Smart Id Card And Library System Using Rfid (Or) "Sicals" Using RFID

Ms.S.Subha¹ , Mr.R.G.Akshay Kumar² , Mr.S.Karthikeyan³ , Mr.S.Jagan⁴

[1.] Assistant professor, Dept. Of EIE, Sri Sairam Engineering College,Chennai-44.

[2.] Student, IV year, Dept. Of EIE, Sri Sairam Engineering College,Chennai-44.

[3.] Student, IV year, Dept. Of EIE,Sri Sairam Engineering College,Chennai-44.

[4.] Student, IV year, Dept. Of EIE, Sri Sairam Engineering College,Chennai-44.

ABSTRACT—Smart Library system is an information system that keeps records of both the library users, books in the library. The Smart Library System is designed to provide systematic approach for user to search the available booklist in library. A properly computerized Smart library will help users with quick and prompt services. In current scenario the user has to search for book from the rack in library and the user doesn't get a clear idea about the availability of the book which is a major limitation. Objective of this project is to automate the library using Arduino and RFID. This system includes a modified circular rack which works in an efficient way. It allows more than one user to access the system at the same time instantaneously. Thus proposed paper reduces the time for the client of manually searching for books and reducing the manpower in the library. This system in incorporates the feature of anti-theft detection.

I. INTRODUCTION

Library is a fast growing system and the ancient methods of maintaining it are no longer dynamic and efficient. For expeditious retrieval and dissemination of information and better service for the clientele, application of modern techniques has become absolutely indispensable. A library automation system (LAS) can be considered as an enterprise resource planning (ERP) system for a library. It is formed from a suite of integrated functions to manage a diverse range of processes within a library. These modules typically include

- Cataloguing -classifying and indexing materials.
- Acquisitions- ordering, receiving, and invoicing materials.
- Circulation -lending materials to users and receiving them back.
- Serials-tracking journal, magazine and newspaper holdings.
- OPAC (Online Public Access Catalogue)-the public interface for users.

A. PREVIOUS WORKS

The already existing library management system deals with managing the books in the library by tagging the reference numbers in the books and also by using **RFID** tags. The rfid tag based management system is quite efficient one but lags in the perception of saving time for the client or user. Already existing library system, the user does not get a clear idea about availability of books in

the library .Thus user gets frustrated if he doesn't get the book he is searching for.

The model proposed in this paper aims in reducing the time taken for user or client in searching for books. Smart library system also gives user clear information about the availability of the books in library

Figure1: Manual library system

B.PROPOSED SYSTEM
Smart ID Card and Library System helps in providing the user clear information about the availability of books in library and reduces the time taken by the user by automatically delivering the book to the user in a respective place

The Smart Library System uses arduino as microcontroller for controlling the actions of barcode scanner, stepper motor and pusher motor. In addtion to Smart Library System , we includerfid based smart id card system to acquire the user information and to moniter the people entering the library

As user enter the library he displays his card to the rfid reader. Reader detects the user card and display the information about the user on the computer screen. User then enters the information about the book in the respective column and checks for the availability of the book .If the book is not available then the monitor displays book is not available

If the book is available, Arduino sends the signal to the barcode scanner and the stepper motor. The Barcode scanner scans the barcode, which adhered to the trunk of each book and matches the barcode with the barcode of the book entered. If the match is correct, Arduino sends the signal to relay which turns on the pusher attached with barcode scanner. Pusher pushes the book into the conveyer belt and the conveyer belt delivers the book to the respective place. Thus the process saves time by delivering the book to the respective place
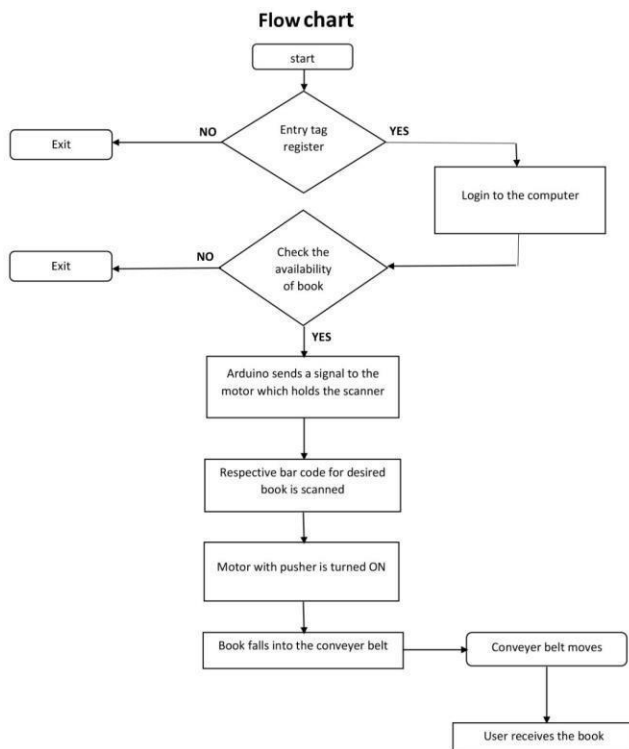
Figure2: Proposed system's flow chart

