

Library Management System

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Abstract— Information and communication technology transformed traditional libraries into digital and virtual libraries, manuscript into digital documents and reduced the efforts of handling volumes and manpower utilization for check in, check out and inventory management. Among various technologies, Radio Frequency Identification [RFID] is emerging as means to improve efficiency in library activities. In this paper, RFID tags that are embedded on books as well as on the user issue card. These tags are scanned by RFID reader and data is serially sent to the Arduino that undergoes processing. The processed data is stored in personal computer that displays the whole information and can be retrieved later. A desktop app is being developed to store data like books and user id and a notification system that pushes a message to user’s mobile, a day before the renewal date.

Key words: Radio Frequency Identification [RFID], RFID Reader, RFID Tags

I. INTRODUCTION

The RFID is an automatic identification technique used for the fast transaction of books or journals using RFID tags and readers. This technology helps in fast issuing, returning and re-issuing of books and also helps in direct transaction of information from the tags to the personal computer of the librarian which in turn provides the automatic updates of the transaction in user account. The RFID tags can be programmed in a unique code which can be read through the RFID reader. When a tag crosses the reader, the reader recognizes the unique code and updates the account of user.

The RF tags are applied directly on library books and can be read with the RFID reader. Server software is integrated with the reader hardware for book keeping. RFID tags reads for a radio query from the reader and respond by transmitting their unique ID code.

II. LITERATURE SURVEY

Mrinalini Ghewari et al have proposed RFID in library automation, in which using the RFID technology the books will be scanned and RFID tags can store and retrieve the data[1].

Felcy Lewis and T.Y.Mallaiah have indicated that the Departmental Library App will make a significant contribution to enrich student learning experiences[2].The concept of RFID can be viewed as an extension to electronic barcode, which can be used to identify, track, or detect holding in the daily maintenance of the library[3].

Vimalraj and et al proposed that when a tag crosses the reader, the reader recognizes the unique code and updates the account of user[4].

Rafeel C. Gonzalez and Richard E have delivered an idea of RFID tags, that provides libraries with more effective

way of managing their collection while providing greater customer service to the user[7].

III. METHODS & MATERIALS

A. Proposed System

The present library system faces some drawbacks like security issues and excess manual works like searching and maintaining records. The RFID system used to automate the library management which overcomes the drawbacks of barcode technology. The proposed system with RFID technology helps to inform the user via text message, the due date and the fine if books are not returned on the given due date. Even the book return is made easy with the help of conveyor. The RFID code is scanned and the books are added to the admin’s library account.

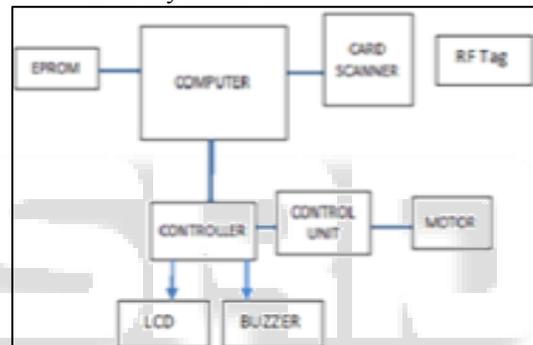


Fig. 1: Proposed Block Diagram For Library Management System

B. Components Used

- 1) Arduino Microcontroller Mega 2560
- 2) RFID Tags
- 3) RFID Reader
- 4) Liquid Crystal Display [LCD]
- 5) Personal computer
- 6) EEPROM 24c04
- 7) DC Motor
- 8) Motor Driver Circuit

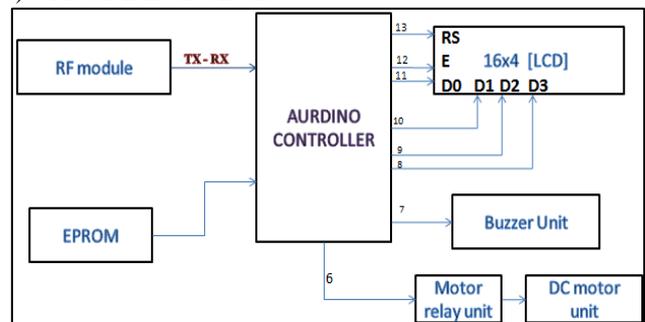


Fig. 2: Proposed Circuit Diagram for Library Management System

C. Hardware Block Explanation

Library management system consists of two modules namely user and admin. Admin is the librarian who can login and access the required information such as adding and removing books and members from the database. He / She can also change the status of the book whether it is available or not. User can search, reserve book and check the availability of books.

