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Paper Authors

**Dr.R.Mohandas, Y.Kavya, G.SureshNayak, E.Rahul, G.Srinath**


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# RFID BASED LIBRARY MANAGEMENT SYSTEM

**Dr.R.Mohandas**[1]
*Associate Professor*
*Balaji Institute of Technology & Science, Narsampet, Warangal, Telangana-506331*
*mohandasbe@gmail.con*

**Y.Kavya**[2]
*Balaji Institute of Technology & Science, Narsampet, Warangal, Telangana-506331*

**G.SureshNayak**[3]
*Balaji Institute of Technology & Science, Narsampet, Warangal, Telangana-506331*

**E.Rahul**[4]
*Balaji Institute of Technology & Science, Narsampet, Warangal, Telangana-506331*

**G.Srinath**[5]
*Balaji Institute of Technology & Science, Narsampet, Warangal, Telangana-506331*

**ABSTRACT**
**In recent years drastic improvements have been accomplished in the field of Radio FrequencyIdentification (RFID), automated RFID object identification, theft detection by using RFID technology etc. RFID recognition and identification is a technology that utilizes the radio frequency for its operation and works in the radio frequency range. The RFID recognition system mainly makes use of the RFID tags and readers for the object identification. Before the development of RFID technology, barcode technology was being used and was popular. The usual barcode technology is of less cost compared to RFID but RFID system have major advantages compared to normal barcodes systems. This work shows the application and feasibility of RFID technology in the field of library book management system. Theexecution of the RFID in libraries depends vigorously on the RFID detection identification of the taggingobject.**

***Keywords***: Library Management System, EM18Reader Module, RFID Tags, GSM Modem, LCD Display, Arduino Uno.

## I. INTRODUCTION

RFID technology is being implemented in a number of industries. Supply chain implementation is perhaps one of the most frequently mentioned applications ofRFID tags and equipment. Retailers such as “Wal-Mart” and grocery stores such as “Albertson’s” have begun to make it mandatory for their suppliers to tag merchandise destined for their stores. There is, however, a key difference to the library’s inventory as compared to that of a warehouse or a retail outlet. In the warehouse and retail supply chain, goods come in andleave[1]. Only occasionally are they returned. The retail sector is looking at RFID as a "throwaway" technology that hands an item to a customer which gets discarded. Yet the item wise unit cost of including an RFID tag is much more than the cost of printing a barcode on a package. In libraries, items are taken out and returned many times[2].

Thus the same RFID tag is re-used many times. The libraries across the globe started to use RFID to speed up the self check in/out processes, to control the theft and to ease the inventory control in library. The barcode technology is slowly getting replaced by the RFID technology. The RFID tag does not have to be visible for detection. It can be read even when it is embedded in an item, such as in the card board cover of a book or in the packaging of a product. It can also store data such as stack number, accession number, book number, author information etc., but barcode Is limited to just an identification number[3].

## II. .RELATED WORK

The current library systems are employed with barcode technology. Every book in the library isprovided with a barcode. The uniqueness of the barcode varies with the thickness of the lines. This type of library management requires manual control. The barcode readers have the capability to read only one code at a time and therefore at most occasions it leads to a long queue at the issue and return counters [4]. The barcodes need to be programmed at the time of manufacture and these codes can be programmed only once. During both issue and return of the books the bar-code reader should have direct line of contact with the bar code. For making this possible it is compulsory to make the operation manual

## III.

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## III.PROPOSED METHOD

The proposed system is based on the RFID technology where RFID tags are embedded on the books and on the user cards and RFID readers are used to read these tags for proper, efficient and theft controlled operation of libraries. Most of the drawbacks associated with the bar-code technology can be overcome using the proposed system [5]. GSM technology is used in the proposed system in order to alert the user with the books taken, due date for return and the fine to be paid if not returned on time. Since the library consists of several menders of book, each book has be given a individual RFID tag and the tagging process as to be completed previously. The issuing of the RFID identity cards for the users also has to be given completed previously. The issuing of the RFID identity cards for users also has to be provided necessarily [6].

