System Development Using Android Based Devices, Bengali OCR and Allied Components

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ABSTRACT

This paper focus on the application that performs Bengali OCR (Optical Character Recognition) in hand held devices.This paper presents an extremely on-demand, fast and user friendly Android Application. The objective is to make use of the visual capabilities of the built in camera of Android devices to extract text from handwritten or printed Bengali data and can be editable. Another aim of this application is to identify the broken letters and replace it by the identical letters that are available in the windows version Bengali OCR. With the help of an initial, sample data, the Eclipse software is trained.The image is processed, eliminating small distortions present. The image is then converted to into a greyscale image, which is segmented and the result is displayed.These characters may be edited by the user and make their own way.

Keywords — Windows Version Optical Character Recognition, Eclipse, SDK,ADT,JAVA, Android, Image Processing.

1. INTRODUCTION

This paper will allow the users to use the application developed for regular purposes. This will enable them to read and understand the handwritten notes in Bengali,passport,bank slips, business cards etc.Extracting text from these require accurate recognition of the characters encompassed by different environmental conditions like luminosity, rotation, reflection, scaling among others .Since creating an application with a one hundred percent correct recognition rate is almost impossible due to noise and different font styles, but one can design character recognition algorithms and develop applications with these failures in mind so that when mistakes aremade, they will at least be understandable and predictable to the person using them.

Understanding the characters present in an image makes the processing of various different kinds of data easier. The inbuilt camera in the device will be used so that software in the device can use this to take pictures of the data available like a hand written text and give the editable data as the output.Another aim of this application is to find the broken letters while initializing the characters and replacing the letters

that are available in the windows version Bengali OCR.Correct user interface has to be created which should help the user to easily enter and accurately and obtain the handwritten data into editable data in the device.

2. LITERATURE SURVEY

In day-to-day life there are a lot of situations where one is unable to understand data in other languages. An automated system for reading documents or cards has also made an importance in various fields. All of these can be addressed by optical character recognition software.The project will be useful mainly when it is extended to different regional languages. Android gives a platform where one can easily install applications and use them easily. Most of the Android supporting devices also contain a built in camera, which are capable of taking good quality pictures. This project aims to make use of the Android platform to develop an application for recognizing textual content written in Bengali by taking pictures of them through built in camera.Here, Bengali OCR will detect the letters from the clicked photo so that they can be electronically searched, stored, editable and used in machine processes. Usually, OCR is a field of research in

pattern recognition, artificial intelligence and computer vision. OCR has been in development for almost 80 years, an OCR machine was filed by a German named Gustav Tauschek in 1929, and an American patent was filed subsequently 1935. OCR has many applications, including use in the postal service, language translation and digital libraries. Little or no development was done between the years of 1996 and 2006.Early optical character recognition could be used for expanding telegraphy, and creating reading devices for the blind. Later it was continued to develop OCR technology for data entry. It was proposed to be used in photographing data records and then, using photocells, matching the photos against a template containing the desired identification pattern. OCR software is analytical artificial intelligence systems that consider sequences of characters rather than whole words or phrases. Based on the analysis of sequential lines and curves, OCR make 'best guesses' at characters using database look-up tables to closely associate or match the strings of characters that form words. Various papers have been presented on the OCR over the years, like the use of OCR for logo matching. In this paper it describes an accurate OCR for Bangla. The paper mainly concentrates on hand written notes and printed notes with the font and colour characters. The approach taken is a very simple one, comparing the Bengali characters with the one present in the windows version OCR. There is no use of any type of neural network like artificial or Kohonen neural network. This paper gives a very basic idea of describing the application of OCR in scanning the handwritten notesand printed notes. The main aim is to make the photo of handwritten notes into editable text in the handheld device. That is converting jpeg to editable textual. This is used for character recognition of the handwritten notes in Bengali which explains the optical character for Bangla characters. The paper provides an insight into the regional language, the challenges faced and the feature extraction method,which is used for the character detection. The paper helps to learn the implementation of OCR to Indian regional languages, as the number of characters is included.

3. SOFTWARE USED

3.1 Eclipse

The OCR is very interesting from other software.The output is given when it detects the input correctly.Eclipse is an integrated development environment (IDE). It contains a base workspace and an extensible plug-in system for customizing the environment. Written mostly in Java, Eclipse can be used to develop applications. By means of various plug-ins, Eclipse may also be used to develop applications in other programming languages. In thisSDK, the Software Development Kit is free and open source software. Eclipse uses plug-ins to provide all the functionality within and on top of the runtime system. Its runtime system is based on Equinox, an implementation of the OSGi core framework specification.

