Library Augmented Reality Using Optical Character Recognition

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Abstract- *Mobile Augmented reality has fuelled up the recent technological advances of smart phones technology.There are many areas in which mobile augmented reality is being used such as Navigation, Military, Gaming, Entertainment, library management etc. Augmented Reality is an emerging technology of virtual reality, involves knowledge about sensors, image recognition, computer vision, human-computer interaction , virtual reality, and many other areas.The key technologies include displaying , registration and tracking , interactive etc. The current world of augmented reality in library management are lacking in context-awareness. Hence in this paper, we planned to focus on one of the major issue of automating library application with the augmented reality software and we propose architecture for accessing the library books index data fetched from the unique visual code maker attached to each library book spine.Thus ,simplifying the task of searching for a book and determine the proximity to desired book. This implementation shows mobile augmented reality is a promising tool for library management.*

I. INTRODUCTION

A library is a building or room containing collections of books, periodicals , and sometimes films and recorded music for use or borrowing by the public or the , members of an institution. In an institution a library basically consist of many books as required by the students as well staff members can have access to the book and even have the option of issuing a book. Many times ,the students or staff face the problem of unavailability of books. As many people may want a particular book at the same time , sometimes books may not be available in the library. Our proposed system tries to resolve this issue.

In our proposed system, the user will capture the image of the books, the captured words will then be sent to server-side for processing from where the entire book name along with detailed chapter and additional references for each chapter will be provided as per the rating given by various users. The concepts useful in developing our application are Optical Character Recognition and Client/Server Communication. In our system , the printed text of the book will be taken as an image and then OCR will be applied on the text.

1. SYSTEM OVERVIEW

This application is android based.We use eclipse software for developing the interface of the application.We use PHP in the server side and SQL in the database side. The mobile device and the server should be connected to the same wireless network. If the mobile device and server fail to connect to the same wireless network then the login and registration will not be possible since the mobile device cannot access the database so neither login will be possible nor registration. Demand for data through selection of image is transferred from the client to the retrieval of data from the database Technologies like this function as the motivation for us to further study on designing an application for library automation to meet the issues related to referring books in a library .

2. MOTIVATION

Library administration is a complex task. It involves storing and maintaining databases , transaction and many more such tasks. Finding out the location of book among these tasks in definitely quite challenging. The databases only stores the logical location of book in the sense that it stores its book id and shelf or rack number as its identify element. But finding out the physical location is up to the user. User has to go through each shelf to get the required book. This way of books tracking is of course time consuming.

3. PROBLEM STATEMENT

Rare books and manuscripts in every library are among the most valuable and priceless collections, because they represent the heritage of the nation. On the other hand , due to the fact that these books are used as references for various fields of study , there are normally , numerous requests by researchers and students. Therefore, the more number of requests by researchers and students , greater the tendency and the eventuality for these books and manuscripts to get spoil and damaged. The rare books and manuscripts are not only old

but every valuable for both the libraries. For both these libraries , users may sometimes not be allowed to borrow or access certain special times .This because the rare books and manuscripts are hand written in materials that are sensitive and can be easily damaged and tarnished . Due to the fact that these documents are rare and valuable they must be kept in safety for generations to come , the researchers need special permission to access these books.

II. LITERATURE SURVEY

Di Capuaetal have proposed a business advancement show for the AR improvement and human-PC connection through cell phones. Jong-Chih Chien et.al have expanded the ARToolkit demonstrate into the internet so that the "Brisk Response"(QR) standardized tags can be caught utilizing the cell phones and can be sent through the internet. Accordingly the examination of QR code can be done in remote which is decoupled from shrewd gadget analysis. This model can be effortlessly stretched out for any sorts of pictures. This model can be summed up as picture catching , exchanging date to the remote server and examination and show .

III. EXISTING SYSTEM

File always lost because of human environment. Sometimes due to some human error there may be a loss of records. File is always lost due to some accident like spilling of water by some member on file accidentally. Besides some natural disaster like floods or fires may also damage the files. Difficult to search record when there is no android app there is always a difficulty in searching of records if the records are large in number.