During the transaction of the book ,the user can be see the details regarding the transaction of the book such as the person hence for whom the book is being issued, the book title, author name, book issue date and due date of the return also. Thus this helps both the administration and the user in easier transaction of the book. If the book is not returned within the due date then remainder message can also be forwarded for the book user.

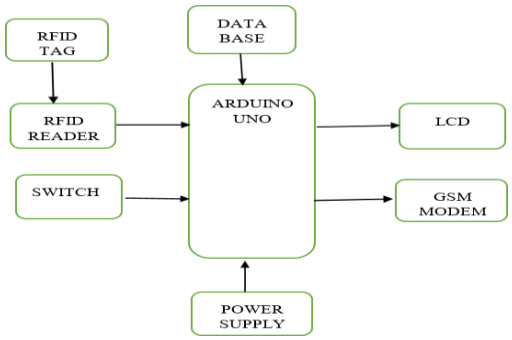



**Fig.1. : Block Diagram of Proposed system**

It consists of RFID Reader to scan RFID Rag and switch is used to on and off condition. Information regarding student, issue/return of books and due date is updated to the database. Each book would be uniquely identified via the RFID tags attached to it and communication would be done wirelessly. An RFID sensor would be placed near the library desk wherein one should only place the book near the sensor and it would get reissued/issued/returned depending on the actions required [7].Moreover information regarding the asset i.e. book can be gained by both the authority and students remotely instead of the traditional way of manually searching the book. This would save a lot of time and enable efficient queue management. As actions on these tagged assets are being recorded, data can be usefully exploited as per librarian's need. Hence, it is tracking books within a limited transmission range [8].

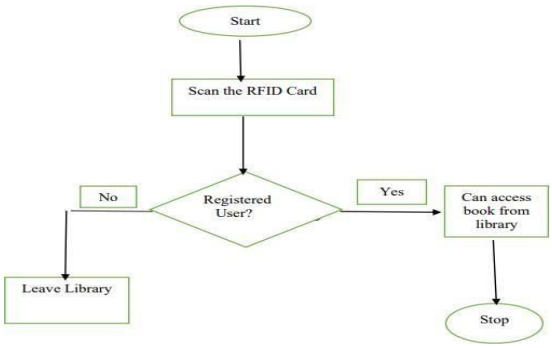
*3.1. Operation*

The working principle of this system mainly include,

**Tagging**: In this system, tag is the most important link. It stores information about the book to which it is attached. It provides identification of book and also its location in library[11]. The librarian's role is simply to classify the books and paste the RFID tags on them.

**Issue/Return Process**: The student approaches to borrow the book or return it to the counter[12]. First the students have to identify themselves using the RFID cards they are given. RFID reader to read card to make an entry in the database. The worker gathers the book and reads the card during book return. If the book is returned late, the user receives good [9].

**Updating to a Database:** The librarian must update the information about the availability of books, their location, and issue and return of books and also about the fine if the book is returned late.




**GSM Modem:** It sends the SMS during return the book. If any person forget the date of return book so daily remainder are given along with the fine amount.

**Fig.2. Flowchart for RFID System**

Keypad is used to view the history of issue and return by the user at a time.

First the user has to register in a particular authorized center. Then user can be provided with the user identity card (RFID).The user has to carry out the identification process to access the library. Tags are used to store the information of the object to be tracked and can be accessed via radio signal of RFID reader [13]. The tags used in this system are passive tags. RFID card is scanned, if it is valid the user can access the books from that particular library or else.

After authentication is done, further process is enabled. Student searches the availability of books from Library Database. If available student takes book. Student shows RFID tag to RFID reader reads and

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updates the database. Displays the return date and student leaves library with book.

Student enters the library with book to be returned. Student displays the RFID tag to the RFID reader and places a book inside the tray. After a book is placed inside the tray."BookReturned message" is displayed on the LCD and also database is updated. Student exists from library after returning of books [10].

