

RFID Implemented Library System

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ABSTRACT

Libraries are important aspects of our life. These are important in providing or acquiring essential knowledge about anything around us. Earlier Library system faced a lot of problems related to the user accessing it using conventional methods. The RFID implementation on Library Management system faced a lot of problems. The RFID implementations on library management helps to reduce and sort out such issues that faced by conventional Library system.

Using RFID implementation, the database shows the availability of the book in the library so that the student can search in the database and if available, they can collect book from the library. It helps to handle the issue, renewal and return process for books using RFID tags implemented on it. Students will also get notified about their status of due of books also.

Keywords— RFID Technology, Traditional Library Management System, RFID Implementations, RFID Tags, RFID Advantages

INTRODUCTION

Libraries are the considered as the gateways to knowledge and culture, hence plays an important role in our society. The resources and services they provide creates opportunities for learning, literacy and education and also helps to shape new ideas and perspectives that are essential to create and innovate society.

Every educational organisations has their own library and they use the conventional system in its implementation and traditional Bar code strategies to access each books in the library.

In traditional Library system, the concept of manual work was necessary. The selectors ordered books using order slips, catalogued items in which indexed them with the card and the users signed out books manually, indicating their names on the cards provided by the libraries.

The main aim of implementing RFID over the traditional library system is to improve operations of library by increasing the efficiency of library transactions, workplace injuries reduction and thereby improving services for users.

OBJECTIVES

The main objective behind the implementation of this RFID is due to improve the faults faced during the usage of traditional Barcode systems.

That includes:

- Increasing Book theft from libraries
- Requirement of more manpower and processing time
- Issues faced while returning of books back to library
- Manual Work

BASIC CONCEPTS

Radio Frequency Identification (RFID) is a form or category of wireless communication where communication is done through the usage of electromagnetic and electrostatic coupling in the radio frequency portion of the EM Spectrum so that to uniquely identify an object, an animal or a person. An RFID System consists of following main components-

- **RFID Tags**
- **RFID Readers**
- **Antenna**
- **Server** on which software is loaded

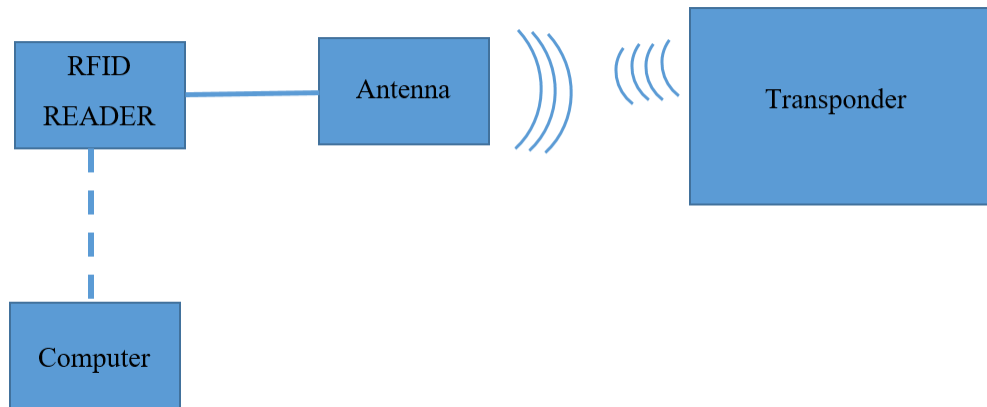


Fig. RFID Connectivity

Each tag has a specially dedicated storage (EE-PROM), that stores information about any object such as its unique Id's.

When these tags pass through separate field generated by the readers, it transmits data back to the reader and hence identifies the object.

The antenna uses certain amount of radio waves that used to transmit signals that activates the transponder and hence the tag transmits data back to the antenna.

RFID vs Barcode

The Barcode recognition technology is not a new technology introduced to the library system. It was the commonly used methodology that have been followed from years.

But RFID technology is something unfamiliar with most people in the library field though its application is widely used in different areas,

E.g., Toll Booth

The major difference that we can notice between **RFID** and **Barcode** is that Bar coding scans only printed label with optical laser to identify the unique object whereas RFID uses an RFID tag that uses radio frequency signals for scanning the tags.

