

Android Application for WIFI Based Library Book Locator

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Abstract - Android is a significant technology which is the base of the library book locator. The proposed system abstracts the complexity of the manual work of going through each shelf to find the book. It connects to the local sever present in the library through WIFI access points. It exchanges information with the server and does the work for the user. It provides the user with the precise location along with the path that lead the leads to the book. System also allows to check the status of multiple books in the library.

Key Words: Android, WIFI, Library, Navigation, Location.

1. INTRODUCTION

Library the eldest Structure is behind in the terms of technological advancements. There are an estimated 116,867 libraries of all kinds in the United States today. Over 70,000 public libraries in the country. The management of the large Library lacks perfection. If the Library is large the management becomes more difficult and complex. It also lacks the customer friendly-ness for the users of library. Even though the books in the library are efficiently managed and categorized in to area using man power. But for locating a book in library the client must first know the area categorization. This sortable list of largest libraries includes libraries that, as measured in 2008 or after, store 15 million or more items. For a first-time or non-frequent client this is much difficult. Thus, there is a need of such a technology which can efficiently manage the information in library. It should be user-friendly and should give tracking. In present day Library the information of the entire library is present on the database servers. This information can be accessed only from the interfaces present inside the library. Considering the scale of library, the user interface lacks mobility and real-time updates. Even though a user could use the information through it and could find location of the book easily. Still the possibility that the book may or may not be present in the library, as another user can take the book before this user. The maps indicating the structure are quite confusing if the library is large So, the user may lose the track of the path and end up running in loops until he can again get hold of the map or a staff of the library.

Considering all the above scenario, focus is given to develop a compressive and efficient system. This system includes feature to find location and track a book, management of the resources of the library and real-time update of information. As the main issue of the library are the funds our system is low-cost. For purpose of mobility our system supports on

serve-based android application. It provides interface for library staff and the common user. The common user can easily get the information from the android application interface. The user can use the tracking system to locate the book and real-time updates for it. QR technology is used for indoor positioning which keeps the system low cost and reliable.

2. SYSTEM DESCRIPTION

2.1 System Architecture

To realize the system, it is fabricated in such a manner that it is easy to develop and maintain. It is divided in to Three Tier Architecture i.e. Database layer, Application layer and Network layer. The main component of this system is Network Layer. It acts as a connector medium between Database layer and Application layer. In the Network layer there are Wi-Fi devices which lets the user to connect to network or disconnect. Database layer store the entire data about the items in the library and its users. At the application layer there are Navigator, Database Handler, and Presentation Manager. Navigator handles the locating and tracking of the user. It responds to Realtime updates. Database Handler handles the flow of information to-and-fro from the Database server. It is responsible for Realtime update of data.

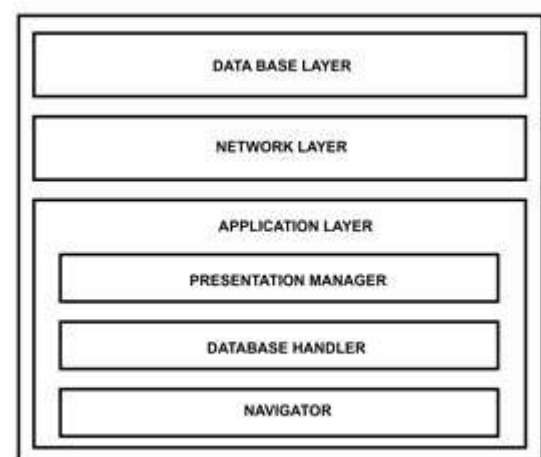


Fig -1: System Architect

2.2 System Design

The design idea of the "WBL" application is as follows. Through the Authentication, the Android user sends a

request to the server. The server will parse the request to identify the type of the request. The types of the request can be getting data or update data. Depending on the user permission the request will be executed, and the response will be delivered back. A common user will first request the data of obtainable books in library. The application requests the user location by letting the user scan the nearest QR code. The application lets the user to choose from available books to get the direction or route to the books location or user can view the details of the book. After locating the book physically user can choose to register the book through the application. For locating a book, the general procedure that application follow is to let user select the book then get the users location after that get the books location and design the quickest route.

