

## A Study on Smart Library Management System

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### ABSTRACT

RFID based systems are going to revolutionize the entire library automation systems. In this system we are going to develop library automation system, which will track the books, whether they are in library, so that library user will get the instant information. 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. This technology helps librarians reduce valuable staff time spent scanning barcodes while charging and discharging items. 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

Keywords: RFID Tag, RFID reader, Bluetooth etc.

### 1. INTRODUCTION

RFID (Radio Frequency Identification) allows an item, for example a library book, to be tracked and communicated with by radio waves. This technology is similar in concept to a cell phone. RFID is a broad term for technologies that use radio waves to automatically identify people or objects. There are several methods of identification, but the most common is to store a serial number that identifies a person or object, and perhaps other information, on a microchip that is attached to an antenna (the chip and the antenna together are called an RFID transponder or an RFID tag). The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can make use of it .The heart of the system is the RFID tag, which can be fixed inside a book's back cover or directly onto CDs and videos. This tag is equipped with a programmable chip and an antenna. Each paper-thin tag contains an engraved antenna and a microchip with a capacity of at least 64 bits. The entire system adopted the Arduino UNO microcontroller board (Based on ATMEGA 328).

### 2. LITERATURE REVIEW

[1] An RFID-Based Library Management System Using Smart Cabinets. Author: Anastasis C. Polycarpou, Theodoros Samaras Year : 2014An intelligent Library Management System (LMS)based on Radio Frequency Identification (RFID) was built as a pilot project for the university library. A Graphical User Interface (GUI) was carefully designed to support all necessary library functionalities and user needs. Different types of shelf antennas were designed and fabricated aiming at 100% tag readability in a low-SAR environment for the library users. Prototype smart cabinets were built and tested using different types of near-field shelf antennas ensuring confined coverage in the vicinity of the shelf, thus avoiding unwanted identification of books residing at nearby shelves. SAR simulations were performed in the presence of human phantom models positioned at a close distance to the

cabinet. The shelf antennas were optimized in such a way as to maximize tag readability and minimize electromagnetic pollution in the vicinity of the cabinet.

Smart Library Management System using RFID Author: Dr. Annaraman<sup>1</sup>, P. Thamarai<sup>\*2</sup>, Dr. T.V.U. Kiran Kumar<sup>3</sup> Year : 2015. Applicability of Radio Frequency Identification (RFID) system which is a new generation of Auto Identification and Data collection technology in a future Smart Library Management System is presented in this paper. It helps to automate business processes and allows identification of large number of tagged objects like books, using radio waves. In existing system barcode and token card system were used. Barcodes have no read/write capabilities; they do not contain any added information such as expiry date etc. and it needs line of sight, less security and it also can easily be damaged. By using token card system, they are very labor intensive and work process for the librarians was more.

By considering the above demerits in the existing systems, the proposed Smart RFID system, which is a wireless non-contact system that uses radio frequency to transfer data from a tag attached to an object, for the purpose of automatic identification and tracking. RFID doesn't need the line of sight, it removes manual book keeping of records, improved utilization of resources like manpower, infrastructure etc. Also less time consumption as line of sight and manual interactions are not needed for RFID Tag reading. RFID based Library Management system would help to allow fast transaction flow for the library and will prove immediate and long term benefits to library in traceability and security.

RFID Technology in Libraries: A Review of Literature of Indian Perspective Author: Parul Gupta\* and Margam Madhusudhan\* Year : 2016 The term Radio Frequency Identification (RFID) technology has come a long way both in terms of the multitude of applications and their potential uses. Despite the involvement of RFID in a variety of areas such as logistics, inventory control, aviation security, road, and rail rolling, the potential implementation and use of the technology in libraries is still in its budding stage, particularly in the case of countries with developing economies like India. As inferred from the fifth law of library science that 'library is a growing organism', librarians are always found interested in adopting latest technologies to provide better and efficient services to the patrons. Indeed, RFID technology has redefined various library related services and made every patron's job easier and efficient, from the patrons to the library professionals, as compared to conventional technologies like barcode, but in a developing country like India, the high cost of implementation and maintenance is still the major barrier in the proliferation of such auspicious technology.

After the perusal of literature based on RFID, it is found that most of the work was carried out on different aspects of RFID technology and none of them systematically covered them keeping focus on the availability of technology in libraries. The aim of the paper is to present the descriptive literature reviews (the abstract section of the source papers) and integrative literature reviews (reference the conclusion) on different facets of RFID technology with emphasis on select libraries of India as revealed in the literature available online.

### **3. MATERIALS AND METHOD:**

Software; Embedded 'C', RIDE to write code/ Kiel uvisions 3ISP

Hardware: AT89s52 based own developed board power supply, RFID reader, Bluetooth module, EEPROM, LCD  
The heart of the system is the RFID tag, which can be fixed inside a book's back cover or directly onto CDs and videos. This tag is equipped with a programmable chip and an antenna. Each paper-thin tag contains an engraved antenna and a microchip with a capacity of at least 64 bits, which contains the information about the book like name of the book etc. RFID is a combination of radio -frequency-based technology and microchip technology. RF (radio frequency) portion of the electromagnetic spectrum is used to transmit signals. An RFID system consists of an antenna and a transceiver, which read the radio frequency and transfer the information to a processing device (reader) and a transponder, or RF tag, which contains the RF circuitry and information to be transmitted. The antenna provides the means for the integrated circuit to transmit its information to the reader that converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can analyze the data.