IV. PROPOSED SYSTEM

In our proposed system user takes the image of the book cover then uploads the image to the server. Server does the OCR detection after that data will be converted into OCR text and retrieved are stored as temporary variable. Initially, user takes the image of the book covers then that image will automatically uploaded to the server. The server does the OCR (optical character recognition) detection. After detection, data will be converted into OCR text and retrieved are stored as a temporary variable. These data is compared with the list of books present in the database. Then similar or exact books or data details send by the server, will be displayed on the user's android phone. Now, the procedure of OCR detection, mainly it converts the image into text. When the word is detected, but the sentence is not in the proper format then we perform stemming on data from database data from OCR text. And later on, these data is matched with the database present on the server. If the matched value returns true, we append the book details in a variable and so on. At the end, the final string which we will get from the database is send back to the android application present on the user's android phone. The android reads the response, and breaks the string in proper format and displays in the GUI on the android side.

V. TECHNOLOGIES

1. Android -

Android is a complete operating environment based upon the Linux kernel. Initially, the deployment target for Android was the mobile-phone arena, including smart phones and lower-cost flip-phone devices. However, Android's full range of computing services and rich functional support has the potential to extend beyond the mobile-phone market. Android can be useful for other platforms and applications.

Android is the world's most popular operating system for mobile devices and tablets. It is an open source operating system, created by Google, and available to all kinds of developers with various expertise levels, ranging from rookie to professional.

From a developer's perspective, Android is a Linux-based operating system for Smartphone and tablets. It includes a touch screen user interface, widgets, camera, network data monitoring and all the other features that enable a cell phone to be called a Smartphone. Android is a platform that supports various applications, available through the Android Play Store. The Android platform also allows end users to develop, install and use their own applications on top of the Android framework. The Android framework is licensed under the Apache License, with Android application developers holding the right to distribute their applications under their customized license.

Table 1.

Version No.	Name	For:
1.0	Android Beta	Phone
1.1	Android	Phone
1.5	Cupcake	Phone
1.6	Donut	Phone
2.0/2.1	Éclair	Phone
2.2.x	Froyo	Phone
2.3.x	Gingerbread	Phone
3.x	Honeycomb	Tablet

4.0.x	Ice Cream Sandwich	Phone and Tablet
4.1/4.2	Jelly Bean	Phone and Tablet

The Android platform

With Android's breadth of capabilities, it would be easy to confuse it with a desktop operating system. Android is a layered environment built upon a foundation of the Linux kernel, and it includes rich functions. The UI subsystem includes:

- Windows
- Views
- Widgets for displaying common elements such as edit boxes, lists, and drop-down lists

Android includes an embeddable browser built upon Web Kit, the same open source browser engine powering the iPhone's Mobile Safari browser.

Android boasts a healthy array of connectivity options, including Wi-Fi, Bluetooth, and wireless data over a cellular connection (for example, GPRS, EDGE, and 3G). A popular technique in Android applications is to link to Google Maps to display an address directly within an application. Support for location-based services (such as GPS) and accelero meters is also available in the Android software stack, though not all Android devices are equipped with the required hardware. There is also camera support.

Historically, two areas where mobile applications have struggled to keep pace with their desktop counterparts are graphics/media, and data storage methods. Android addresses the graphics challenge with built-in support for 2-D and 3-D graphics, including the OpenGL library. The data-storage burden is eased because the Android platform includes the popular open source SQLite database. Figure 1 shows a simplified view of the Android software layers.

