library, Digital Libraries, Automation

INTRODUCTION

Radio frequency identification (RFID) is a rapidly growing technology transmits information through wireless by using radio waves. RFID required a device known as reader and it is receive any data stored in RFID Tag. RFID tag has micro chip that contain two gigabytes of data. Over a long period of research, this RFID technology is used in prolific environments. Now a day's large number of viable applications are available and subsequently the cost of tags decreasing. These technologies will surly set off global image in the near future.

REVIEW OF LITERATURE

Narayanan, A., Singh, S., & Somasekharan, M. (2005) explained that how the RFID technology displace the barcode management. He also inspect about the designing of the RFID tag and also anti collision of the same. And he concluded that this system is still not yet widely installed to understand and the cost/ROI models are far from established. RFID's application, standardization, and innovation are constantly changing. RFID adoption is still new concept and hence there are many features of the technology that are not well understood by the general populace.

OBJECTIVES

The main intention of this research was to inspect or find out the usages in academic libraries for various purposes by using this technology, specially

- ✓ To study the different elements of RFID required for library automation
- ✓ To examine the current issues associated with the implementation of RFID
- ✓ To see whether the RFID improves the users opinion on satisfaction
- ✓ To know the kinds of tags and frequency of RFID, to check the execution of RFID and finding the availability of its vendors.
- ✓ To check the actual time consumed for implementing RFID in libraries
- ✓ To know what data are to be stored in RFID database / Tags

RFID TECHNOLOGY IN LIBRARY

Using RFID technology in many sections of library like circulation, books inventory, books sorting gets which are used for security books is properly checked out of the library. When users giving back books and other materials the security bit are reset and the records in the library systems in automatically updated. It also gives print out of the check in and checkout status of the library.

The structure of this RFID technology is flexible thin paper and small labels around 2'' * 2'' in size. The tag contains an engraved antenna and a tiny chip which accumulate vital bibliographic data including a unique accession number to identify each item. These smart labels are applied directly on library books and can be read with an RFID scanner.

USE OF RFID TECHNOLOGY

RFID is a wireless technology by which objects can be identified using radio waves. RFID can be used in various applications for identifying objects are

1. Security and Access control
2. Asset Tracking
3. Library Automation
4. Payment Systems
5. Vehicle Tracking
6. Supply Chain Management
7. Retailing
8. Manufacturing

ADVANTAGES OF RFID IN LIBRARY

1. Increases the effectiveness in self check in and check out: This type technology is not like barcode technology. In fact RFID reader don't need line of sight and can read multiple tags concurrently. Read multiple tags at the same time means faster check in and checkout leading to increase customer contentment
2. Reliability: We can able to see which items are going out of the library. The most important is when RFID is used in theft detection
3. High Speed inventorying: Ability to scan books on the shelves without tipping them out or removing them.

4. Improves overall efficiency of the library task
5. Time savings
6. Man power saving by avoiding repetitive, physically stressful tasks like stock verification and shelf rectification
7. 24X7 access to the library materials
8. The services like payment of fees, fines and etc are quick
9. Faster and accurate re-shelving ensures patrons find items in proper place
10. Help to focus on customer services

DIS ADVANTAGES OF RFID IN LIBRARY

1. The implementation cost of this technology is very high
2. Security Features: We can use these tag for to manage inventory and also to protect from theft.
3. As for as concern with technology, the problems with global standards
4. RFID Systems can be easily disrupted by the intervention of other radio-frequency (RF) emitting devices (RFI), such as other RFID readers and Wi-Fi access points
5. RFID tags are very difficult to remove from users. Some are very smal
6. Data theft
7. Data Corruption

RFID COMPONENTS FOR LIRBARY

1. RFID TAG - The RFID tags are very small device consists of microchip embedded inside. This chip has the unique id number of the RFID tag

Types of Tag

- a. Passive tags:** These type of tags not have a power source, uses power form the reader to operate
- b. Battery Assisted Passive Tags:** The circuit chip uses the battery power. For activate and for the function need RF signal from the reader
- c. Active Tags:** Tags uses a power source like battery, not required power from the reader