### **4. DISCUSSION**

The reliability of the system, its ease of operation, and the flexibility of tagging all kinds of media easily, are important criteria in choosing an RFID system. The main aim for today's libraries in adopting RFID is the need to increase efficiency and reduce cost. Automation and self-service can help libraries of all sizes achieve these aims, and RFID has the added advantage that it can also provide security for the range of different media offered in libraries. The technology can also improve circulation and inventory control, which helps allocate human and financial resources. This means that libraries can relieve their professional employees of routine work and operational tasks.

### **5. RESULT**

The Library should be open about its use of RFID technology including providing publicly available documents stating the rational for using RFID, objectives of its use and associated policies and procedure and who to contact with questions. Signs should be pasted at all facilities using RFID. The signs should inform the public that RFID technology is in use, the types of usage and a statement of protection of privacy and how this technology differs from other information collection methods. Only authorized personnel should have access to the RFID system. No personal information should be stored on the RFID tag. Information describing the tagged item should be encrypted on the tag even if the data limited to a serial number No static information should be contained on the tag (bar code, manufacturer number) that can be read by unauthorized readers All communication between tag and reader should be encrypted via a unique encryption key. All RFID readers in the library should be clearly marked.

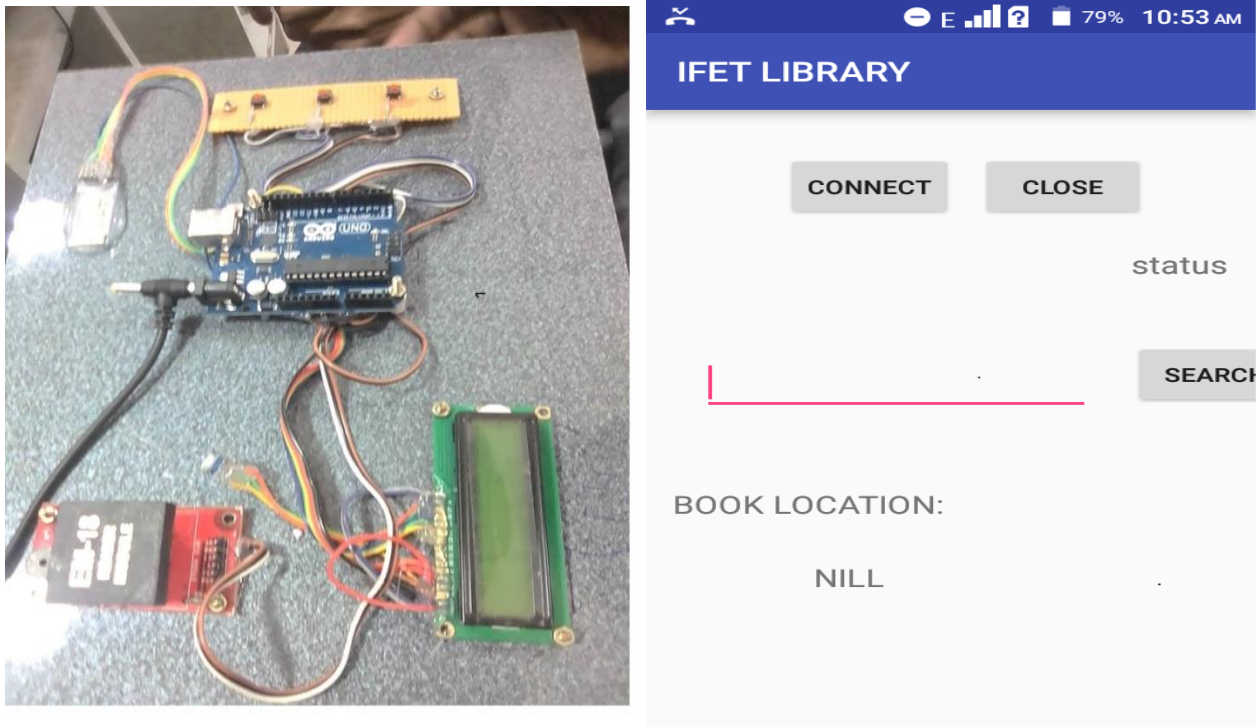


Fig 1.1 book location system

## 6. CONCLUSION

It is quite clear from the above discussion that an RFID system may be a comprehensive system that addresses both the security and materials tracking needs of a library. RFID in the library is not a threat if best practices guidelines followed religiously, that it speeds up book borrowing and inventories and frees staff to do more user-service tasks. The technology saves money too and quickly gives a return on investment. It is important to educate library staff and library users about RFID technology before implementing a program. It may be good for librarians to watch developments in RFID until the cost of tags comes down to \$.20 or less.

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