

Image Framework For Library Application

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Abstract— The Augmented Reality is an emerging and booming technology of Virtual Reality, which has a vast application scope. Augmented Reality involves knowledge about sensors, image recognition, computer vision, human-computer interaction, virtual reality, and many other areas [11].

Some of its major applications are displaying, registration and tracking, interactive etc. Most of the applications are able to obtain information from different servers pertaining to the environment and traffic etc. But the software which deal with students' issues are very few. Hence, we planned to focus on one of the major issue of automating Library application with the augmented reality software so as to access the library books meta-data [11].

The application will be such designed that when the user captures the image of any book in the library he/she will have the entire book in his android phone along with the extra references for each chapter/topic department.

Index Terms—Augmented Reality, Client Server Communication, Image, Optical Character Recognition, SaaS, Tesseract.

1 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 consists of many books as required by the students of the institute where-in students as well staff members can have access to the book and even have the option of issuing a book. Many a 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 the books may not be available in 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 the 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.

Concept of Optical Character Recognition (OCR):

Optical Character Recognition is a process of recognition of different characters (printed or handwritten) from a digital image of documents. It is widely used as a form of data entry from printed paper data records, whether passport documents, invoices, bank statements, computerized receipts, business cards, mail, printouts of static-data, or any suitable documentation. It is a common method of digitizing printed texts so that it can be electronically edited, searched, stored more compactly, displayed on-line, and used in machine processes such as machine translation, text-to-speech, key data and text mining. OCR is a field of research in pattern recognition, artificial intelligence and computer vision. In our system, the printed text of the book will be taken as an image and then OCR will be applied on that text.

Client/Server Communication:

At a basic level, network based systems consist of a server, client, and a media for communication. A client is a piece of computer hardware or software that accesses a service made available by a server. The server is often (but not always) on

another computer system, in which case the client accesses the service by way of a network.

A server is both a running instance of some software that is capable of accepting requests from clients, and the computer that executes such software. Generally, programs running on client machine make requests to server machines. They involve networking services provided by the transport layer, which is part of the Internet software stack, called TCP/IP stack.

The transport layer has two protocols under it i.e. TCP (Transport Control Protocol) and UDP (User Datagram Protocol).

In this application, two technologies are going to be used i.e. SaaS" and "Augmented Reality".

"SaaS", is a term used for both Software as a Service and Storage as a Service. Software as a Service is a software delivery method that provides access to software and its functions remotely as a Web-based service [11]. Storage as a Service is used to express a storage model where a business or organization rents or leases storage space from a third-party provider [11]. Data is transferred from the client to the service provider via the Internet and the client would then access their stored data using software provided by the storage provider.

Augmented Reality (AR) is a comprehensive technology allowing for a digitally intensified view of the real world, connecting people with more relevant content in life. Michael Berger in his article states that augmented reality will become a more integrated part of our lives [12]. An augmented reality system creates a view which is a combination of the view which is seen by the user and a virtual scene generated by the computer. The virtual scene generated by a computer is designed to enhance the user's sensory perception of the virtual world they are seeing or interacting with. Nowadays, Augmented Reality is being used in various fields such as entertainment, engineering design, robotics, other industries related to storage, such as data backups and data transfers.

2 LITERATURE SURVEY

Jong-Chih Chien *et.al* have used ARToolkit model to scan “Quick Response” (QR) barcodes using the mobile devices and can be sent through the Internet. Thus the analysis of QR code can be done from the smart device [8].

Xiangrong Chen *et.al* has proposed an algorithm to detect the text in natural images (images taken while travelling in a city). First the region that contains the text is detected and OCR software is used to determine that text [9].

Ronald T. Azuma *et.al* had surveyed the current state-of-the-art in Augmented Reality. This paper describes about the complications and problems that occurs while developing an Augmented Reality system. This paper also provides the solution to the issues faced [6].

Wei-Tek Tsai *et.al* has given a detail information about the existing architecture and the problems that occur. Thus, this paper proposes a service-oriented cloud computing architecture SOCCA. This architecture enables an application to run on different clouds and interoperate with each other. It supports “SaaS”. [2]

Di Capua *et.al* have surveyed about the current status of AR Development tools and their complications and shortage of features that slow the development process. This paper proposes a tool which will enable quick and easy development of the mobile applications [7].

Tesseract is an open source optical character recognition engine which is considered to be the most accurate and it was developed by HP between 1984 and 1994. Tesseract was in the top three OCR engines in 1995[13]. Since 2006 Google has sponsored the development of Tesseract.

3 SYSTEM DESCRIPTION

Figure 1 depicts level 0 DFD and Figure 2 depicts level 1 DFD. There are namely two modules i.e. the user module and the admin module.