2. ANTENNA - The RFID antennas are specifically designed to operate at a specific frequency and these antennas are mounted nearby on the RFID reader and easy accessible for tag

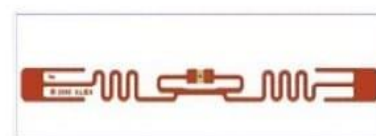
Low Frequency



High Frequency



Ultra High Frequency



1. RFID READER

| Frequency | Range | Data Rate |
|------------------------------------|----------------|------------------|
| Low Level 120-150 KHz | 10 centimeter | Low |
| High Level 120-150 KHz | 0.1 – 1meter | Low to Moderate |
| Ultra High Level 433 MHz | 1 - 100 meter | Moderate |
| Microwave Level 2450 – 5800 MHz | 1 - 2 meter | High |
| Microwave Level 3.1 – 10 GHz | Till 200 meter | High |

2. Software: The concerned software can be controlled the RFID reader, begin scanning and fetch information from the tag and store the fetching information in a system or send to the cloud

DEPLOYMENT OF RFID AT LIBRARIES

While taking into consideration of the deployment process of RFID in library can be split into many stages like budget allocation, the types of materials in stack, number of copies, kinds of materials in issue & return, and the number users in the organisation, time bound for the implementation, and required technology etc..

CHECKLIST FOR DEPLOYING RFID

- Check the budget allocation for library
- Check the total collection of library and the usage of library materials
- Check the policy procedures and standards of RFID tags
- Check the occurrence and life of the tags
- Check the time bound given for the implementation
- Evaluate the benefits of new technology for library before implementation
- Ask the maintenance and service cost from the vendor
- To check best practice of the RFID from other institutions who are using.
- Proper orientation and also proper training is required for both user and librarians

CHECKLIST FOR VENDOR SELECTION

- Both the components that is Software and hardware should have international standards
- The hardware products should be accordant with universal standards such as ISO or any other standards
- Confirm whether vendors should do any software up gradation in future
- Must check the selected vendor's services with their existing clients.
- Approach vendor for customer reference and discuss your concerns with them
- Get clear agreement from vendor on training and Local Support

VENDORS OF RFID SOLUTIONS IN INDIA

- 3rd Eye Informatics, Mumbai
- Sandilyam Automations Systems, Greater Noida, UP
- BQ Technologies, Kochi, Kerala
- Data Code, Mumbai
- Insync India
- Raj Barcode Systems, Ahmedabad
- SRD Infotech, Mumbai
- Unihalt India, Vishakapatnam
- IoT Ready Technological Services, Bangalore
- AtomX Corporation Pvt Ltd, Pune
- Logical India, New Delhi

RFID SYSTEMS IN LIBRARY

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Figure: 2 Library Management Using RFID Technology⁸

CONCLUSION

Before coming to the conclusion, the following steps are to be considered before implementation in library

- In the first step it is very difficult to select the RFID tag for library materials, so librarian should carefully observe the tag reading range and capacity to meet our expectation
- It is very important to check the RFID tags are unbroken due to liquid and other environmental issues.
- Must buy HF (High frequency) RFID tags which are lowest in price having good read range for library tracking.
- In the beginning we can tag only most moving materials not for all materials; in this we can reduce the implementation cost.
- For better tracking purpose install 3 dimensions gate, it is little costlier than 2 dimensions gate and it detects the material at any point.
- Select the most sold products in the market with international standards. When we are investing more we are very careful while selecting the hardware as well as vendors of RFID.
- For better management the proper planning and budgeting is required.
- We can't do anything without technology in this world, so librarians should think for new technologies which ever is applicable to our profession. Each and every technology maintains their own policies. To overcome the current as well as future issues by learning this technologies
- Tagging can be done with the help of our staff to avoid the additional burden from vendors.
- Available students' smart ID cards shall be used with these RFID systems to avoid investment.

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