

## Smart Library using QR Code

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### ABSTRACT

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Library management system from ancient age one of the research area and bar codes are extensively used in most of the modern library management system. This Research project is aimed to develop smart library management system using QR code. QR codes are two dimensional matrix barcodes. QR codes can be widely used in both commercial and institutions with the increased use of smart phones, as smart mobile phones can scan the sensible data. Use of QR code in Library management system is very easy but still in primary stage. Library should try to keep up with digital world with various technologies in this modern age. The importance of library system is because these systems are used as primary resource of information by many peoples. Most of the libraries currently working with large number of persons for daily activities and supervision. QR code based Library management system is very efficient and reliable for Librarian, staff and students. This system will simplify library processes to keep track of all records, and make library more directly accessible to its users. The main focus behind library management using QR code is to upgrade the existing library, make it more appealing to the new generation increase productivity and make uses of available technology to speed up the processes in library. Maintain records in an organized manner. QR code can facilitate this and increase the flow of students and their retention in library.

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### I. INTRODUCTION

A library is a place where wide variety of books are available. The purpose of library is to provide all kinds of books and required material in one place. Librarian issues the required book to the student of

academic institute. Traditional Library Management is time consuming, laborious and having low book circulation rate. To overcome these problems, we have designed a smart library system using QR Code. Once all data is registered with this system, each student and staff will have a QR code scanner

application in mobile to search the information of books. Similar kind of application is with librarian having data of all students, staff and books. Students or staff can themselves scan the data in the system and get the information of the required books. Librarian only needs to scan the ID card of the student or staff and QR code of the book to be issued. Thus the process of issuing has become efficient and less time consuming. The work of a librarian is also reduced which in turn increase the efficiency and circulation rate of books

## II. BACKGROUND STUDY

### A. QR Code

QR code stands for Quick Response code. It is a two-dimensional bar code and can easily read by QR code reader software. It was first introduced in the year 1994 by the Denson Wave- Toyota Motors subsidiary. QR code can be read through device which has the QR code reader facilities like the mobile phones. QR codes represent text that is then used by the mobile device for performing an action. Codes can be created to link directly to a URL, create a vCard (saved to the mobile device) or initiate a phone call, text or e-mail, among other functions (Whitchurch 2011). QR codes have some data limits up to Max. 7,089 Numeric character, Alphanumeric Max. 4296 character and Binary (8 bits) Max. 2953.

### B. Functioning of QR Code

A QR code is a two-way dimensional square-shaped barcodes that comprise many black square dots on a white setting. There are mainly four kinds of data such as numeric, alphanumeric, byte or binary and Kanji which are encoded into information or through supported extensions. The processor locates the three distinctive squares at the corners of the image, and normalises image size, orientation, and angle of viewing, with the aid of a smaller square near the fourth corner. The small dots are then converted into

binary numbers and the validity is checked with an error-correcting code (Wave 2011).



Fig. 1: QR code Bitmap

### C. Android Application

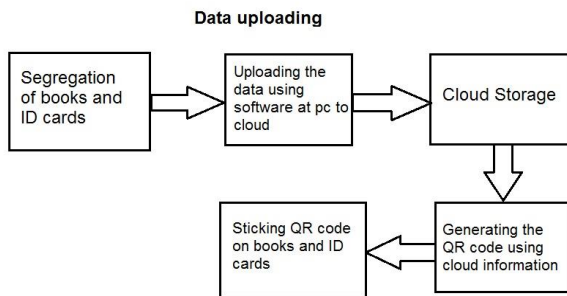
Android applications are written in Java programming language. However, it is important to remember that they are not executed using the standard Java Virtual Machine (JVM). Instead, Google has created a custom VM called Dalvik which is responsible for converting and executing Java byte code. All custom Java classes must be converted (this is done automatically but can also be done manually) into a Dalvik compatible instruction set before being executed into an Android operating system. Dalvik VM takes the generated Java class files and combines them into one or more Dalvik Executable (.dex) files. It reuses duplicate information from multiple class files, effectively reducing the space requirement (uncompressed) by half from a traditional .jar file. Dalvik was created to support the nature of lightweight mobile operating Systems require because of the limited hardware capabilities Compared to conventional desktops or laptops.

## III. PROPOSED SYSTEM

### A. Data Acquisition

In this data of the book is acquired from all the means and feedback of experts from that particular field is taken and a remark is added for the books. The data of students is also filled in the system from there ID

cards which will also be automated entered into the system using QR code. This data is manually uploaded in the database and server will have the information as shown in the diagram.

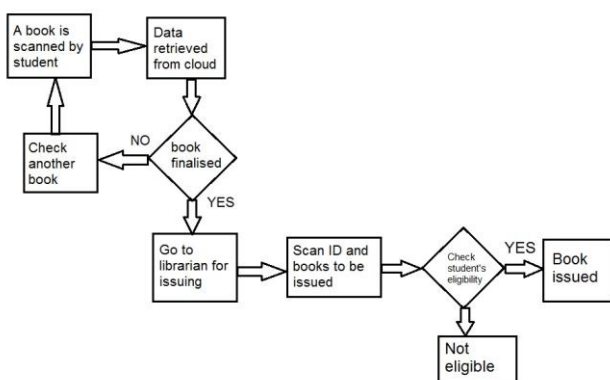


**Fig.2 : Data acquisition Block Diagram**

After that we have to generate QR codes with the information using the standard available sites which uses images, text, URL's and the whole PDF itself. This generated QR codes are stick along the books and ID cards for further steps or the procedure for issuing books and for students to analyze a particular book

### B. Procedure of book issue

The system employs two-tier architecture where data access code is separated from presentation tier, offering web interface to an end user.



**Fig.3 : Proposed System algorithm**

It started with the initialization of a student selecting a particular book to be issued. This is

scanned using the application in his mobile which features the scanning of a QR code option. Thus providing him with the required information of the book like branch, detail and recommendation for this all information is revived by an expert for that book. Now this process is repeated for all the books the student wants to get and he finalizes with those which he wanted.

Next it moves to the side of the issuing authority i.e. librarian. He is in charge of issuing. Same procedure is followed here of scanning but it starts with the ID card. The ID details are provided to him by the cloud. Then it is checked for the eligibility of the student whether he can be issued with the books.

If all the parameters are met, we move towards scanning of the books using the application with the librarian. Then the students' data is matched with the book details and is issued to the student.

## IV. CONCLUSION

With the increase use of mobile technology, we have implement mobile based QR code technology to connect user community with information resources. This technology reflects greater impact on academic community. Although the future of QR codes is not clear right now, QR codes will not replace any technology however efficient uses of these QR codes can enhance the user experience at large and alter how s/he interacts with the academic libraries, the librarians and the library collection.

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