BLOCK DIAGRAM:

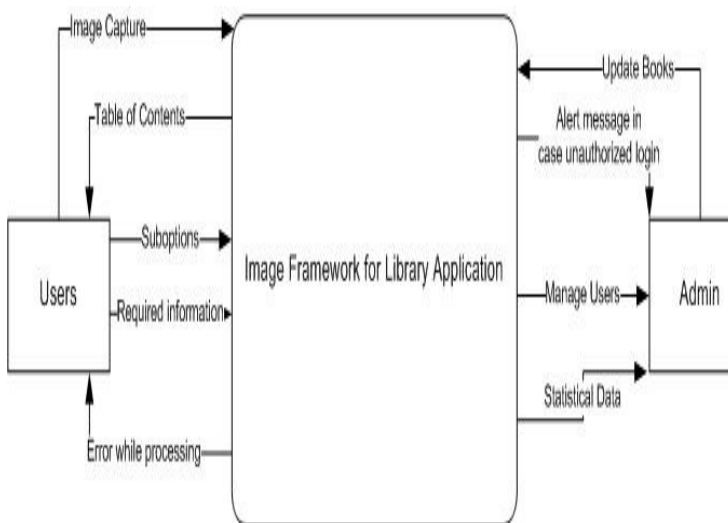


Figure 1: Level 0 DFD

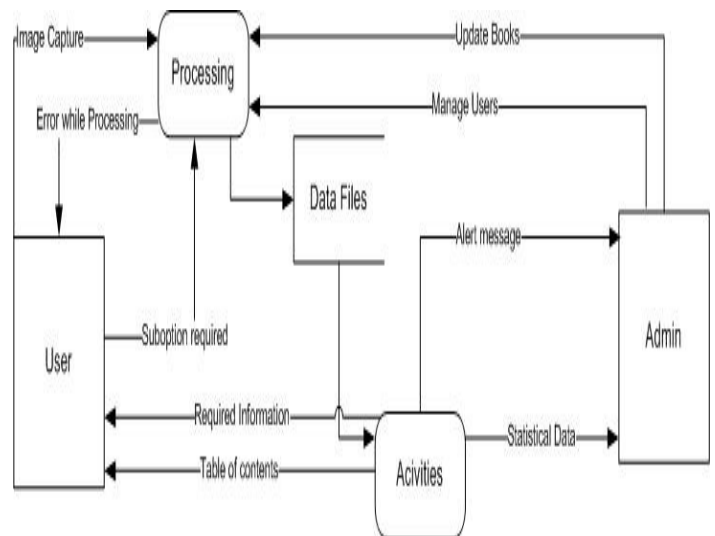


Figure 2: Level 1 DFD

3.1. USER MODULE

The user module is an android based application that provides a user friendly graphical user interface. With the help of this module the user can have the book of his interest in his phone. The android app allows the user to take a snapshot of the cover page of a book, which he uploads i.e. send to server. The user then gets the list of books based on pattern matching which is done at the back end. Once the user selects the book his choice, the chapters will be displayed to him and then depending on which chapter the user selects the related content along with recommendation will be displayed.

3.2. ADMIN MODULE

The admin module is basically the server module. This is the backend wherein the Admin will have the whole and sole control. The admin is responsible for adding new books and chapters along with the keywords which will be used for recommendation. When the user uploads the photo of the cover page of the book, the processing i.e. conversion of image to text format will be performed on the server side. Then pattern matching will be performed based on the books which are already present in the database and the matched books will be displayed to user on his android app. Keywords will be added by the admin for recommendation purpose.

4 IMPLEMENTATION

The project is under its development phase. The basic layout of the app and the login page has been designed. Fig. 3 shows the login page for user module which will be password protected and can be logged in only by the administrator.

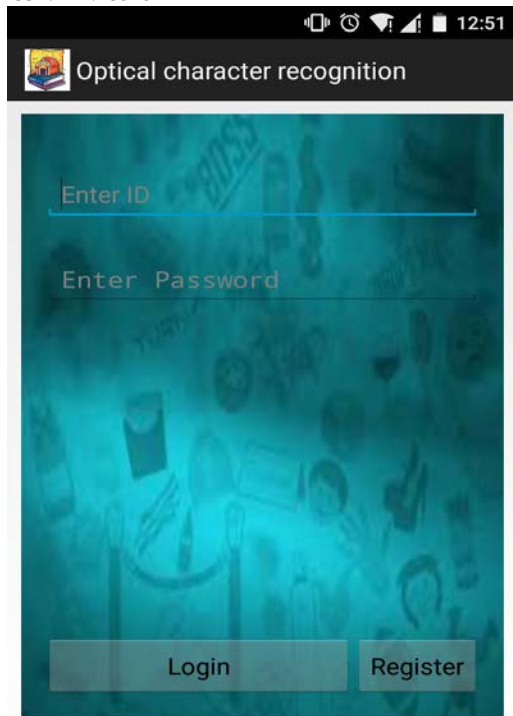


Figure 3: Login page

Figure 4 depicts the registration page wherein a first-time user will register, giving all his/her necessary details.

