ANDROID APPLICATION FOR PARTIALLY BLIND PEOPLE

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ABSTRACT

Blind people do not have luxury to read and write. Hence we are making an application which will enable to read and write emails using speech engine. We are also integrating image to speech conversion so they can read sign boards. Machine replication of human functions, like reading, is an ancient dream. However, over the last five decades, machine reading has grown from a dream to reality. Optical character recognition has become one of the most successful applications of technology in the field. The Optical Character Recognition is a mobile application. It uses smart mobile phones of android platform. This paper combines the functionality of Optical Character Recognition and speech synthesizer. The objective is to develop user friendly application

Keyword: - image processing, object detection, speech synthesizer, android

1. INTRODUCTION:

The Current system in android there is not any mechanism for voice command on android events like phone Call, Message reading, Unlock System. Current users use the Services for looking the Phones features So the Motivation is that to implement the android system for blind people who can't handle the android phone effectively. The Blind people wants to allow the android phones services like calling, reading messages using voice commands. Text detection is a wide area of development. Detecting objects using image processing can be used in multiple industrial as well as social application. This project is proposing to use object detection for blind people and give them audio/ vocal information about it. We are detecting an object using the mobile camera and giving voice instructions about the direction of an object. User must have to train the system first about the object information. We are then doing feature extraction to search for objects in the camera view. We are taking help of angle where object is placed to give direction about the object

There are several Optical Character Recognition (OCR) mobile applications on the market running on mobile devices, both android and iOS (iPhone, iPad, iPod) platforms. The limitations of mobile device processor hinder the possible execution of computationally intensive applications that need less time of process. This paper proposes a framework of Optical Character Recognition (OCR) on mobile device using server-based processing. Comparison methods proposed by this paper by conducting a series of tests using standalone and server-based OCR on mobile devices, and compare the results of the accuracy and time required for the entire OCR processing. Server-based mobile OCR obtains 5% higher character recognition accuracy than the standalone OCR and its format recognition accuracy is 99.8%. The framework tries to overcome the limitation of mobile device capability process, so the devices can do the computationally intensive application more quickly.

2. SYSTEM ARCHITECTURE

Optical character recognition (also optical character reader, OCR) is is used to convert physical text into machine encoded text. These text can be from written papers, handwritten notes, sign boards, templates, etc. It is a common method of digitising printed texts so that they can be electronically edited, stored more compactly, displayed on-line,

and used in machine processes such as machine translation, (extracted) text-to-speech, key data and text mining. OCR can be used in deep learning, AI and computer vision.

2.1 Applications

OCR engines have been developed into many kinds of domain-specific OCR applications, such as receipt OCR, invoice OCR, check OCR, legal billing document OCR.

They can be used for:

- Banks can use OCR for processing of checks without interference of human.
- Healthcare has also seen an increase in the use of OCR technology to process paperwork.
- Extracting business card information into a contact list
- In the legal industry, there has also been a significant movement to digitize paper documents.
- Make electronic images of printed documents searchable,
- Converting handwriting in real time to control a computer (pen computing)
- Defeating CAPTCHA anti-bot systems, though these are specifically designed to prevent OCR. The purpose can also be to test the robustness of CAPTCHA anti-bot systems.

The **JavaMail** is an API that is used to compose, write and read electronic messages (emails).The JavaMail API provides protocol-independent and plateform-independent framework for sending and receiving mails. The JavaMail facility can be used to many events. It can be used to register the user, forgot password (sending password to the users email id), sending broadcast for important updates. So there can be various usage of java mail api. The API provides access to Gmail accounts through OAuth. This allows for secure, revokable access to Gmail accounts that doesn't require users to share their email passwords with application providers. With the Gmail API, you can send and retrieve messages, apply labels, find messages with labels, and manage email within threads.

2.2 Types

- Optical character recognition (OCR) – targets typewritten text, one glyph or character at a time.
- Optical word recognition – targets typewritten text, one word at a time (for languages that use a space as a word divider). (Usually just called "OCR".)
- Intelligent character recognition (ICR) – also targets handwritten printscript or cursive text one glyph or character at a time, usually involving machine learning.
- Intelligent word recognition (IWR) – also targets handwritten text, one word at a time. This is especially useful for languages where symbols are not separated in handwritten script. Instead of merely using the shapes of glyphs and words, this technique is able to capture motions, such as the order in which segments are drawn, the direction, and the pattern of putting the pen down and lifting it. This additional information can make the end-to-end process more accurate. This technology is also known as "on-line character recognition", "dynamic character recognition", "real-time character recognition", and "intelligent character recognition".

2.3 Authentication

The Gmail API uses OAuth 2.0 to handle authentication and authorization. There are three authentication scopes which can be used individually or in combination.

- Read only, e.g. read a message from Gmail
- Modify, e.g. change labels applied to a thread or message
- Compose, e.g. send messages on behalf of a user

This gives users a variety of controls of how apps interact with their account.

2.4 API Components

The Gmail API provides five primary resource types:

- Messages
- Labels
- Drafts
- History
- Threads

Messages and labels are the basic units of a mailbox. Drafts, history, and threads all contain one or more messages with additional metadata.

Drafts are unsent messages. They can't be modified—only created and deleted. They can also be sent.

Labels are represented as collection of mails in Gmail. They help with categorizing and organizing messages and threads. There are both system labels such as INBOX, TRASH and SPAM and user generated labels such as TRAVEL.

History is a collection of recently modified messages in decreasing order.

