RFID Based Intelligent Book Finder Using Ultra High Frequency Sensor

Nithya.M[1], Solaiyammal.K[2]

P.G Student, Dept. of Communication Systems (ECE), Idhaya Engineering College for Women, Chinnasalem, India.[1]

Assistant Professor, Dept. of Electronics and Communication Engineering, Idhaya Engineering College

for Women, Chinnasalem, India.[2]

ABSTRACT: Locating items rapidly and accurately has become a crucial part of our modern library. Accurate locating not only saves time and money but also reduces waste, as products do not get lost along supply chains. One promising indoor tracking method is provided by radio-frequency identification (RFID) technology. The main benefit of RFID technology is the ability to inventory items simultaneously and rapidly without the requirement of line of sight to the target. Because RFID tags are attached to various objects and are used in different environments, RFID engineers are required to design RFID tags that operate reliably within varying environments and medium materials. In this approach, the books are equipped with an ultrahigh frequency (UHF) RFID tag and can be located using a hand-held RFID reader device. In addition to locating the books, the system keeps the book inventory up to date.

KEYWORDS: RFID, Library Management System, Proteus Design Suite.

I.   INTRODUCTION

RFID stands for Radio-Frequency Identification. The acronym refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less. RFID is a general term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object wirelessly, using radio waves. This is sometimes referred to as contact-less technology and a typical RFID system is made up of three components: tags, readers and the host computer system. An RFID tag is a tiny radio device that is also referred to as a transponder, smart tag, smart label or radio barcode. The tag comprises of a simple silicon microchip attached to a small flat aerial and mounted on a substrate. The whole device can then be encapsulated in different materials (such as plastic) dependent upon its intended usage. The finished tag can be attached to an object, typically an item, box or pallet and read remotely to ascertain its identity, position or state.

II.   RELATED WORK

The paper [1] presents Event-driven architecture not only shares many of the same characteristics with service-oriented architecture, such as modularity, loose-couplings, and adaptability, but also has ability to process event in an asynchronous way. So it is able to respond better to real-time changes and Integrate the system. This article is concentrate on RIFD information management system design which base on EDA/SOA. The paper [2] proposes RFID provides a good wireless platform to facilitate indoor positioning. However, duo to the small width of each book spine, adopting positioning based RFID alone is not enough to locate books in a library. In this work, they combine image matching with L-GEM based RBFNN to enhance the accuracy and robustness of the book locating system. We apply this new method in a library to position the certain books. Experimental results show that the proposed method is highly accurate and robust to white noise of RFID signals. The paper [3] presents a RFID Intelligent Book Conveyor using Radio Frequency Identification (RFID) technology and embedded technology, they also exploited GUI using Qt integrated development environment. This book conveyor is a portable equipment with complete functions, friendly

interface and convenient operation. It can greatly improve the work efficiency of librarians and the service quality of the library. The paper [4] proposes a smart Book-LOCating System called BLOCS with two location modes using RFID technology – single book mode and book list mode. The single book mode provides users to find the bookshelf containing the desired book which was misplaced. The book list mode offers a corresponding list of the bookshelves and the misplaced books regularly for a librarian to localize all misplaced books in the wrong bookshelves. The simulation results show that the locating accuracies of the single book mode and the book list mode. The paper [5] presents a 3D RFID-based library search System. Measuring and determining RFID-tagged book location is an application development for the library search system namely 3D RFID-based library search system. This paper presents the development of this application which includes the application execution flow and as well as the laboratory scale system structure.

A. EXISTING SYSTEM

RFID based systems are going to revolutionize the entire library automation systems. In this project we are going to develop library automation system, which will track the books, whether they are issued or 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 (i.e., the technology does not require line-of-sight or a fixed plane to read tags as do traditional theft detection systems). This system only detects the missing books. It does not give any student information. It only provides the easy maintenance of the books in library. It will not give the due date information.

III. PROPOSED SYSTEM

RFID is an automatic identification technique used for the fast transaction of books, journals or DVDs using RFID tags and readers. The RFID technology helps in fast issuing, returning, and reissuing of books. The technology helps in direct transaction of information from the tags to the PC of the librarian and in automatic updating of transactions in the users account. The RFID tags can be programmed unique code. This code gets read when passing through the RFID reader. When a tag crosses the reader the reader recognizes the unique code and updates the account of the user. The RFID tags are embedded into the books and are not visible for detection. The readers since they have a wide read range unlike bar code readers have the capability to read the tags even when they are embedded within the books. Special care and attention should be given in programming the tags since they are mostly programmable only once. These tags can store stack number, accession number, book number, author information etc., but the bar code technology is limited to only the identification number. The programming cost of RFID tags are much costlier than the barcodes but it should be noted that the same tag can be reprogrammed if necessary. Depending on the applications added the cost of tag increases.

