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Automated Library Data Tracking System By Smartphone

A.P. Khan[1*], Y.B. Patil[2], P.R. Patil[3], M.S. Nagarale[4], R.V. Patil[5]

[1]Department of Computer and IT, University of North Maharashtra University, Jalgaon, India
[2]Department of Computer and IT, University of North Maharashtra University, Jalgaon, India
[3]Department of Computer and IT, University of North Maharashtra University, Jalgaon, India
[4]Department of Computer and IT, University of North Maharashtra University, Jalgaon, India
[5]Department of Computer and IT, University of North Maharashtra University, Jalgaon, India

[*]*Corresponding Author: yogeshpatilinfo786@gmail.com, Tel.: +91 8605186007*

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***Abstract*—** Automated Library data tracking system by smartphone is the android based application containing the facility for the student and the staff of the library to track and transact the book and library system. These application has the functionality to register the student on the library database according the branch and enrolment number. In this system the student can make the book issue and return easily by using the QR code. Each and every student has the unique QR code instead of paper ID card. The book also has the QR code by scanning these QR codes the librarian can issue or return the book. Application also has the facility for student to search for the book availability and college department information with teacher information. The staff can also use the application to track the book data and make the entry for new books to the library. And can also make the entry for the college department staff. All the information about the staff, student and book transaction is stored and managed by the centralized database over the internet. All the system is fully online. The website middle ware is also designed to handle and manage all request by the staff, student and book by the admin.

***Keywords*—**QR Code, Centralised Database, Android Application, Library Automation.

I. INTRODUCTION

The source of knowledge in an Institution is Library. Library provides resources like books, journals, CDs etc. to support learning of student. There are different actions done by the Librarian such as adding new student, book data, date of issuing books, entering details of all relevant information about books, etc. For this the student has to wait for his/her turn as Librarian enters data student by student. It is very time consuming process. It is worthwhile to take advantage of the technology to support so as to improve Library services. As information changes according to time, it becomes difficult task for the Librarian to go hand in hand with the dynamic data. The basic objective of Library data tracking system is to manage the entire transactions of the Library. The software keeps the track of all the information about the books in library, their cost, their complete details and total number of books available in Library and as well as keeps the complete details of the registered members [6].

II. PROBLEM DEFINITION

Library systems are implemented manually which is very costly, time consuming and tedious. Academic libraries in engineering institutions are prominent information organizations and play a crucial role in fulfilling the needs of the pedagogy. A college strength its educational level through the advancement of its library. Teachers, laboratories and libraries are important components in imparting effective engineering education to them. The aim of an engineering college library is to facilitate the engineering professionals in enhancing and updating their knowledge and skills, and to provide them information regarding new innovations, views, theories, engineering education, and research. This will in turn enhance the quality of teaching and up gradation of student's results. The primary role of engineering college library is to collect and organize recorded information in engineering and allied subjects to meet the needs of users. Information and Communication Technologies are increasingly used to collect, store, retrieve and promulgate a great amount of information to help engineering professionals. Information Technology has a profound

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impact on library operations, Information resources, services, staff skills development requirements and users'.

III. PROPOSED METHODOLOGY

- Basic structure of librarian & student where librarian is directly connected to database server student have their android phone an which library application is installed through which they interact with book database without going into library to find book in book shell it avoid time wastage of student for searching of book in librarian, minimize work load of librarian.
- Library Automation system allow student as well as college staff to access library activity via android application.
- This system is automation, it minimize work load of librarian, and it assigns books to student without involvement of librarian.
- Student need not to wait for his / her turn for issuing books.

IV. SYSTEM ARCHITECTURE

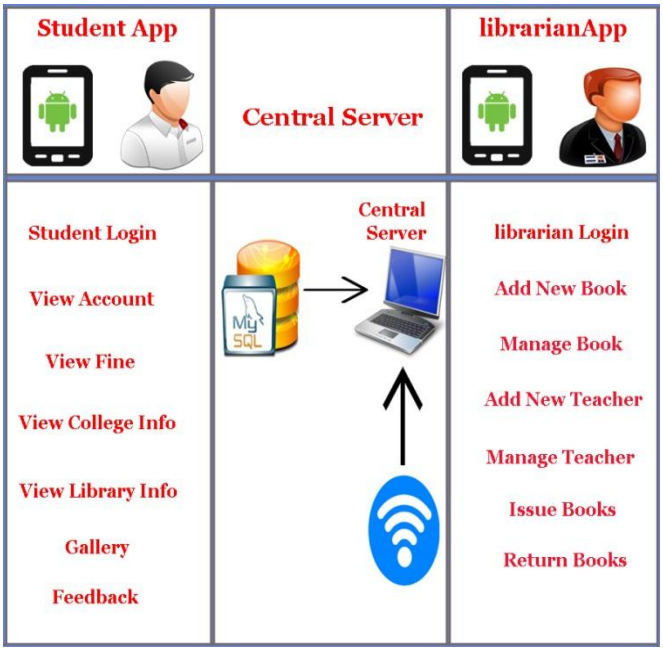

Figure 1. System Architecture

Module Description:

Android Application:

The Mobile software application developed for use on devices powered by Google's Android platform. Android apps are available in the Google Play Store (formerly known as the Android Market), in the Amazon Appstore and on various Android App-focused sites, and the apps can run on Android Smartphone's, tablets, TV and other devices. Android apps are written in the Java programming language and use Java core libraries. They are first compiled to Dalvik executable to run on the Dalvik virtual machine, which is a virtual machine specially designed for mobile devices. Developers may download the Android software development kit (SDK) from the Android website. The SDK includes tools, sample code and relevant documents for creating Android apps [5].

