SMART LIBRARY SYSTEM MANAGEMENT USING RFID

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Abstract - 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. RFID doesn't need the line of sight, it remove 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

*Key Words***:** RFID Readers; RFID Tags; Computer;

1. INTRODUCTION

In everyday life, we are using Library. In libraries, working is still done manually. Books issue, reissue, return all this activity are done by librarian and it also increases the labor cost. So instead of doing this manually we are creating the system named as Smart Library Management System. In this system we are going to design a system in which user can get all information about name of the books he/she had issued. They will also get to know return date of the book. If user is not registered then there is option for new registration (sign up). The tag is attached to the each book in the library. These tags have the unique code and because of this uniqueness in code we are using it for different items. For this smart library management system we used RFID instead of Barcode due to more advantages over barcode.

1.1 EXISTING SYSTEM

In today's library system, we will use the physical or barcode technology. Every book in library is given with a barcode. This barcode is operated manually. Based on the barcode the books are issued and returned. The drawback of using barcode is only one barcode is scanned at a time. This makes a very big queue in library for issuing the books. The disadvantages of existing system such as,

- This leads to more power intake.
- Lack of security features.
- Time consuming.
- Misplacement of books/journals/magazines.

1.2 PROPOSED SYSTEM

The drawbacks of existing system can overcome by using rule-based technique and RFID (Radio Frequency Identification). RFID technique is a form of wireless communication that includes the use of electromagnetic coupling to distinctively identify the things(such as person, animal, tags etc.,). This system make use of various elements such as RFID reader, FPGA kit, GSM technology(modems), LCD display, PC, tags, Arduino uno, RC522, Mortar interface circuit.

The advantages of proposed system are

- Wastage of time is reduced in searching a book based on reference id
- Arduino uno is consumes less power
- RFID tags for authenticating user

2. COMPONENTS

The RFID based Smart Library Management System consists of following components

A. RFID Tags

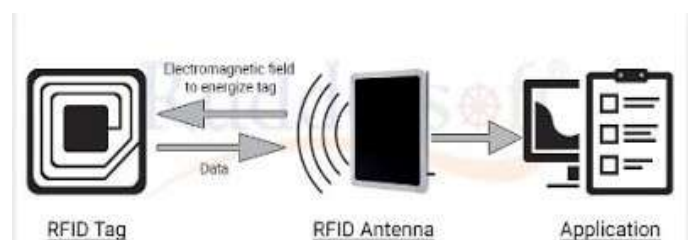B. RFID Reader

C. Arduino uno

D. Database Software

Figure 2.1 RFID Components

RFID Tags: Tags are thin labels which can be fixed inside a back cover of the book. RFID tags are made up of carbonic structure which contains a magnetic strip or coil layer inside the tag which helps in sensing the tags. In the figure shown, the tag contains a unique serial number like"0600394791 000345" which is used for the authentication of the user.

Figure2.2: RFID Tags

When we bring the tag in front of the reader of the reader, the reader antenna senses the tag and checks the unique serial number of the tag. If the tag is registered in the database then the reader authenticates the tag otherwise the reader shows an error and gives the message that the tag is not registered or the tag is not authenticated.
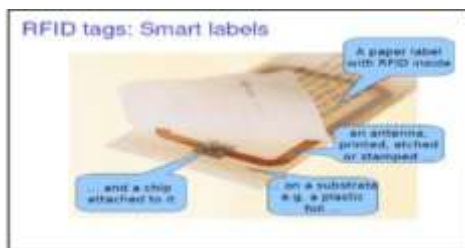

Figure 2.3: RFID Tags Construction

B. RFID Readers: RFID readers are used to interrogate data stored in tags. It contains a radio frequency module, a control unit and an antenna to communicate with electronic tags via radio signals. The antenna inside the reader generates electromagnetic field. When a tag passes through the field, the information stored on the tag is interpreted by the reader and sent to the database server, which in turn stores or retrieves information about the book's issue or return.

Figure 2.4 RFID Reader

Different types of readers are available in market depending on their range and suitable applications.

