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CAMERA BASED PRODUCT IDENTIFICATION FOR THE VISUALLY IMPAIRED

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Abstract— This project is developed to make the life of blind people easy. This is a camera based system to scan the barcode behind the image and read the description of the product with the help of Id stored in the barcode. This is very beneficial in case of finding out the description of packaged goods to the blind people and thus helping them in deciding to purchase a product or not especially which are packaged. This is because it becomes very difficult for the blind people to distinguish between the packaged goods. In order to use this system, all the user needs to do is capture the image on the product in the mobile phone which then resolves the barcode which means it scans the image to find out the Id stored. Thus this application really benefits blind and visually impaired people and thus making their work of identifying products easy. This is very easy to use and affordable as it requires a scanner to scan the barcode and a camera phone to take the picture of the image containing the barcode. This is now easy to implement as most of the mobile phones today have the required resolution in order product description. This project can be implemented to scan the barcode to identify the Id stored in it and read out the in any shopping mall, supermarket, Book stores, Medical stores etc.

Keywords— Visually Impaired, Barcode, Smart Phones, Supermarket, Georgie Launcher, Audio Output, TTS (Text to Speech).

INTRODUCTION

The ability to identify products such as groceries and other products is very useful for blind and visually impaired persons, for whom such identification information may be inaccessible. There is thus considerable interest among these persons in barcode readers, which read the product barcodes that uniquely identify almost all commercial products.

The smartphone is a potentially convenient tool for reading product barcodes, since many people carry smartphones and would prefer not to carry a dedicated barcode reader even if the dedicated reader would be more effective. A variety of smartphone apps are available for reading barcodes such as the RedLaser and the ZXing which are for IPhone and Android respectively. A number of portable reading assistants have been designed specifically for the visually impaired. Mobile runs on a cell phone and allows the user to read mail, receipts, fliers, and many other documents. However, the document to be read must be nearly flat, placed on a clear, dark surface (i.e., a non-cluttered background), and contain mostly text. Mobile accurately reads black print on a white background, but has problems recognizing coloured text or text on a coloured background. It cannot read text with complex backgrounds, text printed on cylinders with warped or incomplete images (such as soup cans or medicine bottles).

PROPOSED SYSTEM

The Camera Based Product Identification system (see Fig.1) provides real-time feedback to first help the user find the barcode on a product using a smartphone camera or webcam and then help orient the camera to read the barcode.

Fig 1: Image shows user a barcode recognition system on a smartphone.

Our project takes several video frames per second and analyzes each frame to detect the presence of a barcode in it. The detection algorithm functions even when only part of the barcode is visible in the image, or when the barcode is too far away from the camera to

be read. Moreover, the barcode can appear at any orientation in the image and need not appear with its bars aligned horizontally or vertically. Whenever a barcode has been detected in an image, an audio tone is issued to alert the user.

The audio tone is modulated to help the user center the barcode in the image and bring the camera close enough to the barcode to capture detailed images of it. Specifically, the tone volume reflects the size of the barcode in the image, with higher volume indicating a more appropriate size (not too small or too big) and hence more appropriate viewing distance; the degree of tone continuity (from stuttered to continuous) indicates how well centered the barcode is in the image, with a more continuous tone corresponding to better centering. A visually impaired user first moves the camera slowly so as to find the barcode; further feedback helps the user to move the camera until the barcode is sufficiently well resolved and decoded. If the system reads a barcode and is sufficiently confident of its reading, the system reads aloud the barcode number (or information about the barcode such as the name of the product).

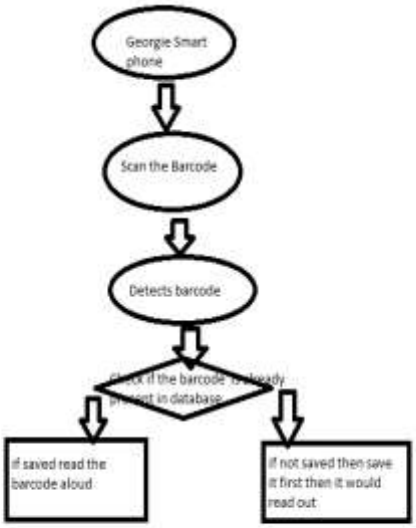

Fig 2: Flowchart of the proposed framework to read text from handheld objects.

Our experience with the system underscores the difficulty that blind users face in using a barcode reader, which requires them to search for barcodes on products in order to read them. This search can take longer on a smartphone-based system due to the much slower rate of processing, smaller detection range and narrower field of view compared with a dedicated system, implying a tradeoff between ease of detection and the burden of having to own and carry a separate device. Empirically we found that the search process tends to be shorter for smaller products (which present less surface area to be searched) and for rectangular packages (curved surfaces are awkward to search, forcing the user to rotate the package relative to the camera). Audio feedback is important for speeding up the search process, and the key to improving our system or other smartphone-based barcode readers in the future lies in improving the feedback.

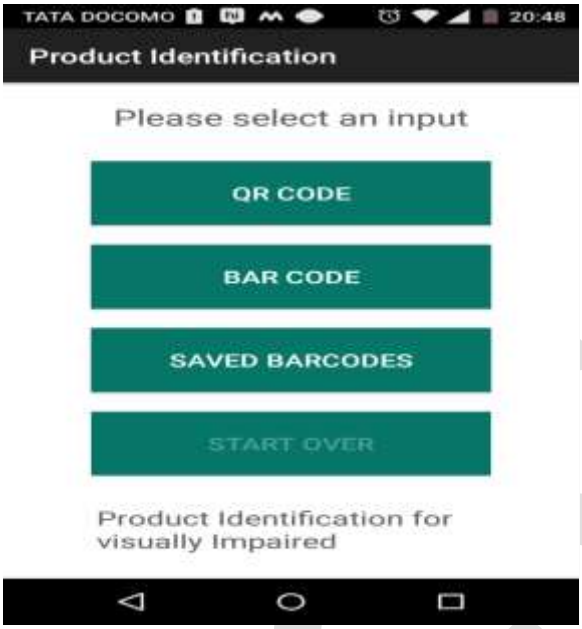

Fig 3: Snapshot of our application

The above image shows us a snapshot of the android application. Our application is developed for Android 4.0(Ice Cream Sandwich) and higher. Our Android application along with the Georgie Launcher could be used well by a visually impaired person as the launcher provides you with the audio output over the clicked button

Fig 4: Snapshot of the saved barcodes in our application.

Once the barcode is detected a description needs to saved along with it (Fig 4). So the next time the same barcode is read the description saved is read aloud, thus the blind user recognizes the product.

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CONCLUSION

This project represents a solution for finding and reading 1D barcodes, intended for use by the visually impaired users. A key feature of the algorithm is the ability to detect barcodes at some distance, allowing the user to rapidly scan packages before homing in on a barcode. Experimental results with a blindfolded subject demonstrate the feasibility of the system. In the future we plan to port our system to a camera phone, and to extend our system to symbologies other than UPC-A, such as the the EAN-13 (which is widespread in Europe).

Experiments with blind/visually impaired volunteer participants demonstrate the feasibility of the system and suggest that its usability is significantly enhanced by real-time feedback to help the user find barcodes before they are read.

We are exploring commercialization options of the application, including collaboration with an organization interested in releasing a consumer-oriented smartphone app that includes detailed information associated with a barcode (e.g., preparation instructions for packaged items).

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