3.2 Eclipse ADT (Android Development Tools)

Android Development Tools (ADT) is a plugin for the Eclipse IDE that is designed to provide an integrated environment in which to build Android applications. ADT extends the capabilities of Eclipse to let developers set up new Android projects, create an application UI, add packages based on the Android Framework API, debug their applications using the Android SDK tools, and export signed (or unsigned) .apk files in order to distribute their applications. It is a freeware available to download. It was the official IDE for Android but was replaced by Android Studio. In computer science, an abstract data type (ADT) is a mathematical model for a certain class of data structures that have similar behavior; or for certain data types of one or more programming languages that have similar semantics. An abstract data type is defined only by the operations that may be performed on it and by mathematical pre-conditions and constraints on the effects of those operations.

4. HARDWARE USED

The hardware that is used to interface with the software is Android Mobile Phone/ Handset, Data Cable, Computer.

5. SYSTEM ARCHITECTURE

Generally we need:

1. End-user arena: The built in camera should be able to take good quality pictures so that the processing of it does not lead to undesired result.

2. Standards measures: it is used to develop the application should comply with the standard general API's of the Android version 2.1 and above.

3. Capability: Any device that will use or improve the application must comply with the standards, operating system and library requirements.

4. Recall and other throughput limitations: Very limited memory is needed. RAM should be of enough to run the application and also to process the image taken by mapping with the back end letters.

6. DATA FLOW DIAGRAM
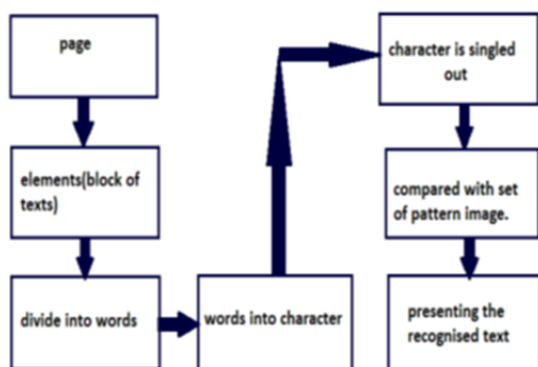
The data flow diagram explains the character recognition process. The input Bengali textual content are optimized to get the best results and then they are compared with the characters present in the Bengali OCR and gives the required output with the editable text format in the device. Firstly, a Bengali handwritten or printed textual content is clicked and then the software improves the quality of the textual photo. Secondly, it removes the line from the words, as the words are divided into characters and then the characters are singled out. Thirdly, it analyses the page and divide the page into grayscale and white scale. Here the greyscale are the letters and white scale is the background or empty space. Then it detects the lines of the text. Thereafter, it analyses the broken letters and recognise the characters and fix it to the pattern image that are present in the Bengali OCR software. Finally, the data is saved into the default file name.

7. IMPLEMENTATION DETAILS

The working of the application is as follows till now:

1. With the help of the Eclipse software, the "Photo by Intent App" is created first and then in that the button based GUI is made and the name given to it is "CAPTURE".

2. Then the camera is accessed with the help of the CAPTURE button.

3. Some Bengali printed textual content or handwritten content is clicked and saved in the default file name that was created newly in the device.

4. After the Bengali OCR software is made, the photo that was saved in the default file name is interfaced with the Bengali OCR software.

5. Then the jpeg is converted to the textual image that could be editable and stored.

6.It is an user friendly App which helps the user to change the data written in Bengali language in their own way.

8. EXPERIMENTAL RESULTS

GUI based button is created and name is CAPTURE, to access the camera.Then interfaced with the Bengali OCR engine.

9. USE OF BENGALIOCR

Bengali Optical Character Recognition (Bengali OCR) refers to an application that performs optical character recognition of characters from images which are printed text or handwritten images in Bengali.It converts the textual jpeg into editable textual content in the android device, which can be edited as our wish and stored in the device in default file name as an original data.This application will be useful for every

individual. It is a very useful application for students specially for rewriting the notes.Allows you to save a lot of time and effort when creating, processing and repurposing various documents. Also to extract quotes from books and magazines and creating your course studies and papers without the need of retyping.

10. CONCLUSION

The paper is based on an Android application based on optical character recognition concept for normal Android device users. The implementation uses the Eclipse software as an backbone support for the project. The user has to make use of built in camera on the device to take a picture containing the Bengali characters or words. The image is processed further to remove the noise, improving the contrast between the characters and the background and scaling the image. The characters are distinguished and separated from each other and individually identified through the network. With every correct identification, the broken characters are replaced by the pattern image of letters that are present in the OCR software. The recognized characters are directly taken as input to the text box and the user can even enter any words of his choice to edit it. When the application is not able to detect the characters due to large distortion a suitable error message is displayed.

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