Librarian Module:

Librarian registered all student and staff and confirm login status. Main activity of librarian is to keep the database up to date. Like if any news available in library, librarian should notify all students about this so that student can able to issue it. Beside registration of students and college staff, librarian also registers about book [6].

Student Module:

Student register can request for librarian. Student will be able to login through their android mobile phones. Student can send a request for issuing book. Each student can request / issue two books at a time. Student also view the college and staff information then also view book information and find the particular book information [6].

Central Server Module:

The Library Database contains all the necessary information about student, book, and college staff. Application retrieves information stored in the library database through the library server. All the registered student / staff information should be present in database. Registered student are given login status via which they can login through android application to view database. Book database contain information such as its book id, title of the book, author, category, publisher, year of publication, availability of book in library, etc. Just like book database. Student database include student registered ID, name of student, department, current class year ,semester ,gender, email ID, mobile number, date of birth, address, etc.
If new book is available in library, then librarian send the notification message to all the student and staff. Each student gets the notification about their last date of book return [6].

V. TECHNOLOGY USED

1. Volley

Volley is an HTTP library developed by Google to ease networking tasks in Android Applications. Volley supersedes

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Java's java.net.HttpURLConnection class and Apache's org.apache.http.client in handling network requests. Volley can handle almost each and everything you will need to do over the network, it handles HTTP request and also manages the async tasks that you need to use while working with canonical networking classes [4].

Features of Android Volley Library:-

- Volley manages network request automatically and without you using any AsyncTask. It offers multiple concurrent network connections, resulting in faster and efficient network operations.
- Volley caches all network requests, utilizing the previous results in the case of change in activity configuration. However due to the same reason, it is only good for small Volley and not suitable for large download or streaming operations.
- It has a powerful cancellation API. You can fully control the request cancellation, or you can set blocks or scopes of requests to cancel.
- Volley allows you to control and order the network requests making it easy to populate UI elements in an orderly manner, useful in case of social networking apps like facebook, twitter. It also provides support for request prioritization.
- Volley has built in debugging and tracing tools which allow user to get to the root of the error.

2. QR Code

QR Codes technology is easily accessible:

– What makes QR Codes especially attractive for marketing is their low cost and universal applicability. Targeted to mobile users, QR Codes help to reach your audience at any time and place. Apart from a smartphone, no special equipment is required, and there are no intermediaries between you and the user [3].

QR Codes are there to stay

– Today the world counts about 1.76 billion smartphone users with an incredible 2.73 billion to be expected by 2018. This massive distribution of mobile devices (and thus potential QR Code readers) requires a stronger consideration of the mobile channel. If you have been ignoring mobile marketing until now, there has never been a better time to start benefiting from the mobile channels' wide range and advantages [3].

Versatile areas of application

– Since QR Codes provide a direct link in the online world, this produces countless possibilities to engage users in a positive way. From simple information, such as contact details, event dates and product descriptions, to special promotions, such as sweepstakes, coupons and voting - you can offer your customers virtually anything you can display in a Web browser. All of this with a single scans [3].

VI. REQUIREMENT ANALYSIS

Requirement analysis bridges the gap between system engineering and software analysis design. Software requirement analysis involves requirement collection, classification, structuring, prioritizing and validation. Requirement analysis consists of user requirements Analysis is concerned with understanding and modelling the application and domain within which it operates. The initial input to the analysis phase is problem statement, which describes the problem to be solved, and provides a conceptual view of the proposed system.

Functional Requirements:-

Functional requirements for the system describe the functionality or services that should be provided by system functions in detail, its input and output expectation.

Normal Requirements:-

N1. Student Registration
N2. Book Registration
N3. Calculate fine
N4. Check the availability of books

Expected Requirements:-

Exp1. College information of Student
Exp2. Details the Book
Exp3. Days wise calculation
Exp4. All the students must be registered.

Exciting Requirements

Ex1. If date will goes above 7 days, an message will automatically sent to student.
Ex2. In case of network failure the system can switch to offline mode. After connection recovery, the data is send to server.

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Non-Functional Requirements:-

This section describes constraints on the system under development such as Usability, Portability etc. In our project following is considered.

VII. EXPECTED RESULT

The main aim of this project is to design an application and interface which will work as a User's accessible to all.

- In the future, a facility of teacher's login where teachers can add lectures notes and also give necessary suggestion to library and also add info about workshops or events happening in our college or nearby college in the online notice board.

VIII. CONCLUSION

This library system aims to reduce the complexity of library staff as well as students and faculty members. It makes entire process online where student can search books, staff can generate book QR code and do book transaction it also has a facility for student where student can see status of books issue as well request for book or give some suggestions. This is the unique and simple approach to maintain each and every transaction properly. By which feedback module, students and faculty members can give important suggestions to librarian. This system provides security in all approaches. Only registered students and faculty members can access this system. The most important part of this system is it will show the availability of books by the book name or author name. The librarian will manage the complete system through website. This application provides an android version of library system which will benefit the students as well as the staff of the library.

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