MySight – A New Vision for the Blind Community

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Abstract

People read newspapers, books, articles and many other materials every day. It is a basic human need which is forbidden for blind people by nature. Sometimes, braille education might be the ultimate solution for such person. As stated by The National Federation of the Blind (NFB), less than 10% of the blind children are engaging with braille reading in United States. Every year a lot of people lose their vision fully or partially. According to the findings, diabetics is one of the major causes for blindness and nowadays it is spreading rapidly. Therefore, the present consequence is significant regarding the blindness. According to NFB, most of the blind people are unemployed and a lot of blind students give up their studies due to the difficulty of learning. The problem is that there are not enough teachers to teach Braille system and also the learning of Braille system is really hard. Therefore, it is feasible to find a method such that a blind person could read newspapers, textbooks, bills, etc. without the braille system. There are several smart applications available which use internet connection to find the Portable Document Format (PDF) of the particular newspaper, book or document and then reads that PDF document audibly. But the problem is that they require the PDF document of the particular reading material to be on the internet available in PDF format which is not practical when all the books have no PDF versions. Currently AIRS-LA, BARD MOBILE, iBlink Radio, NFB Newsline, Voice Dream Reader are the top five applications for the usage of the blind community. Since, they need an internet connection and use huge amounts of data, it is not suitable for real time reading. The problem is if a blind person wants to read something in an area which does not have an internet connection, he cannot use any of the mentioned applications. Therefore, there is a great necessity of an application which is portable, effective and work in an offline environment. This research is completely focused on finding a way which could let the blind people to expose to a new kind of reading. The main objective of this research was to develop an android application which could identify words and various kinds of symbols written using a standard font in a given document, and then convert them into an audible format such that a blind person could understand. It also should easy to use by a blind person by providing voice notifications and smart touch techniques. "MySight" is a revolutionary application which could change the entire reading and learning techniques of a blind person. This would replace the braille system currently used by the blind people and let them read and learn effectively and easily. The application was designed in such a way that a blind person could simply get handled with its functionalities and experience the maximum benefit. Also, this can be considered as a method which could let them read like a normal person.
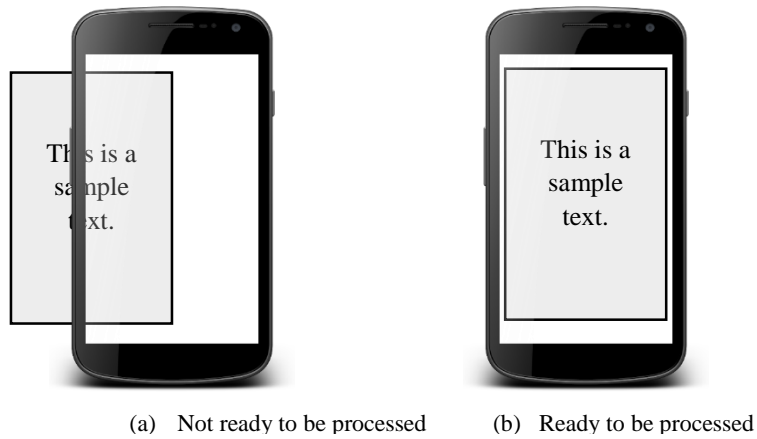
(a) Not ready to be processed   (b) Ready to be processed

Fig. 1. Before capturing the text

Fig. 2. Capturing the text

a)   Detected text   (b) Available text operations
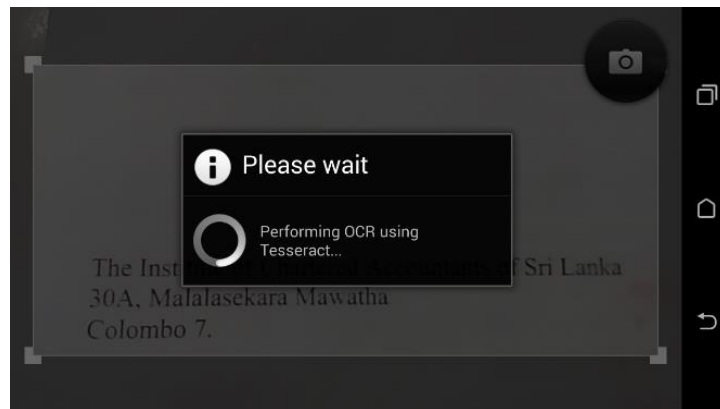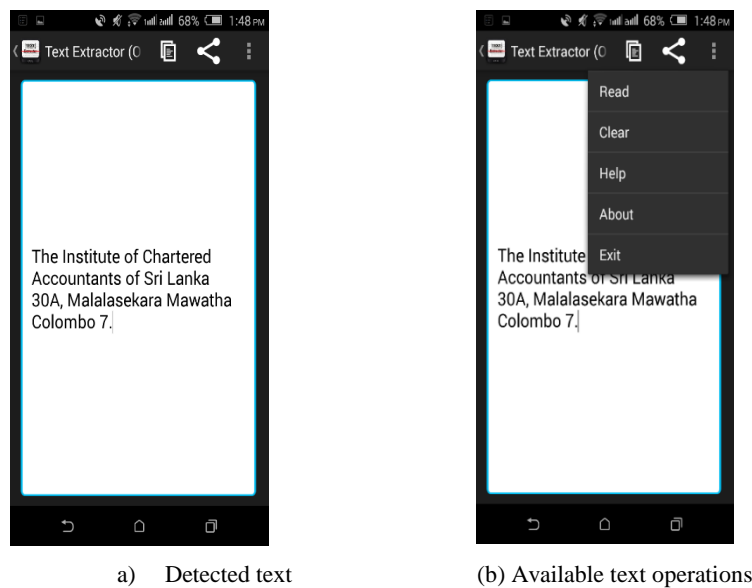
Fig. 3. After capturing the text

The first step was to find an appropriate and efficient Optical Character Recognition (OCR) technique which compatible with the Android platform. In order to fulfill that requirement, the Tesseract OCR library was used. The reason behind choosing Tesseract is, now it has become a leading commercial engine because of its accuracy. The next step was interface designing. Fig.2 shows how the application captures the text. Fig.3 (a) shows the interface after detecting the text and the Fig.3 (b) shows the text operations that can be performed once it detects the text. Once the OCR implementation completed, the application can detect the text using the captured image. At the same time it can convert the text as a sound output through the mobile phone speaker or headset. For the future improvements, the application should be enhanced to guide the blind person to capture the image of a paper or a page of a book. If the four borders of the page are not captured, the application should say the user to move in the corresponding direction. Fig.1 (a) shows the page which is not fully detected to mobile camera. In that situation the border of the page can be identified using the edge detection. If the four borders of the page are not presented in camera preview, it indicates that the page is not ready to be processed. The adjustment can be identified using the distance from the edges. Then the user can be notified by giving a sound output asking to move to left, right, forward or backward until the image is ready to be processed as in Fig.1 (b). For the above improvements, OpenCV library is going to be used for edge detection and the smart voice commands for giving instructions to the blind person. Furthermore, the application will be tested with the blind community to evaluate the applicability and the effectiveness of the application in the real environment.

Keywords: Text-to-Speech, Blind community, OCR, Android, Tesseract