

Rfid Technology in Library and Information Science

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Abstract:

The radiofrequency identification system (RFID) makes it possible for devices like computers or machines to automatically recognize things, record metadata, or control certain targets. A technique called Radio Frequency Identification (RFID) makes it possible to identify objects without a direct line of sight. For administering the automated library and detecting theft, libraries are using the most recent technologies. The inventory, issuance, and return status of books, gadgets, and other objects in the library can all be monitored with the help of RFID systems. Additionally, it ensures that your library is secure and that no priceless resources are stolen from it. The library management system receives the ID number from the RFID system and uses it to retrieve the book, check it out, and produce a receipt. When a visitor returns a book, the tag responds with the ID number, and the system credits the user's account. The automated identification of library documents involved in a certain technical process requires reading data from the tag memory located in the working region of the RFID reader. Radio-frequency labels of the same type as the library labels but not those can also fall within the reading zone at the same time. Libraries must make sure that their RFID systems adhere to all applicable laws, keep them updated often, and instruct their employees and visitors on how to use them effectively..

Keywords: RFID components, inventory management, library management, academic libraries, and library automation.

Introduction

The most recent theft detection tool for libraries is RFID (Radio Frequency Identification). RFID-based systems go beyond security to become tracking systems that combine security with more effective tracking of materials throughout the library, including easier and faster charge and discharge, inventorying, and materials handling, in contrast to EM (Electro-Mechanical) and RF (Radio Frequency) systems, which have been used in libraries for decades. Radiofrequency technology reads the data on microchips in the tags attached to library materials regardless of the orientation or alignment of the item (as opposed to traditional theft detection systems, which require line-of-sight or a fixed plane to read tags), and distance from the item is not a crucial consideration unless the item is an extra-wide exit gate. Because each of the two parallel exit sensors can read the tags from up to two feet away, the corridors at the building exits can be up to four feet wide. Barcodes and EM or RF theft detection targets can both be replaced by the targets used in RFID systems.¹

What Is Rfid

The automatic recognition technique known as RFID (radio frequency identification) takes advantage of wireless connection. RFID refers to a system or component that employs an IC tag to wirelessly identify or control a variety of objects. Here, the key characteristics of RFID and the idea behind wireless communication are described to provide readers with a foundational understanding of RFID.³In order to uniquely identify an object, animal, or human, RFID (radio frequency identification) uses electromagnetic or electrostatic coupling in the radio frequency region of the electromagnetic spectrum.

There Are Two Types of Rfid

1. RFID passive

RFID tags that are passive lack a power source. The reader's power is used. In this system, passive RF tags store their power instead of being connected to a power source. The RF tag uses a range of frequencies when it emits from active antennas, including 125–134 KHz for low frequency, 13.56 MHz for high frequency, and 856 MHz to 960 MHz for ultra-high frequency.

2. Active RFID

This gadget has an antenna that receives the data and a power supply that emits a signal to attach RF tags. This indicates that the active tag is powered by a battery. It has a power source of its own and is independent of the reader or source.²

Objectives of Rfid

Without needing to count every item, RFID devices provide a quick and accurate way to track them. You can swiftly ascertain how many items of a particular sort you have as well as their location or stage of production with the help of RFID solutions.

The inventory, issuance, and return status of books, gadgets, and other objects in the library can all be monitored with the help of RFID systems. Additionally, it makes sure no valuable resources are stolen from your library and that it is secure. Multiple tags can

be scanned simultaneously by handheld or fixed RFID scanners, which can also connect to the library administration system. Libraries may benefit from speedier checkout and check-in times, better inventory management, decreased theft, and increased customer service through RFID.

Rfid Library Management System

RFID in libraries automates processes, saving time for library employees. A business that uses RFID library management saves the time a book reader would have had to spend standing in line to check out or return a book. Maintaining books and making them accessible to readers is essential. The majority of the staff members' time is spent entering data on new and borrowed books. The borrowing and returning of books can be automated using self-check-in/check-out systems. The installation of particular software is necessary for this system. A computer screen displays the options available to users of this system when they want to borrow books. The person must be identified by a code, preferably a personal identification number or some kind of unique identifying code.

Application in Rfid Library Management System

1. Book Drops

Anywhere, within or outside the library, is where you can find the Book Drops. MRT/train stations, commercial malls, schools, and other potential off-site sites include remote locations outside the library. This provides never-before-seen convenience and flexibility for returning library materials at any time of day, even while the library is closed.

2. RFID Transponder or Tagging

Any RFID system's most crucial link is this one. Without any need for touch or line of sight, it may retain data about the particular object to which they are attached and rewrite it again. An item's identification, ownership documentation, initial storage location, loan status, and history may all be found in a tag's data.

3. Counter Station

A station that offers services like lending, return, labeling, sorting, etc. is called a counter station. It has modules for arming and disarming, tagging, and sorting loads. Through the arming/disarming module, the Electronic Article Surveillance (EAS) bit inside the tag of the library item can be set or reset to trigger or not trigger the alert of the EAS gate.