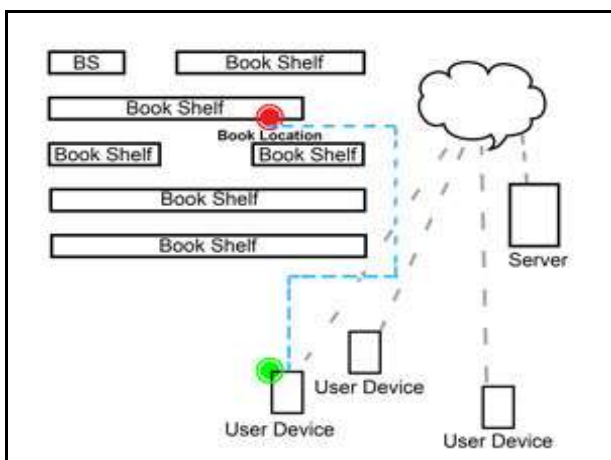


Fig -2: System Design

2.3 Hardware Environment

To implement the software, the following material are used.

1. Smartphones.
2. A server.
3. Wi-fi routers.
4. QR codes.

2.4 Software Environment

Programming Languages in which the system is developed are Java and PHP. Java is used in android application to develop activities and class modules. Php is used to develop server-side scripts for communicating with the server.

Programming tools used are Eclipse and Android Studio. Both tools provide debugging, creating APK, deploying android application to smartphone or virtual machine.

Database Server management is done using PhpMyAdmin which provides graphical user interface for editing and updating the database.

Web Server is based on Apache Server which is an open source server operating system. Using Apache hosting of HTTP is enabled for our system.

3. SYSTEM IMPLEMENTATION

When the user first opens the application, it establishes a connection with the server and fetches the list of books recorded in the library. User can either select a book to see the details or Add the book to watch-list for checking the availability. Fig-3 shows the first screen that is shown to the user.

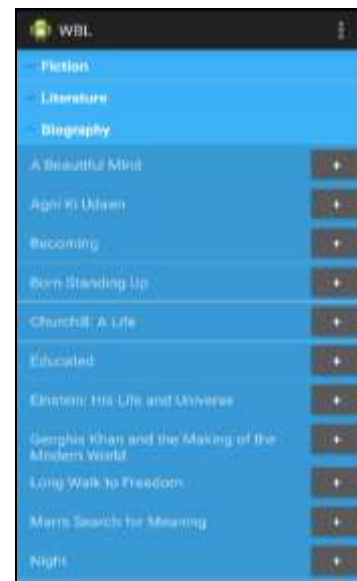


Fig -3: Main User Interface

When a user selects a book from the list displayed on the screen the application shows the display of that book to the user. Fig-4 shows the screen displayed to the user

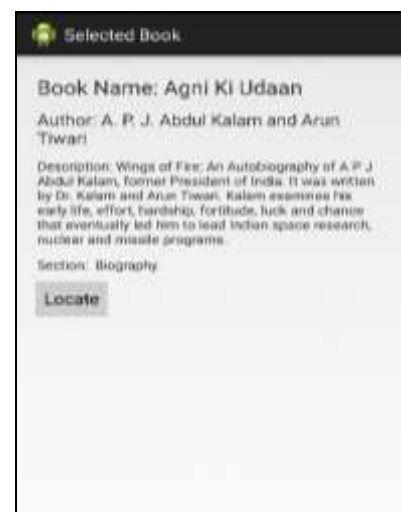


Fig -4: Book Details Interface

When the user presses the Locate button shown on the GUI the path is calculated and then displayed to the user. Fig-5 shows the Navigation interface displayed to the user.



Fig -5: Navigation Interface

All the books added to the watch-list are shown on separate screen. The live updates about the availability of the book is displayed on the interface.



Fig -6: Watch List Interface

4. EVALUATION AND RESULT

1. The Software performance tested on Redmi Note 5 pro resulted in smooth error free.
2. The UI performs smoothly.
3. For loading 250 records at a time the server takes 3 seconds.

4. The output of the data is feasible for user's task.
5. Save the user efforts and time.
6. The system can be easily migrated and used for location and tracking for structures like malls or supermarkets.

5. CONCLUSION

In general, on a global level the need for tracking and locating the book has become essential. Using a modern-day technology, solution to this necessity and ease to user can be provided. The android platform makes the system portable and readily available. It reduces the efforts of the user and the library's staff.

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