A. SOFTWARE DESCRIPTION

To implement Library Management System (LMS) designs, a platform has been selected which includes the Software:Embedded C, PIC C Compiler, Proteus design suite.

B. PROTEUS DESIGN SUITE

The Proteus Design Suite is an Electronic Design Automation (EDA) tool including schematic capture, simulation and PCB Layout modules. It can be purchased in many configurations, depending on the size of designs being produced and the requirements for microcontroller simulation. Schematic capture in the Proteus Design Suite is used for both the simulation of designs and as the design phase of a PCB layout project. It is therefore a core component and is included with all product configurations. The micro-controller simulation in Proteus works by applying either a hex file or a debug file to the microcontroller part on the schematic. Proteus is composed of two applications called ARES and ISIS. ISIS ismainly focused on the design of a real circuit board and how it works with

thedifferent elements that a PCB has. For example, it allows you to simulatemicrocontrollers and its different connections in real time.On the other hand, ARES is able to route and place the different objects andis used to generate printed circuit boards.Besides that, one of the good things about this program is that it is veryversatile and is able to effectively integrate all the parts of the project.Proteus incorporates a common database which allows the user toautomatically update the data of the different modules which are part of the mainproject. In addition, the 3D viewer has been improved and lets you see changesand modifications in real time.

C. PROCEDURE

1. Open the Proteus 8 Professional software
2. Click the new project in the Proteus 8 Professional window.
3. Enter the file name and select the folder.
4. Select – Create a Schematic from the selected template then the schematic capture will be opened.
5. To select device, click component mode, pick the needed devices and click ok.
6. Click the device name one by one then place the device in the schematic capture window and connect the devices.
7. Run the simulation.

D. FLOWCHART
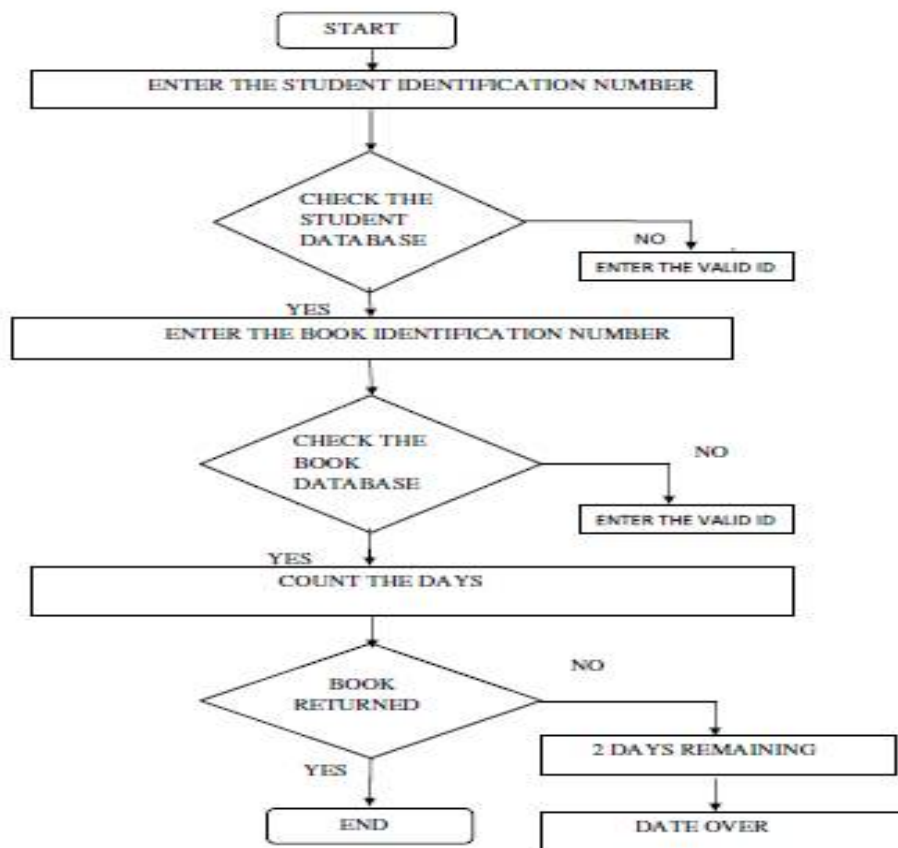
Figure 1: Flow chart
The figure 1 shows the flow chart of the Library Management System(LMS).