By implementing RFID into library management system, a micro-chip (RFID Tags) will be embedded into the items at the library. These micro-chip will automatically send data to the RFID scanner, which will not require manual scanning in the Barcode scanning methodology.

METHODOLOGY

The users have to register in a particular centre that is being authorized. The user is thus provided with a unique identity card (RFID). The user has to carry this RFID so as to access the library.

These RFID tags are used to store information of the object to be tracked and to be accessed with the help of radio signals produced by the RFID reader.

The RFID card is scanned using the reader, if it is valid then that particular user can be able to access the library. Else, it stores the data of the book to which the RFID tags are attached.

All the books available at that library is being embedded with the RFID tags. The RFID readers are used to read these tags.

Once a user borrows a particular book, the book is scanned and the information were stored in the database.

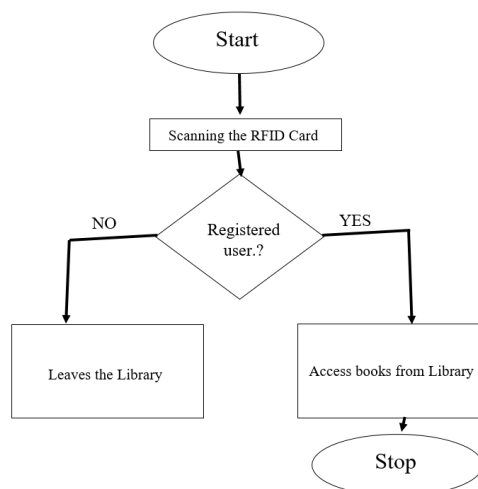
Once the authentication is done, the student can be able to search the required book from Library database and if found, they can take that book and hence the information would be updated in the database itself.

Student shows their unique RFID tags to the RFID readers and reader reads the tag and updates the information in database. The system hence displays the return date of the book to the library and hence student leaves from the library.

If a student wants to return a book after reading, they have to display the RFID tag and RFID reader scans and reads the tag and places the book inside its appropriate trays. After returning books, the student gets the response message from library that “The book has been returned”. So this is the way how the RFID has to implemented in the library.

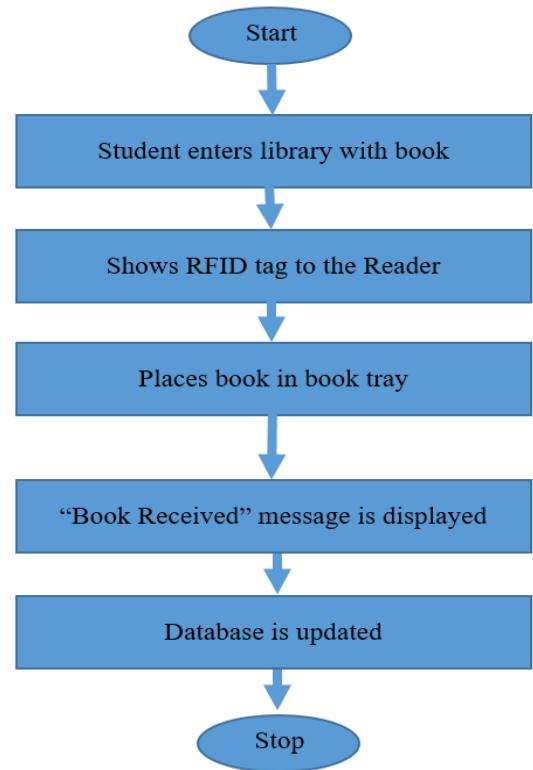
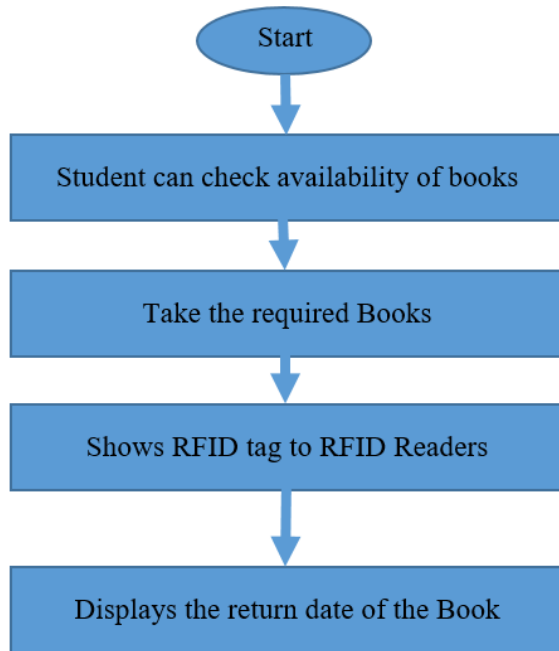
	RFID	Barcode
Data Storing	EE-PROM	Paper
Durability	High	Low
Cost of Tag	Expensive	Inexpensive
Reusability	Yes	No
Number of items to be Scanned	Multiple items can be scanned	Only one item can be scanned at a time
Capability	Capable of read/Write	Capable of Read only