**IV.Result**

The software used by the Arduino is Arduino IDE. Here Arduino IDE is a cross-platform application written in Java, and is derived from the IDE for the programming language and the Wiring project. It is designed to introduce programming to artists and other new comers un familiar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and is also capable of compiling and uploading programs to the board with a single click. There is typically no need to edit make files or run programs on a command-line interface. Although building on command-line is possible if required with some third-party tools.

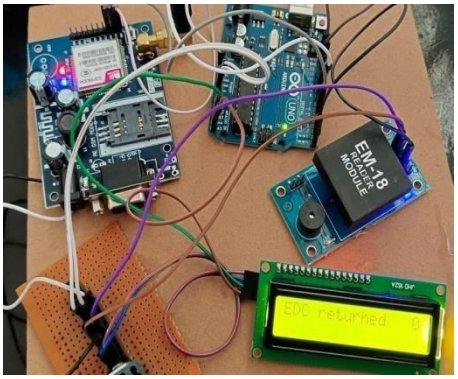


**Fig.3.: After Scanning the Books**

The Arduino IDE comes with a C/C++library called "Wiring" (from the project of the same name), which makes many common input/output operations much easier. Arduino
programs are written in C/C++, although users only need define two functions to make a runnable program:

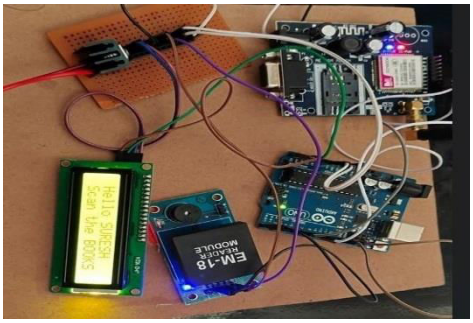


**Fig.4.: Returning Process**

- setup()– a function run once at the start of a program that can initialize settings
- loop()–a function called repeatedly until the board powers off.

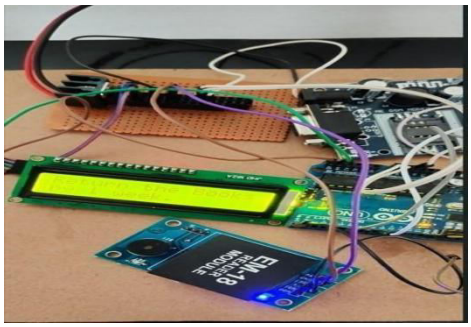


**Fig.5.: Returning remaining Books**

**V.ADVANTAGES**

- ❖ No line-of-sight needed like barcode
- ❖ Allows the circulation of several books simultaneously.
- ❖ Performs both identification and anti-theft in one single operation.
- ❖ Faster scanning and identification of book details.
- ❖ Automation of data collection minimizes human errors.
- ❖ Enables librarians to maintain a100% accurate inventory of tagged books.
- ❖ Data is encrypted and completely secured.
- ❖ RFID tag scan be reused and are highly durable.
- ❖ Helps the user to easily search books with its name.

**VI. APPLICATION**

- ❖ Pet and live stock tracking.
- ❖ Inventory management.
- ❖ Asset tracking and equipment tracking.
- ❖ Inventory control.
- ❖ Cargo and supply chain logistics.

**VII.CONCLUSION**

The proposed system is very efficient in terms of technology and easy to use, consumes less time and automate the library and reduce the workload of the librarian. RFID in the library speeds up the process of book borrowing, tracking, books searching thus frees workers to perform further customer support tasks. RFID readers and RFID tags to be used have to be of

high quality to provide the best results. The main benefit of this project is that all the activities including problem, renewal and return of books are digitized and all these actions are modified in the database automatically. The efficient utilization of the technology also depends on the information that is to be written in tag. Such applications will result in substantial labor cost savings, improve customer service, lower book theft and provide a continuous update of new book collections.