IV.RESULTS & DISCUSSION

The Library Management System (LMS) is implemented using Proteus Design Suite.The Library Management System (LMS) consists of PIC Microcontroller, LCD, Virtual terminal, Resistor, DC Generator and Switch.
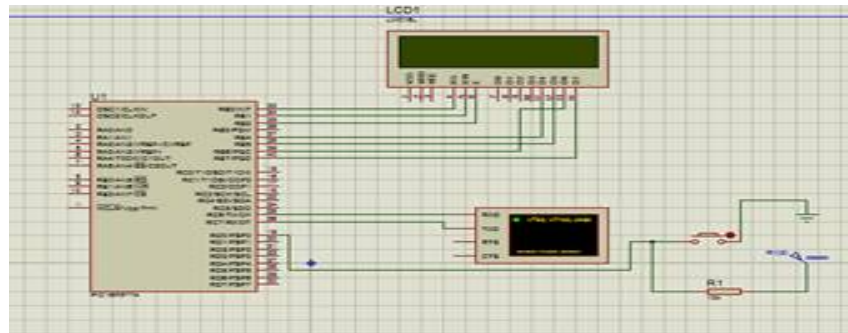

Figure 2: Library Management System (LMS)

The figure 2 shows the implementation of Library Management System (LMS)using Proteus Design Suite.

STEP 1-STUDENT IDENTIFICATION
If enter the student identification number, the student details will be displayed one by one as follows.
(i) Student name
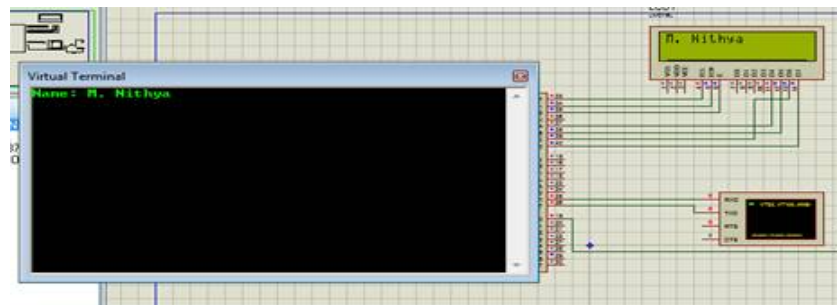
Figure 3: Student name

The figure 3 shows the Student Name. If enter the student identification number,the Student Name will be displayed.
(ii) Student Register Number
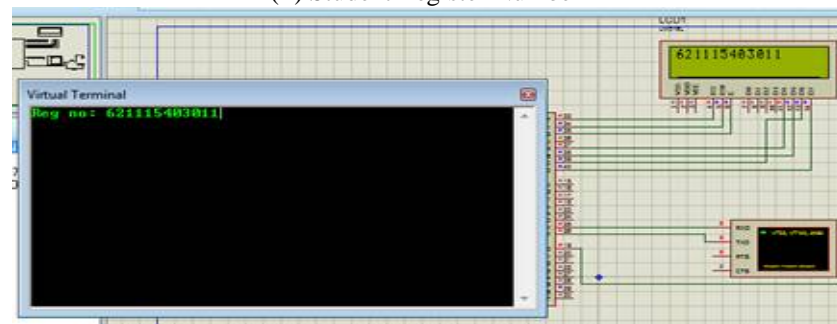
Figure 4: Student Register Number

The figure 4 shows the Student Register Number. After the Student Name, Student Register Number will be displayed.
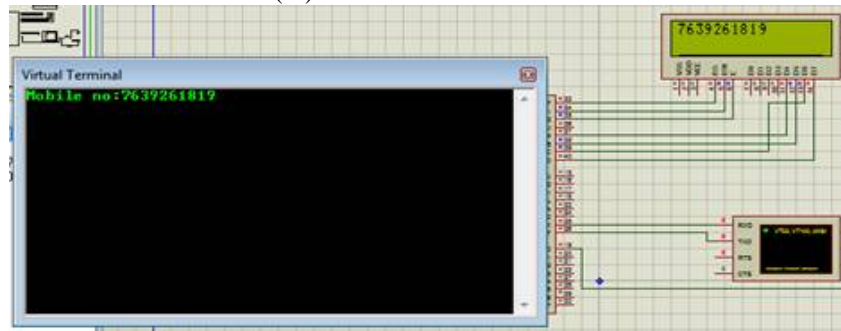
(iii) Student Mobile Number