3. TECHNIQUES

3.1 Pre-processing

OCR software often "pre-processes" images to improve the chances of successful recognition. Techniques include:

- De-skew – Scanned images can be tilted or not aligned properly. Here comes the role of de-skew. It is used to straighten the image.
- Despeckle – remove positive and negative spots, smoothing edges
- Binarisation – It is a process of converting color image to greyscale image. Greyscale is also called binary image because it contains two colors. Binarisation is important because it makes the processing of text easy.
- Line removal – Cleans up non-glyph boxes and lines
- Layout analysis or "zoning" – Identifies columns, paragraphs, captions, etc. as distinct blocks. Especially important in multi-column layouts and tables.
- Line and word detection – Establishes baseline for word and character shapes, separates words if necessary.
- Script recognition – In multilingual documents, the script may change at the level of the words and hence, identification of the script is necessary, before the right OCR can be invoked to handle the specific script.
- Character isolation or "segmentation" – For per-character OCR, multiple characters that are connected due to image artifacts must be separated; single characters that are broken into multiple pieces due to artifacts must be connected.
- Normalise aspect ratio and scale

Segmentation of fixed-pitch fonts is accomplished relatively simply by aligning the image to a uniform grid based on where vertical grid lines will least often intersect black areas. For proportional fonts, more sophisticated techniques are needed because whitespace between letters can sometimes be greater than that between words, and vertical lines can intersect more than one character.

Character recognition

There are two basic types of core OCR algorithm, which may produce a ranked list of candidate characters.

Matrix matching involves comparing an image to a stored glyph on a pixel-by-pixel basis; it is also known as "pattern matching", "pattern recognition", or "image correlation". This relies on the input glyph being correctly isolated from the rest of the image, and on the stored glyph being in a similar font and at the same scale. This technique works best with typewritten text and does not work well when new fonts are encountered. This is the technique the early physical photocell-based OCR implemented, rather directly.

Feature extraction decomposes glyphs into "features" like lines, closed loops, line direction, and line intersections. The extraction features reduces the dimensionality of the representation and makes the recognition process

computationally efficient. These features are compared with an abstract vector-like representation of a character, which might reduce to one or more glyph prototypes. General techniques of feature detection in computer vision are applicable to this type of OCR, which is commonly seen in "intelligent" handwriting recognition and indeed most modern OCR software. Nearest neighbour classifiers such as the k-nearest neighbors algorithm are used to compare image features with stored glyph features and choose the nearest match.
Software such as Cuneiform and Tesseract use a two-pass approach to character recognition. The second pass is known as "adaptive recognition" and uses the letter shapes recognised with high confidence on the first pass to recognise better the remaining letters on the second pass. This is advantageous for unusual fonts or low-quality scans where the font is distorted (e.g. blurred or faded).
The OCR result can be stored in the standardised ALTO format, a dedicated XML schema maintained by the United States Library of Congress.
For a list of optical character recognition software see Comparison of optical character recognition software.

3.2 Post-processing

OCR accuracy can be increased if the output is constrained by a lexicon – a list of words that are allowed to occur in a document. This might be, for example, all the words in the English language, or a more technical lexicon for a specific field. This technique can be problematic if the document contains words not in the lexicon, like proper nouns. Tesseract uses its dictionary to influence the character segmentation step, for improved accuracy.
The output stream may be a plain text stream or file of characters, but more sophisticated OCR systems can preserve the original layout of the page and produce, for example, an annotated PDF that includes both the original image of the page and a searchable textual representation. "Near-neighbor analysis" can make use of co-occurrence frequencies to correct errors, by noting that certain words are often seen together. For example, "Washington, D.C." is generally far more common in English than "Washington DOC".Knowledge of the grammar of the language being scanned can also help determine if a word is likely to be a verb or a noun, for example, allowing greater accuracy. The Levenshtein Distance algorithm has also been used in OCR post-processing to further optimize results from an OCR API.

3.3 Application-specific optimisations

In recent years, the major OCR technology providers began to tweak OCR systems to better deal with specific types of input. Beyond an application-specific lexicon, better performance can be had by taking into account business rules, standard expression or rich information contained in color images. This strategy is called "Application-Oriented OCR" or "Customised OCR", and has been applied to OCR of license plates, invoices, screenshots, ID cards, driver licenses, and automobile manufacturing.

4. MERIT AND DE-MERIT

1. Reliable: - This type of technology Provides good video quality . Difference between various object like chair and table etc. can be easily differentiated and exact path can will be detected for visually impaired people.

2. Scalable This application can be run on various operating system. object will not be stationary so it will captured the ongoing video and process all the developing steps for detection and placement of object. This feature highlights the merits.

3. Efficient cost: The cost will be depend on the smart phones.

4. Memory: Memory is one of the key constraint of any android application and this important feature is embedded in our project .Memory is required only for storing the application which is usually less.

5. Speed: Object will be detected by ORB algorithm so speed is quiet fast. Most important thing is object will be detected and movements and their location can be identified with ease and vocal commands will be given according to object.

6. Open Source: Android application is an open source utility command which is linux based and released under apache software. It has many versions with extending features and properties.(e.g. lollipop, jellybean, kitkat etc.) The coloured part of android is play store where the developer can upload their project and the users who wished to use this application can easily download it only the need is internet.

5. CONCLUSION

Here we have successfully modeled the Object Detection using ORB algorithm. The tests will went smoothly and had no problems. This report introduced two environmentally-friendly designs for a blind people. We presented information about the Blind people application. This application will be more effective for blind people. It is important to develop this application for the future. The system is used by Blind peoples but the normal people also can use. In future we are going to detect the potholes which are coming across the camera video.

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