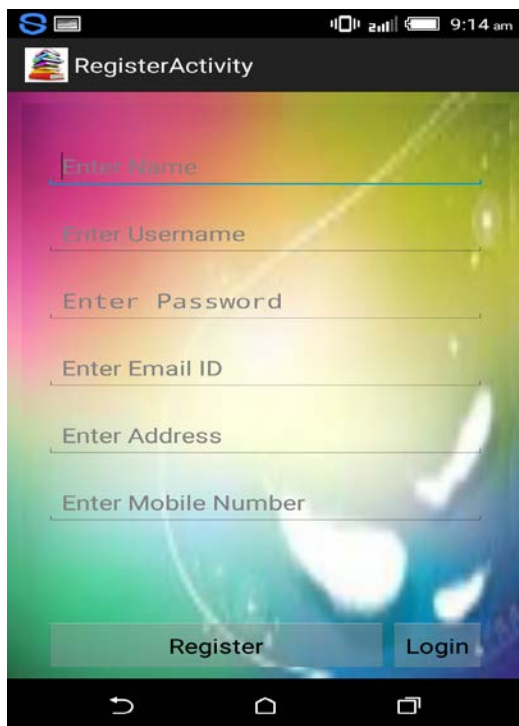


Figure 4 : Registration screen

Figure 5 shows the screen where an image is captured by the user.

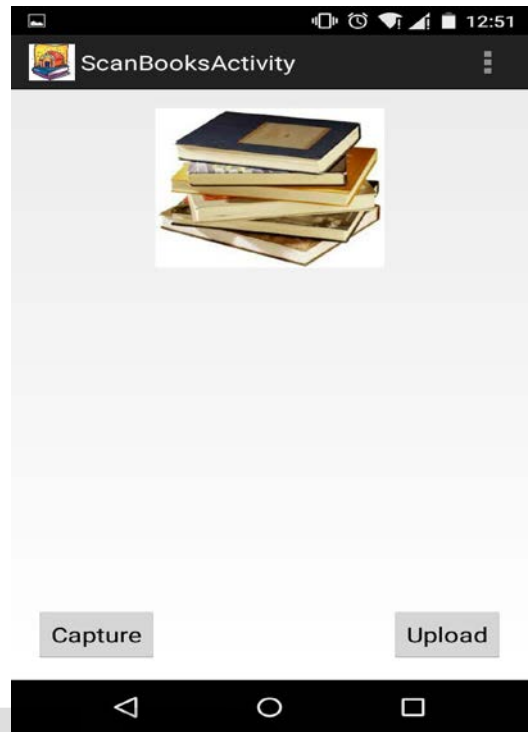


Figure 5: Image Capture

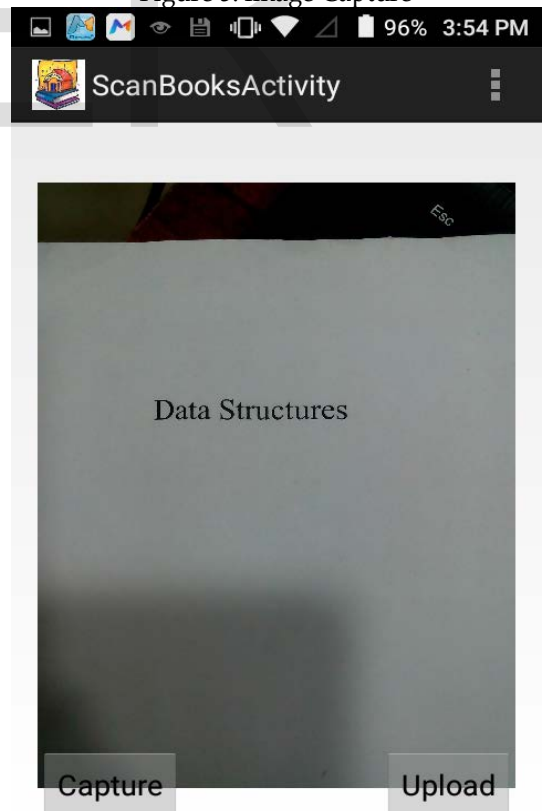


Figure 6: Image captured

Figure 6 shows that the image is captured by the user. Following figure shows the list of books which are matched

with the words found in the database

opened. Recommendations about other books is also provided.