Figure 5: Student Mobile Number

The figure 5 shows the Student Mobile Number. After the Student Register Number, theStudent Mobile Number will be displayed.
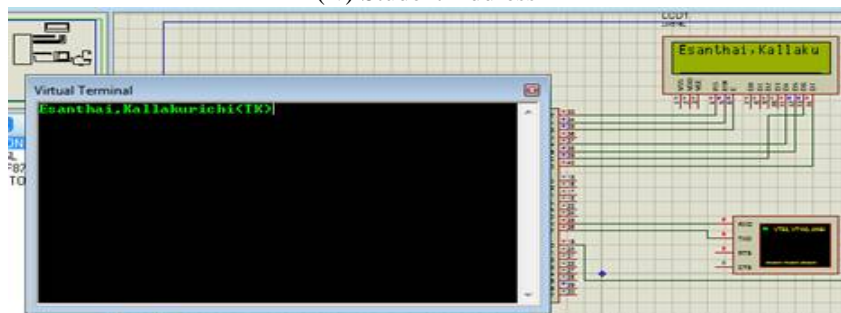

(iv) Student Address

Figure 6: Student Address

The figure 6 shows the Student Address. After theStudent Mobile Number, the Student Addresswill be displayed.

STEP 2- BOOK IDENTIFICATION

If enter the book identification number, the book details will be displayed one by one as follows.
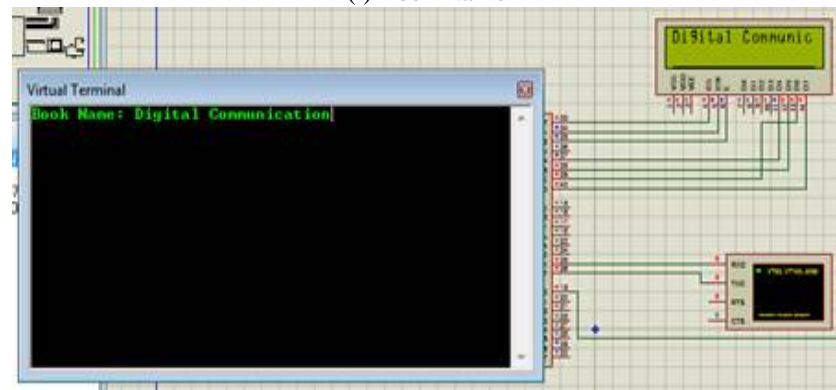
(i) Book Name

Figure 7: Book Name

The figure 7 shows the Book Name. If enter the book identification number,the Book Name will be displayed.
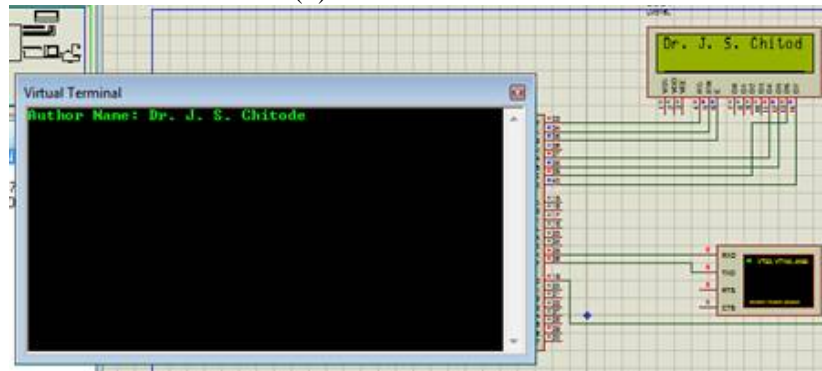
(ii) Book Author Name