- Low frequency readers-125Khz

- High frequency readers-13.56Mhz

- Ultra High frequency readers-800-900Mhz

C. Arduino uno: In this project, we are going to design a system by which user can use the library smartly. Major components in our system are as Arduino uno, Database, RFID readers & RFID tags. Arduino uno has the inbuilt USART support and we will use it to obtain serial communication for transmitting and receiving the data between RFID readers, Arduino uno & the Database stored in PC. Also to achieve anti-theft we will interface a Buzzer and one more RFID reader to the Arduino.

Figure2.5: Arduino uno

❖ Microcontroller: ATmega328

❖ Operating Voltage: 5V

❖ Uno Board Recommended Input Voltage: 7 – 12 V

❖ Uno Board Input Voltage Limits: 6 – 20 V

❖ Digital I/O Pins: 14 total – 6 of which can be PWM

❖ Analog Input Pins: 6

❖ Maximum DC Current per I/O pin at 5VDC: 40ma

❖ Maximum DC Current per I/I pinat 3.3 VDC: 50ma

❖ Flash Memory: 32KB (0.5KB used by bootloader)

❖ SRAM Memory: 2KB

❖ EEPROM: 1KB

❖ Clock Speed: 16 MHz

Database: A database is an organized collection of data. It is the collection of schemas, tables, queries, reports, views, and other objects. The data are organized to model aspects of reality in a way that supports processes requiring in format
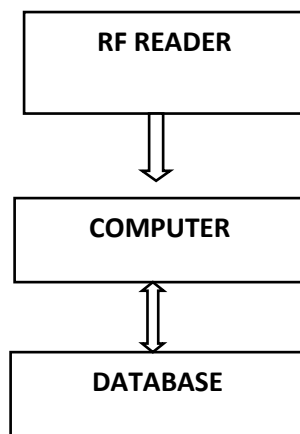
Figure: 2.6 DATABASE

3. CONCLUSION

Radio Frequency Identification (RFID) Systems is used in libraries for book identification, for selfcheckout, for anti-theft control. These applications can lead to significant savings in labour costs, enhance customer service, lower book theft and provide a constant update of collections of books. It also increases the speed and efficiency of book borrowing, returning and monitoring, and thus frees staff from doing manual work so that they could be used to enhance user-services task. The efficiency of this system is depending upon the information to be written in tag. To obtain best performance, RFID readers and RFID tags must be of good quality.

REFERENCES

► Langeswaran K., Revathy R., Kumar S.G., Vijayaprakash S., Balasubramanian M.P., "Kaempferol ameliorates aflatoxin B1 (AFB1) induced hepatocellular carcinoma through modifying metabolizing enzymes, membrane bound ATPases and mitochondrial TCA cycle enzymes", Asian Pacific Journal of Tropical Biomedicine, 2(S3) (2012)

► Rajendran S., Muthupalani R.S., Ramanathan A., "Lack of RING finger domain (RFD) mutations of the c-Cbl gene in oral squamous cell carcinomas in Chennai, India", Asian Pacific Journal of Cancer Prevention, 14(2) (2013)

► Anbazhagan R., Satheesh B., Gopalakrishnan K., 'Mathematical modeling and simulation of modern cars in the role of stability analysis", Indian Journal of Science and Technology,6(S5) (2013)

► Patil, Nisha, Pallavi Karande, Jayshree Desai, Sheetal Pereira, and U. G. Student. "Internet of Things for library Management System." International Journal of Engineering Science 10021 (2017).

► Hassan, Abbas Saleh, and Raoof Talal Hussein. "SIMULATION OF RADIO FREQUENCY IDENTIFICATION BASED LIBRARY MANAGEMENT SYSTEM." Journal of Engineering and Sustainable Development 21, no. 4 (2018): 161-170.

► Mishra, Rakesh Kumar. "Application of RFID Technology in Library Automation." Journalof Advancements in Library Sciences 3, no. 2 (2018): 1-6

► Alka Londhe, Hemal Gokhale, Prashant Kumar Gautam ,Shravi Jadhav ,Vineet Job. International Journal of Scientific Research Engineering & Technology March 2019