4. The Patron self-check-out station

It is made up of a touch-screen computer, an RFID reader, specific software for managing and distributing books and other media, as well as a means of identifying the user. The patron is then given the option to check out one or more books after being identified by a library ID card, a barcode card, or his ID number (PIN). The customer chooses check-out and sets the book(s) in front of the RFID reader screen. The display then displays the title and ID number of the checked-out books (along with other optional information, if requested) on the screen.

5. Shelf Control

With this technique, librarians can easily locate and identify objects on the shelves. It consists of a base station and a mobile scanner. Three primary needs are addressed by the solution:

1. Find the specific books you've asked for.
2. Look for books that are incorrectly shelved.
3. A complete stock inventory of the library

6. Theft deterrence

The anti-theft component of the Library RFID Management System, known as RFID EAS Gates, uses the same RFID tags that are present on the library materials. When an object that has not been borrowed travels across one of the lanes, which can track objects up to around one meter, the alert system is activated. As the customer enters the building carrying the unborrowed library book, the alarm will go off and the gate's lights will flash.⁵

Impact of Rfid System in Library

The deployment of the RFID technology has had a variety of effects on the library:

1. Time savings at the circulation desk

The usage of RFID shortens the time needed to complete circulation tasks. By using technology, librarians can save significant staff time by doing away with the need to scan barcodes when borrowing and returning goods. RFID streamlines the borrowing and returning processes for users.

2. Theft detection

The entrance and exit gates of the library have theft detection pedestals installed at the two security gates. These gates are separate from one another, and the overlapping protective zones give an extra layer of security. Aside from books getting lost on the shelves, many items in the library were untraceable the use of RFID.

3. Finding missing books using an RFID hand reader

Due to the breadth of the collection and the various classification systems the library used to shelve objects, finding lost books was previously quite challenging. Sometimes it takes a long time to find a book, but library workers may quickly discover any item with

an RFID hand reader. When staff scans through the stacks with the RFID hand reader, an audible "beep" reveals the position of the lost item. The RFID hand reader allows accession numbers of missing volumes to be kept.

4. Stock verification

Taking stock each year is a crucial task for all libraries and poses a significant burden for those with sizable holdings. It is almost hard for this library to manually verify stock. The PDA-based hand reader can scan thousands of volumes that are stacked on shelves without ever having to lift a single book out, as with a barcode reader. The server then immediately updates the data for stock database verification. The list of matched and mismatched items is displayed at the conclusion. This tool is also useful for looking for particular products and organizing shelves.³

Advantage and Disadvantage of Rfid Systems

The usage of RFID can be a difficult topic when libraries choose to digitize their collections makes use of the technology. There's no denying that RFID technology will spread more widely in the future, but libraries should balance the benefits and drawbacks. Two of the many advantages of the technology are the actual implementation of RFID in libraries and using it to free up librarians for activities that involve more engagement with users. There are many negative aspects of technology, but there are also security and privacy issues.⁶

Advantage:

1. Less staff responsibilities
2. A decrease in staff injuries
3. Dependability
4. Tag appearance and life
5. The capacity to handle the scope over several years.
6. Employees can use their administrative expertise to leverage their professional skills.
7. Reports that were misfiled.
8. Multiple items may be checked out or checked in simultaneously.
9. Long tag life.
10. Rapid blood flow.
11. Simple self-charging and discharge.
12. Quick inventory.
13. More dependability.
14. Automatic Material handling.
15. Affordable.
16. Automated issuance and return.
17. Simple stock confirmation.
18. Automatic book sorting upon return.
19. Boost the library's security system.
20. The database may be instantly updated.

Disadvantage:

1. A reduction in personnel responsibilities
2. Price
3. Tags' susceptibility
4. Big Brother and invasion of customer privacy
5. Block of frequency.
6. High price.
7. There is no standard
8. Potential for compromise.
9. Elimination of tag exposure.
10. Privacy issues with users.
11. Issues with the exit gate sensor.
12. Reader squabble
13. Tag conflict⁴

Suggestions

1. An orientation program ought to be made available at the start of the session
2. The users are made aware of the charging and unchanging of books. Additionally, it enables the pupils to use it more effectively and correctly.

3. Installing CCTV cameras in addition to RFID gates is preferable during rush hour as it may aid in surveillance.
4. A reliable electrical backup is crucial for RFID.

Conclusion

RFID technology is a crucial tool for logistical applications and is being used in a variety of industries to improve supply chains and production procedures. Although this technology is not entirely new, various new approaches are being investigated improve it for novel uses. A system called Radio Frequency Identification (RFID) uses radio waves to passively identify tagged objects. RFID technology will eventually offer data for tactical and strategic decision-making in real time. RFID data will be used in a more efficient and pertinent manner. Future applications for RFID are possible.

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