Figure 8: Book Author Name

The figure 8 shows theBook Author Name. After the Book Name, the Book Author Name will be displayed.
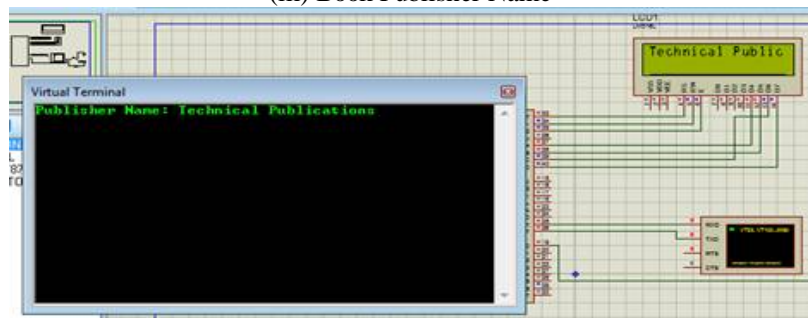
(iii) Book Publisher Name

Figure 9: Book Publisher Name

The figure 9 shows the Book Publisher Name. After the Book Author Name, the Book Publisher Name will be displayed.

The Book Name will be stored in the Student database.
After few days the student will return the book.

STEP 3 – RETURN PROCESS
If the student returns the book, the following window will be displayed.
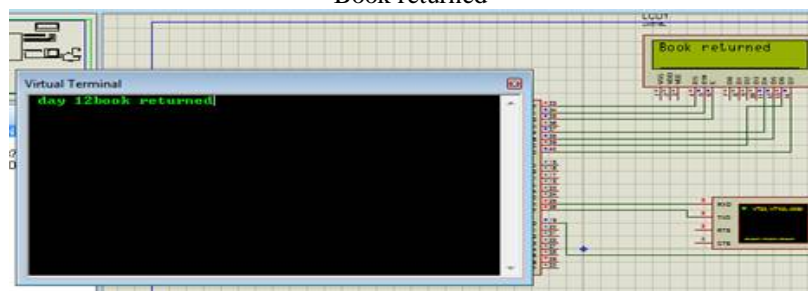
Book returned

Figure 10: Book returned
The figure 10 shows the Book returned when the student returns the book.

STEP 4 – ALERT PROCESS

If the Student does not return the book within due date, the 2 days remaining message will be displayed.
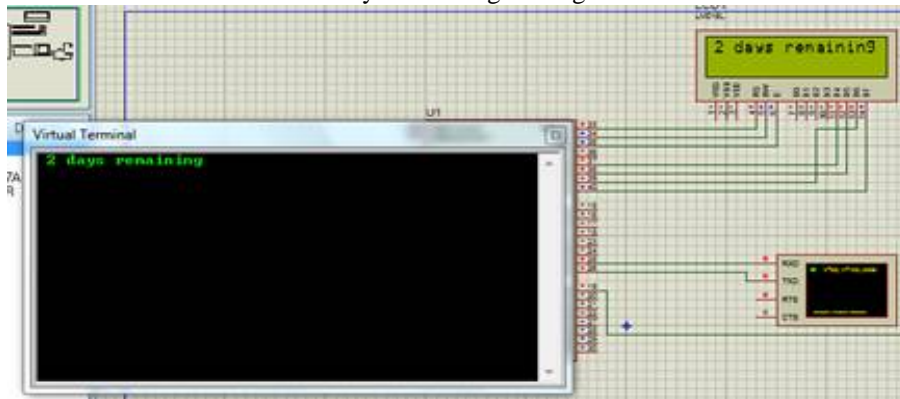
2 days remaining message

Figure 11: 2 days remaining message

The figure 11 shows the 2 days remaining message. The 2 days remaining message will be displayed if the Student does not return the book within due date.

After 2 days the date over message will be displayed.
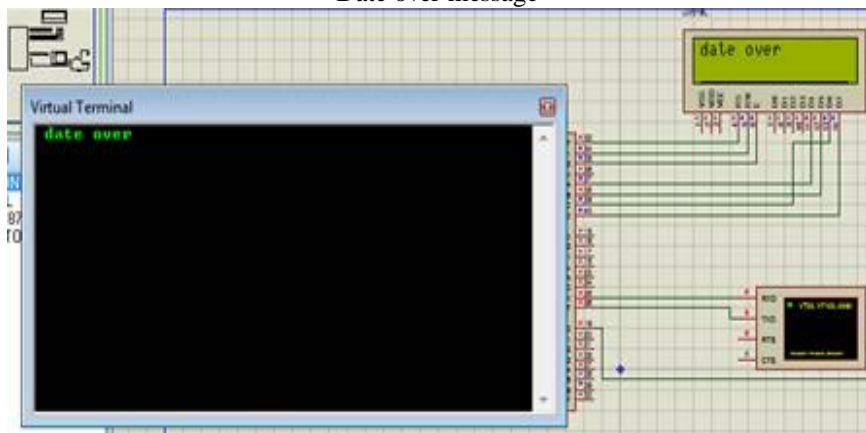
Date over message

Figure 12: Date over message

The figure 11 shows the Date over message. The Date over message is displayed if the Student does not return the book after the 2 days remaining message.