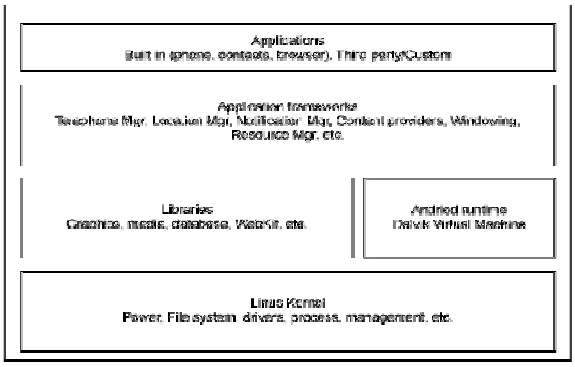

Figure 1. Android software layers

Android architecture –

As mentioned, Android runs atop a Linux kernel. Android applications are written in the Java programming language, and they run within a virtual machine (VM). It's important to note that the VM is not a JVM as you might expect, but is the Dalvik Virtual Machine, an open source technology. Each Android application runs within an instance of the Dalvik VM, which in turn resides within a Linux-kernel managed process, as shown below.

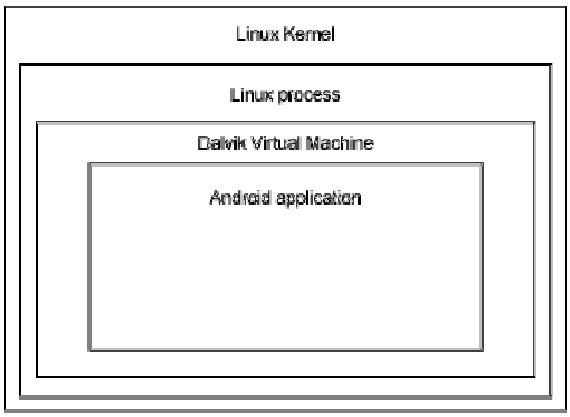

Figure 2. Dalvik Virtual Machine

VI. REQUIREMENT SPECIFICATION

1. Software Requirement -

1) Android Smart phone with built in GPS and Android OS
2) Android Software Development Kit (SDK).
3) Eclipse using Android Development Toolkit (ADT).
4) Jdk 1.6/1.7
5) Php MySql

Backend :

Database: MySql 5.5
Cloud: Microsoft Azure Cloud
Operating System: Windows XP or later versions or any Open source OS.

2. Hardware Requirement -

RAM: 128Mb SD RAM
Processor: Intel IV, 1.13GHz
Mouse: 2-Buttoned mouse
Hard Drive: 40GB HDD

VII. SYSTEM ARCHITECTURE

In this architecture we used advanced technology of OCR and knowledge about the real world in order to make digital interactivity in more efficient way. The system architecture is divided into two parts that is the user and application. The user end performs only three steps that is the authentication, the image selection and the books selection.The application end performs four steps that is the authentication, OCR analysis, searching book and displaying the book summary.

The user interacts with the application and checks the authenticity as shown in Fig.1. Authenticity is checked from both user end and application end whether the user is a valid user or not. If the user is valid then the required user details are stored in the database. The user captures the image and the application performs OCR function on the image. The application then converts the image into characters and these characters are searched in the database. If available then the book details are displayed and we can view contents of the book.

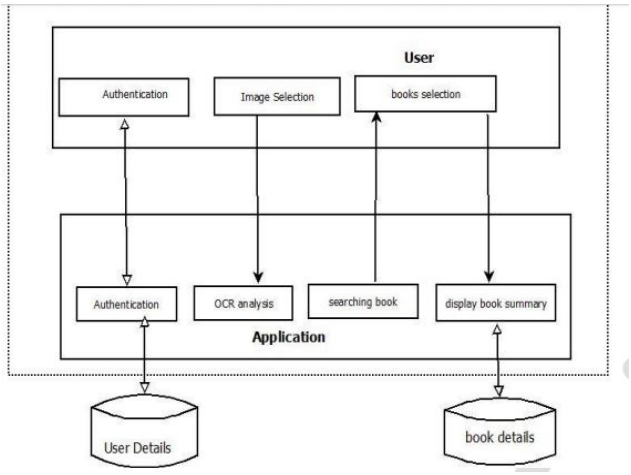

Figure 3. System Architecture

VIII. CONLUSION

In this paper, we have implemented the architecture of library architecture using the concept of augmented reality. To implement this application study has been made in different areas like the OCR, image processing, tools used for implementing an android application etc. To convert the image into text an optical recognition engine called as the tesseract is used.

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