The Flowchart representations for the implementation is given as follows-

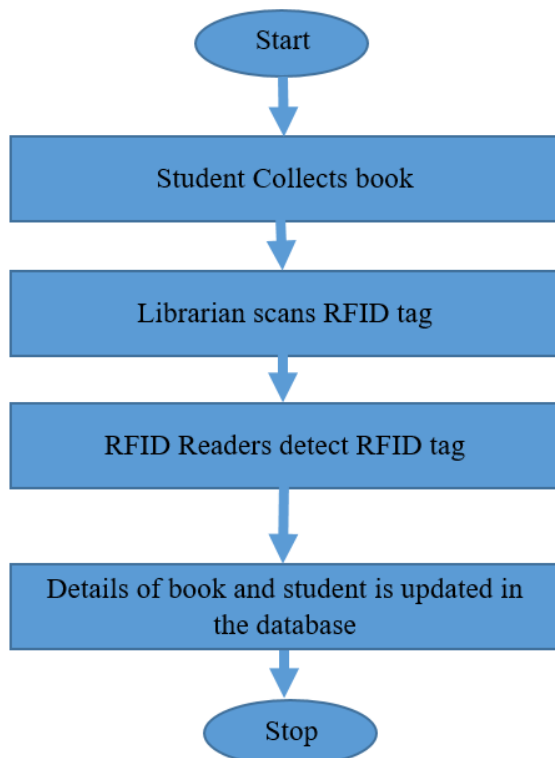


The RFID scanner scans the unique RFID card. If already a user, then he or she can access books from the library otherwise can leave from the library.

BOOK BORROW BOOK RETURN



TASK DONE BY LIBRARIAN



The main working principles of this system mainly includes :

- **RFID Tagging**

Stores the information about the book it is attached.

- **Book Issue/ Return**

The student approaches to the library with the unique RFID identity card to borrow or return book to the library counter

- **Updating data to database**

The Librarian must update the information in the database each time when a student approaches them with the id.

- **Anti-Theft Detection System**

Detects the EAS-equipped RFID tags and prevents theft entering the library without these unique tags

ADVANTAGES

- Reduces Time Complexities
- Accuracy in data Management
- Security Improvement
- Better Book shelf Management
- Labour Management and effective Labour saving
- Effective updating of data into the database

The RFID Technology can be applied best in the middle or larger size libraries, where more obvious benefits can be achieved by using RFID.

For example, in National Singapore Library, one of the earliest user of RFID technology in the world, brought a great impact among the patron's self-service efficiency and hence effectively reduced staff's working time.

In future, it is expected that this technology will be adopted worldwide not even in library but also in book publication industries, that means that the published books would be embedded with an RFID tags on it before shipping them, to the libraries.

This will make RFID's Future in the library management more appreciating and positive.

CONCLUSION

The proposed system is very effective in terms of security, time management, data accuracy and effective library management as compared to the conventional library management system. The RFID in the Library system helps to speed up the book issue and borrowing process, tracking each books and also checking the availability of a particular books available in the library.

It is mandatory that for the implementation of the system it is necessary to have RFID tags and RFID readers of high quality so that to produce better results. The effective utilization of this project depends on the information stored in the RFID tags.

Such application will result in future benefits like sustainable management of labours, cost efficiency, improved service to the customer, reducing book theft and provides continuous updation of all books available in the library.

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