V. CONCLUTION AND FUTURE WORK

A. CONCLUSION

RFID in the library speeds up book borrowing, monitoring, books searching processes and thus frees staff to do more user-service tasks. These applications can lead to significant savings in labour costs, enhance customer service, lower book theft and provide a constant record update of new collections of books. The system that would allow fast Transaction flow and will make it easy to handle the issue and return of books from the library without much intervention of manual bookkeeping which benefits by adding properties of traceability and security. In phase one the student and book database and issue and return process will be implemented using software.

B. FUTURE WORK

In future the system will be implemented in hardware. This system would be able to issue and return books via RFID tags. GSM technology is used in the system in order to alert the user with the books taken, due date for return. As the user leaves the library after picking a book a SMS alert is given to the user regarding the book issued. Similarly a SMS is sent after the person returns the book. GPS is used to find the location of the book.

REFERENCES

[1]. Wu Jieming, Ding Yu, 2009, "A Study on RFID Book Information Management System with an EDA/SOA", vol. 02, no.,pp. 451-455, 2009, doi:10.1109/ISECS.2009.157.

[2]. Wing W. Y. NG, Yi-Song Qiao, Li Lin, Hai-Lan Ding, Patrick P. K. Chan, Daniel S. Yeung, 2011, "Intelligent book positioning for library using RFID and book spine matching" 978-1-4577-0308-9/11/$26.00 ©2011 IEEE.

[3]. Zhu Chang-ping, Wang Zh , Deng Jing-xuan, Gu Hui ,Shan Ming-lei HanQing-bang,Yu Hong-zhen, Zhang Shen, 2010, "Design of an Intelligent Book Conveyor Based on RFID", 978-1-4244- 7618-3 /10/$26.00 ©2010 IEEE.

[4]. Kuen-Liang Sue, Yi-Min Lo,2007, "BLOCS: A Smart Book-Locating System Based on RFID in Libraries",1-4244-0885-7/07/$20.00 2007 IEEE.

[5]. Terence Jerome Daim, RazakMohd Ali Lee, 2010 "3D RFID-Based Library Search System Application Development" , 978-1-4244-8648-9/10/$26.00 ©2010 IEEE.

[6]. Suganthy. R, 2016, " RFID Library Management System" , Vol.4 (Iss.5: SE): May, 2016.

[7]. S.Vimalraj, S. Sameera, S. Saranya, 2015 , " RFID based Library Management System" , ISSN: 2349-2163 Issue 1, Volume 2 (January 2015).

[8]. Sree Lakshmi Addepalli, SreeGowriAddepalli, 2014" Library Management System Using RFID Technology", Vol. 5 (6) , 2014, 6932-6935.

[9]. S.Parameshwara, B. Anusha, M. R. Chandrika, J. Pavithra, RakshaMuralidharkodangal, 2016, " RFID for Library Management", Volume-2, Issue-1, January 2016, ISSN: 2395-3470.

[10]. Narayanan A., Sanjay Singh and Somasekharan. M, 2010, " Implementing RFID in Library: Methodologies, Advantages and Disadvantages".

[11]. Dr.Prabhat Pandey, Ms. K.D. Mahajan, 2010,"Application of RFID Technology in Libraries and Role of Librarian".

[12]. Dhanalakshmi M, UppalaMamatha, 2009, "RFID Based Library Management System".

[13]. PritiPawar, KavitaShegaonkar,ArchanaUdane, 2016, "Radio Frequency Identification Based LibraryManagement System",March 2016,ISSN NO - 2394-3696.

[14]. A. Ankit Kumar Jain, T. Rama Krishna, 2014 "Dynamic Book Search Using RFID Technology", Volume 2, Issue 6, October-November, 2014, ISSN 2091- 2730.

[15]. Priyanka Grover and Anshul Ahuja, 2010"Radio Frequency IdentificationBasedLibrary Management System",Vol. 1, _o. 1, July 2010.

[16]. Embedded system tutorial, www.tutorialpoints.com.

[17]. Basics of RFID Technology, www.discountpdh.com.

[18]. A survey paper on Radio Frequency Identification Identification (RFID) Trend.