The RF tag is scanned using reader and the information stored in the EPROM is retrieved and is displayed on the personal computer. This automatically updates the book as returned in the admin's database.

LCD shows whether the book is to be returned or the days have to be extended. If the user's wish is to extend the period, the book is returned back with the help of the dc motor placed in the conveyor. Otherwise, the book is dragged and dropped in the book collector box.

IV. RESULTS & DISCUSSIONS

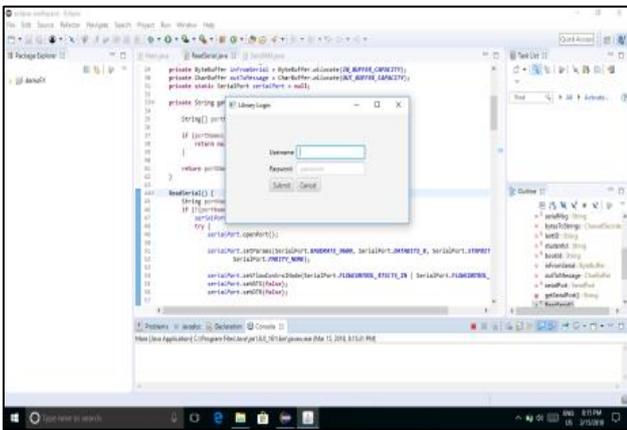


Fig. 3: Login Page

In Fig.3, the main user id and password that will be used to login. The user and password will common for all users.

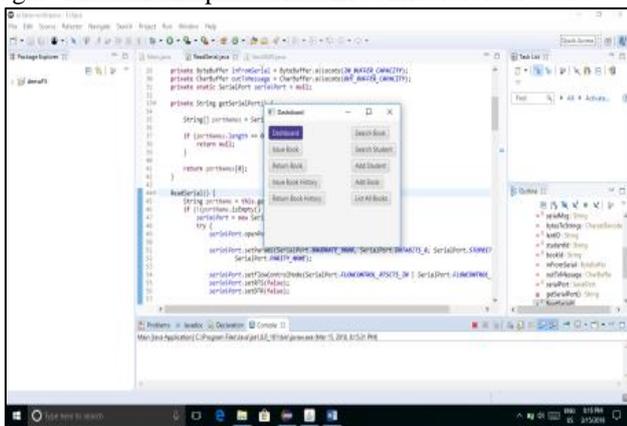


Fig.4: Home Page Details

Fig.4 shows the main home page details in which we can add books, search books, add members, take and return books. We have to choose according to our preference or work that has to be done.

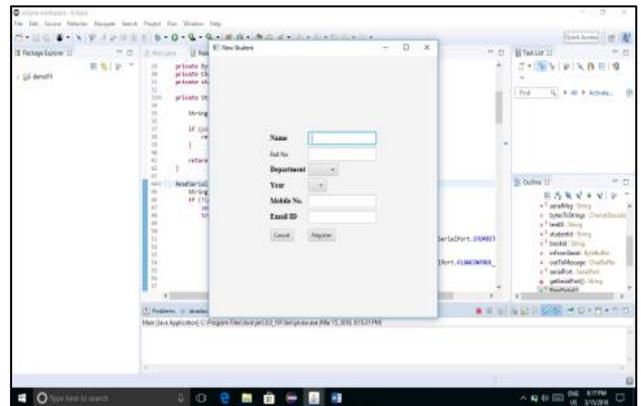


Fig. 5: Adding details of Members to the Library Database

In Fig.5, we can add the members by filling the details such as name, roll no etc., and click register, so that the member will be added. Each time the user don't want to register or add them.