II.   BLOCK DIAGRAM

When the user enters the library, the RFID tag incorporated in the user's ID card will be detected and the details of the user is displayed in the system. If the user has already reached the limit of books then he is blocked from accessing the system but if the user is permissible to borrow the book then the name of the book should be entered, the respective barcode of the book is detected in the server and the scanning process is initiated. The barcode scanner stops on the particular place where the respective barcode is detected. The motor connected to the pusher is activated and the metal pusher will push the book into the conveyor belt placed in the centre of the rack. A signal is send to the conveyor belt motor and it gets energized. Finally the book will reach the hands of the end user. This process consists of Arduino, stepper motor, RFID module, conveyor belt, Barcode scanner and a circular rack.
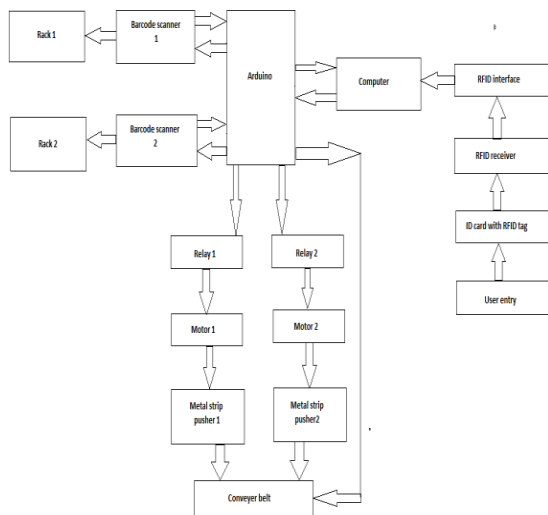
Figure3: Block Diagram

ARDUINO

Arduino is an open-source electronics platform based on easy- to-use hardware and software. Arduino boardsare able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can decide the actions of your board by sending a set of instructions to the micro controller on the board. To do so you use the Arduino programming language, and the Arduino Software (IDE). Arduino has been used in thousands of different projects and applications

RFID MODULE

It is the wireless non-contact system that uses radio frequency EM waves to transfer data from a tag attached to an object, for automatic identification and tracking. A Radio-Frequency Identification system has three parts that are –a scanning antenna ,a transceiver with a decoder to interpret the data, a transponder - the RFID tag - that has been programmed with information. The scanning antenna puts out radio-frequency signals in a relatively short range. The RF radiation provides a means of communicating with the transponder (the RFID tag) and provides the RFID tag with the energy to communicate (in the case of passive RFID tags).The scanning antennas can be permanently affixed to a surface, handheld antennas are also available. They can take whatever shape you need; for example, you could build them into a door frame to accept data from persons or objects passing through. When an RFID tag passes through the field of the scanning antenna, it detects the activation signal from the antenna. That "wakes up" the RFID chip, and it transmits the information on its microchip to be picked up by the scanning antenna. The RF low frequency range 120- 150 KHz is used for the data transmission.

BARCODE SCANNER

A barcode reader (or barcode scanner) is an electronic device that can read and output printed barcodes to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Laser scanners works by using a laser beam as the light source and typically employ either a reciprocating mirror or a rotating prism to scan the laser

beam back and forth across the bar code. In laser scanners, the light emitted by the reader is rapidly varied in brightness with a data pattern and the photo-diode receive circuitry is designed to detect only signals with the same modulated pattern. Barcode even A metal pusher is a metal strip mounted above the barcode scanner which is used to push the book into the conveyor belt. This metal strip is made of mild steel which can push higher weights and cost effective compared to the aluminium material. This metal strip is moulded in such a way that it can be fixed into the chassis above barcode scanner withstanding the movement of the scanner.

Figure4: Interfacing barcode scanner with Arduino.

CIRCULAR RACK

A circular rack is the one which contains the books itched with barcodes and its circular manner makes the process more efficient. This type of rack helps in arrangement of books in such a manner that any book in the rack pushed by the metal pusher will fall into the conveyor belt. The conveyor belt will be placed in the middle of the circular rack and collects the books pushed into it. This allows us to reduce the occupying space and increases the amount of books placed in the single row of the rack.

METAL PUSHER

A metal pusher is a metal strip mounted above the barcode scanner which is used to push the book into the conveyor belt. This metal strip is made of mild steel which can push higher weights and cost effective compared to the aluminium material. This metal strip is moulded in such a way that it can be fixed into the chassis above barcode scanner withstanding the movement of the scanner.