## REFERENCE

[1] N.Sivapriya, R.Mohandas, "Optimal Route Selection for Mobile Ad-hoc Networks based on Cluster Head Selection and Energy Efficient Multicast Routing Protocol", Journal of Algebraic Statistics,Volume 13, No. 2, 2022, p. 595 - 607, ISSN: 1309-3452, June 2022.

[2] Sivapriya N, Ravi T.N., "Efficient Fuzzy-Based Multi-constraint Multicasting with Fault Tolerance Routing Mechanism", Lecture Notes on Data Engineering and Communications Technologiesbook series (LNDECT), Springer, Vol. 44, Chap. 54, pp. 475-484, Online ISSN: 2367-4520, ISBN: 978-3-030-37051-0, January 2020.

[3] S.Balakrishnan, P.Hemalatha, S.Gridharan, "A Study on Smart Library Management System" ,AJAST, Vol. 2, Issue1, January2018.

[4] H.C.Bansode, S.M.Mhatre, A.N.Patil, G.C.Talkar, "Smart Library using NFC", IJARCET, Vol.5, Issue5, May2016.

[5] ChethanJ.Jadhav, ShivaniS. Jadhav, "Smart Library Management System using RFID Technology", IRJET, Vol.4, Issue5, May 2017.

[6] B.T.Geetha, V.Pereumal, S.Hariharan, T,Jayakumar, "A Smart Book accessing System using RFID and IR in library",IJPAM,Vol.4,Issue24,May2018.

[7] Karne, RadhaKrishna, and T. K. Sreeja. "ROUTING PROTOCOLS IN VEHICULAR ADHOC NETWORKS (VANETs)." *International Journal of Early Childhood* 14.03: 2022.

[8] Karne, RadhaKrishna, et al. "Optimization of WSN using Honey Bee Algorithm."

[9] RadhaKrishna Karne, Dr TK. "COINV-Chances and Obstacles Interpretation to Carry new approaches in the VANET Communications." *Design Engineering* (2021): 10346-10361.

[10] Karne, RadhaKrishna, et al. "Simulation of ACO for Shortest Path Finding Using NS2." (2021): 12866-12873.

[11] RadhaKrishna Karne, Dr TK. "Review On Vanet Architecture And Applications." *Turkish Journal of Computer and Mathematics Education (TURCOMAT)* 12.4 (2021): 1745-1749.

[12] Karne, Radha Krishna, et al. "GENETIC ALGORITHM FOR WIRELESS SENSOR NETWORKS."

[13] R.Dinesh, S.R.ArunPravin, M.Aravindhan, D.Rajeshwari,"LibraryAccess system Smart phone Application using Android", IJCSMS, Vol.4,Issue1, January 2013.

[14] SanthoshAbajiKharat, B. M. Pange,"QR Codes and academic libraries",IJLIS,Vol. 2,Issue1, January 2013.

[15] PoojaShejwal, AmitaWankhade, VivekShimpi, AjitWale, "A survey on existing barcodes and barcode generation technique" ,IJCSIT, Vol.7,Issue5,July2016.

[16] Mandeep Kaur, Manjeet Sandhu, Neeraj Mohan, Pavinder S Sandhu, "RFID Technology principles, advantage, limitation, and its application", IJCEE, Vol. 3, Issue 1, February 2011.

[17] Dr.Nookala Venu, "Analysis of Xtrinsic Sense MEMS Sensors" International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE), ISSN:2278-8875 Vol 4, Issue:8, August 2015, PP: 7228-7234.

[18] Dr.Nookala Venu, Dr.A.ArunKumar and Karthik Kumar Vaigandla. Review of Internet of Things (IoT) for Future Generation Wireless Communications. International Journal for Modern Trends in Science and Technology 2022, 8(03), pp. 01-08.

[19] Dr.Nookala Venu, Karthik Kumar Vaigandla, Dr.A.ArunKumar, "Investigations of Internet of Things (IoT): Technologies, Challenges and Applications in healthcare", International Journal of Research (IJR), ISSN: 2236-6124, Volume XI, Issue II, Feb 2022, PP: 143-153.