

# Raspberry PI based Wireless Smart Library Book Catalog System

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**Abstract**— In recent days, whenever someone wants to take a book from library he or she must go through all the books available in library related to the subject. Even if the book is not available in that library, the user will have to search the entire department. Also, the manual work done by the librarians is tedious as they must organize the books as per the department and must maintain the records to summaries the present-day library system is not efficient and need improvement with the advance technology. To solve the problem of manual work done in the present-day library system, we propose the idea of using a smart cart for accessing the library catalogue. It will automate the process of borrowing a book or issuing a book or any other literature available in library. We propose to use an intelligent system that reduces the manual work and fastens the processes in a library. Also, we can merge the data- bases of various public libraries available in a city and provide the information to the citizens so that it will be easier for them to go to only that specific library which has the book instead of browsing through all the libraries and moving from place to place.

**Key words:** Raspberry PI, Smart Library Book Catalog System

## I. INTRODUCTION

In recent days library system is based on manual work done by the librarians and other staff members. It is necessary to get rid of this tedious job and to increase the productivity of employee as well as meaningful to the users who are visiting it. So. Proposal of introducing the technology with some new advancement lead to make the automated library that will be user friendly and serve the purpose of originality to its user.

In the previous time libraries were considered as being simply a warehouse of books. The books in the libraries were kept locked in shelves and they were preserved and not issued; consequently, the chances of their loss were very rare. As the libraries now provide open access service to make the holdings available to the users, the loss, damage, and misplacement of books is inevitable. To know and replace the lost books, and to maintain balance between various subjects, and to take adequate precautionary measures, it is necessary to do periodical inventory and accounting of the library collection. The term stock verification thus came into existence with regard to libraries.

In general, there may be three types of environments for stock verification of documents in the Library: a. Manual library environments: Without the help of computers, only staff involved. b. Semi-automated library environments: Partial use of computers. c. Complete automated library environments: Full use of computers, Library Management Software, Barcode Technology, etc.

Even though the barcode technology introduced in the library stock verification reduces the time of stock verification, this process requires book scanning either using RFID or Barcode. The books need to be brought to the Scanner (Fixed at one place) for verification. For few books

it is fine to carry them till the scanner, but the task becomes tedious if a few hundred books need to be verified. This process becomes even more difficult when a few thousand books need to be verified. In an average any library of an institution will have at least a few thousand books. Stock verification of books is a regular activity, which need to be done every year. It is both time consuming and error prone. Hence it is necessary to develop a system which can save both time and efforts by smart book catalog. Thus, we propose a system which does stock verification of books using a smart book catalog attached with a barcode scanner and finger print scanner.

## A. Objective

- 1) To check the availability of book.
- 2) To check the location of the book in the library.
- 3) To issue book to student as he/she entered.
- 4) To eliminate human error in allotting spaces.
- 5) To cut the labour cost.

## II. SCOPE OF THE OBJECTIVE

Library Automation will reduce the time requirements to perform the task. Using 'Artificial Intelligence' for making more reliable cart. Integration of more libraries database is a very important parameter which can be added. Notification system can be implemented which helps the users to access the resources easily and also used for the renewal of books at the end of fixed time period

## III. LITERATURE SURVEY

### A. Review of Existing Facilities

- 1) By using computers and library management software and other automated methods.
- 2) Cost of the existing device is high.
- 3) The verifier must carry the books till the scanner as the scanner and server has wired connection.
- 4) It takes more time to read barcode from books.
- 5) Time taken by the system from verification till generation of reports is more.

### 1) Review of Existing Technology & Literature

This section provides information about existing system and its drawbacks. Libraries traditionally perform the periodic stock verification by adopting any one of the methods enumerated as follows:

- 1) By accession register.
- 2) By separate register with accession numbers in consecutive order.
- 3) By slips containing accession numbers.
- 4) By numerical counting of documents on the shelves.
- 5) By shelf-register cards or shelf-list cards.
- 6) By sample stock verification.
- 7) By making stock verification as a continuous process.
- 8) By using computers and library management software and other automated methods.

### B. Addressing These Issues

Our project minimizes human effort, human error and costs. It ensures organized allotment of books per students. It analyses stock and issued books and displays when will be the book available.

E.g. it'll display "Book will be available on 13 Nov in library." So, students don't waste their time for finding the book as time is money now a day.