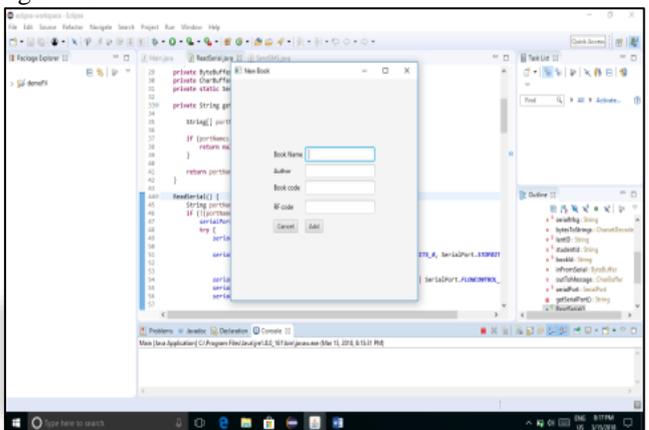


Fig. 6: Book Details

In Fig.6, books can be added by filling the book details like book code, RFID code etc. The books will be added by the admin or librarian. Each book has its unique RFID code and book code. Only if the book code and the RFID code is matched the book can be issued or returned.

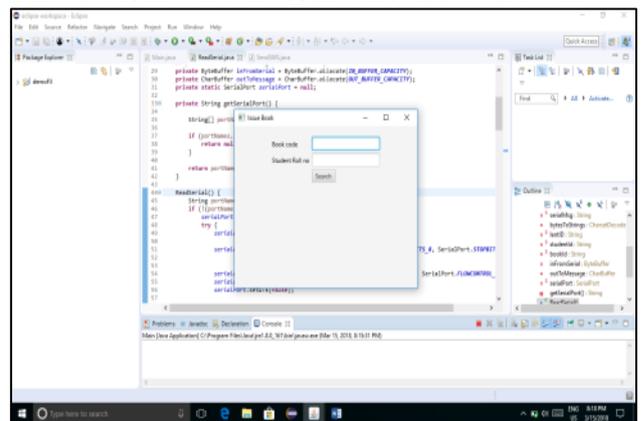


Fig. 7: Issue of Book

In Fig.7, the books will be issued to the user according to the user's choice of book. Book code and students roll no must be given by the user.

In Fig.8, the working condition of the hardware setup is shown. Arduino is interfaced with pc, LCD display will display the student's name to whom the book is issued and returned. RFID reader for scanning the code to return the

books. The quality of service and the efficiency of operation is improved. The overwhelming reason for considering new technologies is the reason for time saving. This self-management solution focus on presenting information and comments in an easy and intelligible manner. Students can login through the login Id with security code and can find the books issued by him/her and date of return with the help of the intimation in the user's mobile.

In addition, report module is also included in Library Management System. If user's position is admin, the user is able to generate different kinds of reports like lists of students registered, list of books, issue and return reports.

All these modules are able to help librarian to manage the library with more convenience and in a more efficient way as compared to library systems which are not computerized. The retrieve of the materials is done using the dc motor controlled using the microcontroller and driver circuit.

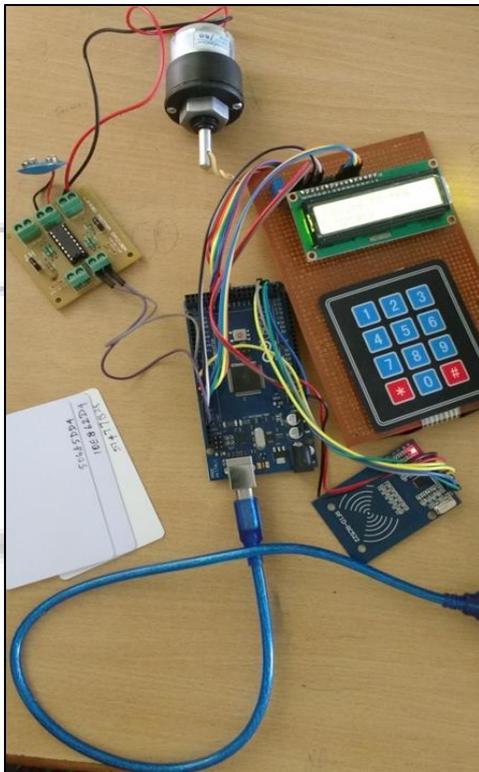


Fig. 8: Working of Hardware Setup

V. CONCLUSION

The RFID in a library management system creates an efficient service quality like book searching, issuing and returning. This paper can lead to significant saving of labor cost and constant updating of records. The initial cost of implementing the project in libraries is high but in future the maintenance and time consumption is reduced. This is applicable for small departmental library as well as vast university library.

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