CONVEYOR BELT

The conveyor belt used here is a general purpose conveyor belt which is driven by motor at its one end. Belt is made of rubber sheets as used in treadmills. Motor specifications is voltage of 125DC, current of 13.8A, RPM of 2000. The conveyor belt is made of rolling rods wrapped up with the rubber sheet and the motor is fixed at its one end. The Arduino sends a signal to the conveyor belt motor after the book falls into the belt and the motor will be energized to run the conveyor belt

STEPPER MOTOR

A stepper motor is a brushless DC electric motor that divides a full rotation into a number of equal

steps. The motor's position can then be commanded to move and hold at one of these steps without any position sensor for feedback (an open-loop con- troller), as long as the motor is carefully sized to the application in respect to torque and speed. Switched reluctance motors are very large stepping motors with a reduced pole count, and gen- erally are closed-loop commutated. Stepper motor used here is of high torque which is capable of moving scanner and the pusher. This motor has a specifications, step angle of 1.8° full step and 0.9° half-step, holding torque of 2000 g-cm, voltage and current of 12v at 400 mA, insulation resistance >100 MΩ at 500VDC, shaft diameter of 0.197 in 5mm

III.   **SOFTWARE DESIGN**

EMBEDDED C software is used to program the microcontroller in the Arduino board. The embedded C code is written in the microcontroller via usb port incorporated in Arduino. This program is used to control the speed of motors used in the barcode scanner, metal pusher and conveyor belt. It also sends the activating signal to the respective devices in the desired time. The whole working process of the module depends upon the programming sequence uploaded to their respective drives.
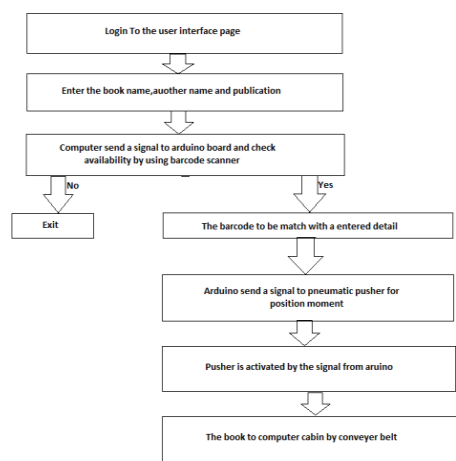
Figure5: Flow Chart

IV.   ANTI-THEFT PROTECTION

RFID EAS Gates is the anti-theft part of the Library RFID Management System using the same RFID tags embedded in the library items. Each lane is able to track items of about 1 meter and would trigger the alarm system when an un- borrowed item passed through them. The alarm will sound and lights on the gate will flash as patron passes through with the un-borrowed library material. This RFID methodology also restrict the unauthorized person to enter the library without the proper credential.

V. RESULT AND CONCLUSION

This proposed idea in library automation reduces the workload for library staff in terms of cataloging, circulation and acquisition. Improvised client services is becomes a prominent aspect of this system. This system reduces the time taken for manual searching of books and it also implements the safest and fastest library mechanism. It helps to avoid theft activities by using anti-theft detection.

VI.   FUTURE SCOPE

The above proposed idea can be implemented in a library which works based on a completely automated criteria. This allows us to reduce the gross errors caused by humans since it does not involve any amount of manual work. This model can also be installed for larger unit of library system in which it works in an efficient manner and it reduces the malignant activities acquired by the unauthorized person in the library unit.

VII.   REFERENCES

1. Library automation using RFID –optimizing libraries, transforming lending by Hamby.R
2. Karen Coyle, "Management of RFID in Libraries" , Preprint version of article published in the Journal of Academic Librarianship.
3. RFID based Library Management System by Dhana Lakshmi M, Uppalamamatha
4. 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, ISSN.
5. Baris Yuksekkaya, A.Alperkayalar,M.Bilgehan Tosun, M.Kaan Ozcan ,and aliZiya AlkarA GSM Internet and speech controlled wireless transactions on consumer electronics, Vol.52(3), pp
6. V.Sathya Narayanan , S.Gayathri, "Design of Wireless Home Automation and security system using Arduino microcontroller "
7. Armado Roy Delago , rich picking, Vic Grout, "Remote-Controlled Home Automation System with Different Networks Technologies"
8. Ouellette Robert ,Automation Impacts on Industry, Ann Arbor, MI,USA
9. E.A.Parr, Industrial control Handbook ,Industrial press
10. Justin lahart "Taking an open-source Approach to hardware "
11. "The Arduino source code" William Elliot Arduino blog.
12. RFID based Library Management System by Dhana Lakshmi M, Uppalamamatha
13. Perceptions an international Survey of library automation
14. Automation Marketplace The Rush to Innovate- Library Journal on Digitalshift

15. Wallace, Patricia M. –Library system migration
16. Tennant, Roy "Picking When to Jump, Part 2". Library Journal. Reed Business Information. Retrieved . Across the pond they use the term library management systems (LMS) for what we call the integrated library system (ILS).
17. Wallace, Patricia M. Gary M. Pitkin, ed. Library Systems Migration: An Introduction. Westport, CT: Meckler.
18. Nelson, Anne Fulcher; Nelson, William Harris Morehead. Building Electronic Commerce: With Web Database Constructions. Prentice Hall.