### IV. BLOCK DIAGRAM

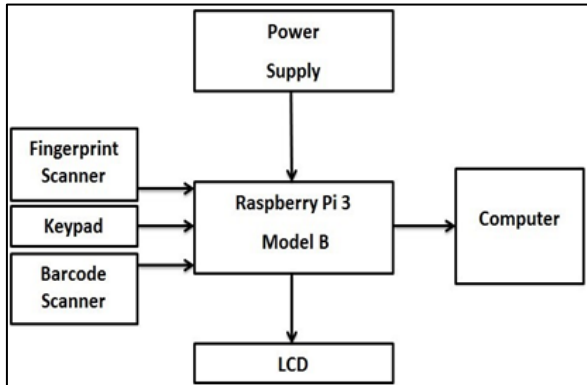


Fig.1.1 Smart Library Catalog

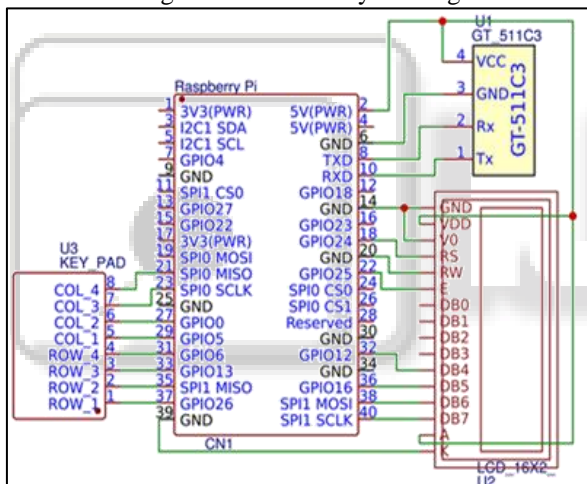


Fig.1.2 Circuit Diagram

In this block diagram smart library book catalog system. The raspberry pi 3 model B, fingerprint scanner, keypad, Barcode scanner, LCD display, power supply is used in this block diagram. Using the Fingerprint scanner, the student can scan his finger and save the database. Using the keypad, we can serialize the system. With the help of barcode scanner, the barcode of the book can be scanned, and the message is displayed on the LCD display.

The book records are saved in the raspberry pi memory. When the student scans his finger the status of the book like issued or return can be displayed on the LCD display. The student database like Name, Roll No, are saved in the system. On the fingerprint scanner student scan his finger three times and then fingerprint scanner authenticate the database. The capacity of the fingerprint scanner is two hundred fingers. If the database of the student cannot have found, then the not matching message is displayed on the LCD display. We can also enter the database with the help of keypad also. Using the VNC viewer the history of the total system can be seen. The Computer are also used for backup

purpose. The system totally works on wireless system and reduce the man power.

### V. COMPONENTS

#### A. Raspberry PI 3 Model B

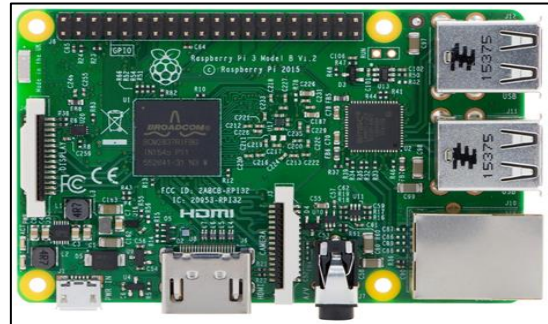


Fig. 1.3 RASPBERRY PI 3 MODEL B

The main part of this project is Raspberry pi board. It operates on Linux based open source operating system. It has two versions: WIFI operated and Ethernet operated. In this project, we are using WIFI operated version. Raspberry pi has Application specific RAM. It contains GPIO header, USB ports, HDMI port, Ethernet socket, micro USB port, camera connector, display connector and 3.5mm audio jack. As Raspberry-Pi does not contain any storage facility, it contains a micro SD card slot. Raspberry pi will control the movement of robotic arm as well as the conveying of instructions between the cart and library database. The database will indicate the present books and about their location.

#### B. Fingerprint Scanner

This device is one chip module with

- Fingerprint algorithm
- Optical sensor
- The major functions are the followings:
  - High-accuracy and high-speed fingerprint identification technology
  - Ultra-thin optical sensor
  - 1:1 verification, 1: N identification
  - Downloading fingerprint image from the device
  - Reading & writing fingerprint template(s) from/to the device
  - Simple UART & USB communication protocol
  - Storing 200 different fingerprints (GT-511C3 / GT-511C31); For GT-511C5 / GT-511C51, it can be up to 2000 different fingerprints.
  - 360-degree recognition



Fig. 1.4: Fingerprint Scanner

### C. Barcode Scanner

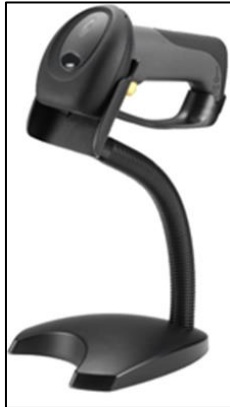


Fig. 1.5: Barcode Scanner

This scanner will automatically scan a barcode at 3 to 8 inches from the symbol when the trigger is pulled. The scanner is programmed by scanning barcodes from the manual when viewed on the screen at 200% or more magnification from the PDF. Successful scanning shall be obtained by tilting the scanner with respect to the barcode to avoid direct reflections that impair reading performance.

### VI. CONCLUSION

Test is found that this system is highly effective, and it is efficient in selecting book directly from library. This system provides fast access to register students. The need of an operator is reduced with this project. This project also gives attention to the concept of self service. Faster input can mean better service. The sole aim of this project is to make the process of book issuing more interesting and secure. This also facilitates the student to maintain the record as per the requirements.

### REFERENCES

- [1] Po-Sheng Chiu, Ying-Hung Pu, Tzung-Shi Chen, Yen-Hung Kuo, "Design and Development of a Mobile Library APP System", 2014 International Conference of Educational Innovation through Technology
- [2] Meera Newmon, Dr. Vandana Sengar, " Engineering College Library", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 6, June 2013
- [3] Felcy Lewis, T.Y. Mallaiah, St. Joseph Engineering College, "Use of information resources in engineering college libraries: A comparative study", Annals of library and information studies, Vol.61, June 2014, pp.142-152.
- [4] Chinna Balu, C. and Reddy, Dr. V. Pulla, "A Survey of Engineering College Libraries in Sri Venkateswara University Area, Andhra Pradesh, India" (2011). Library Philosophy and Practice (e-journal). Paper 672.
- [5] Qiuyu Huang, " Mobile Services in University Libraries in China", Library of Huzhou Teachers College Huzhou, China