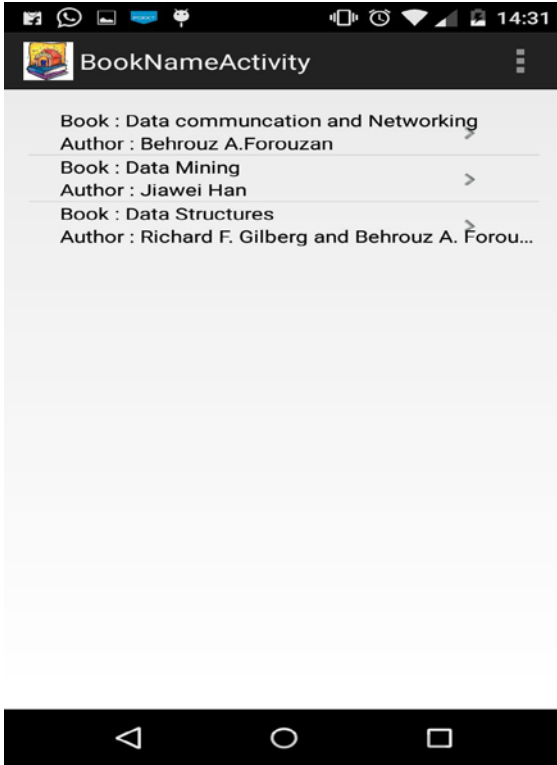


Figure 7: List of Books

Figure 8 shows the table of contents of the selected book.



Figure 8: Chapters Name

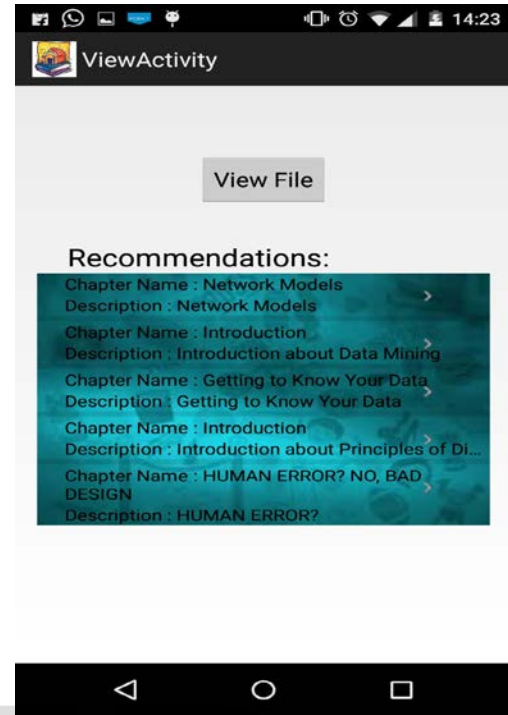


Figure 9: View button and recommendations

Once the user clicks on view button the pdf is opened.

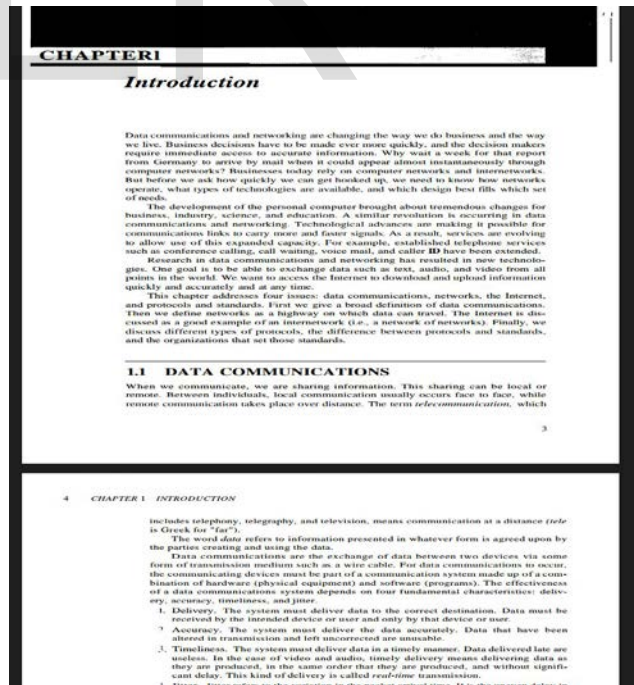


Figure 10 : PDF of the chapter

The below given figure 9 contains the 'view' button, on which once the user clicks the pdf of the selected chapter is

5 CONCLUSION

Many a times the students of various colleges face the problem of unavailability of a particular book in the library, or there are situations when the book is out of stock. Therefore it becomes difficult for the students. Thus, our project aims to resolve this issue. The main reason behind choosing this project is that the students should always have access to all the books which are there in the library.

You just need a smartphone with Internet Connection. You can easily deploy our app on your smartphone and use it accordingly. The best part our software is that the whole processing is done at the Server Side and your phone (camera) acts as an input - output device for our software.

The database will comprise of approximately 20 to 25 books along with the information about the users.

The user will be then free to choose any book along with the topic. Extra references will be provided to the user. Thus our android application provides the desired books on the go.

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