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Bluetooth Based Product Identification through Voice for Blind People

T. Jayanthi[1],Sridhar

[1]*Assistant Professor, Dept. of E.C.E,CMR ENGINEERING COLLEGE*

[2] *Assistant Professor, Dept. of E.C.E,CMR ENGINEERING COLLEGE*

Abstract

A cam based assistive content perusing system is proposed to help blind persons read content names and item bundling from hand-held protests in their day by day lives. To detach the object from jumbled foundations or other encompassing protests in the cam view, implementation is done in two steps. First training of the object is done by which the images of the objects are stored in the data base and RGB and entropy mean values of those images are calculated. In the second step testing of the objects is performed. Here the images of the products to be tested are taken and RGB values of them are calculated. These are compared with the trained image RGB values if a match then the image name is obtained. Through serial communication it is transferred to the micro controller. It is compared with the code in the controller and the result is transferred through Bluetooth to the android mobile. In mobile by using Android SDK tool an application will be developed such that the name of the object and the brief description of the product will be heard through head phones or in speakers. Thus the system helps the blind people to know the details of the handheld objects.

Keywords:

ARM 7 Board, Webcam based PC, Bluetooth Module, Products, Smart Phone.

1. INTRODUCTION

Worldwide there are 314 million visually impaired people, of those blind are 45 million [1]. Even in a developed country like the U.S., the 2008 National Health Interview Survey reported that an estimated 25.2 million adult Americans (over8%) are blind or visually impaired [2]. This number is increasing rapidly as the baby boomer generation ages. Recent developments in computer vision, digital cameras and computers make it feasible to assist these individuals by developing camera based products that combine computer vision technology with other existing computer products such optical character recognition (OCR) systems[3]. Reading is obviously essential in today's society. All over the place the printed content can be seen as reports, receipts, bank proclamations, eatery menus, classroom presents, item bundles, directions on pharmaceutical jugs, and so forth. Keeping in mind optical guides, feature magnifiers, and screen per users can help blind clients and those with low vision to get to reports, there are couple of gadgets that can give great access to regular hand-held protests, for example, item bundles, and items printed with content, for example, physician endorsed drug bottles. The capacity of individuals who are dazzle or have critical visual debilitations to peruse printed names and item bundles will improve autonomous living and foster Economic and social independence. Section 2 describes the previous work and section 3 deals with the proposed work. The flow chart and the algorithm of the proposed system are described in section 4. Section 5 describes results of proposed system and Conclusion and future scope are presented in section 6.

2. PREVIOUS WORK

Today, there are already a few systems that have some promise for portable use, but they cannot handle product labeling. But a big limitation is that it is very hard for blind users to find the position of the barcode and to correctly point the barcode reader at the barcode [5]. Some perusing assistive frameworks, for example, pen scanners may be utilized in these and comparable circumstances. Such frameworks coordinate OCR programming to offer the capacity of checking and acknowledgment of content and some have incorporated voice yield.

However, these systems are generally designed for and perform best with document images with simple backgrounds, standard fonts, a small range of font sizes, and well-organized characters rather than commercial product boxes with multiple decorative patterns. Most state-of-the-art OCR software cannot directly handle scene images with complex backgrounds.

Various versatile perusing associates have been planned particularly for the outwardly disabled [8], [11], [12], [13], [14] Nonetheless, the archive to be perused must be about level, set on a reasonable, dull surface (i.e. a noncluttered foundation), and contain for the most part content.

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Fig. 1. Examples of printed text from hand-held objects with multiple colors, complex backgrounds, or nonflat surfaces.

Fig 1 indicates the images of the products used for text extraction. The existing perused proto types all are designed to extract text only from the images of the products that are horizontal in surfaces.

Portable precisely peruses dark print on a white foundation, yet has issues perceiving shaded content or content on a hued foundation. It can't read content with complex foundations. Moreover, these frameworks oblige a visually impaired client to physically limit zones of interest and content districts on the articles much of the time.

Despite the fact that various perusing associates have been outlined particularly for the outwardly debilitated, as far as anyone is concerned, no Current perusing associate can read content from the sorts of testing examples and foundations found on numerous regular business items. As indicated in Fig. 1, such content data can show up in different scales, textual styles, hues, and introductions.

To help blind persons to peruse content from these sorts of hand-held items, a thought of cam based assistive content perusing system is made to track the object of enthusiasm inside the cam view and concentrate print content data from the article. Proposed calculation can successfully handle complex foundation and different examples, and concentrate content data from images and adjacent signage, as indicated in Fig.2

Fig. 2. Typical objects (top row) and their associated contextual information (bottom row). (a) a bathroom, (b) an exit, (c) a laboratory, (4) an elevator.

Fig 2 indicates the basic shapes of bathroom, an exit, a laboratory and an elevator which are very similar; it is very difficult for the blind people to distinguish all these without having any idea about the content information.

In assistive perusing frameworks for visually impaired persons, it is exceptionally trying for clients to position the object of enthusiasm inside the focal point of the cam's perspective. Starting now, there are still no adequate arrangements. The approach is done in stages.

To verify the hand-held article shows up in the cam view, a cam with adequately wide point is used to suit clients with just inexact point. This may frequently bring about other content articles showing up in the cam's perspective (for instance, while shopping at a grocery store). To concentrate the hand-held item from the cam picture, a movement based system is added to get a district of interest (return for capital invested) of the article. At that point, content acknowledgment is performed just in this return for money invested.

It is a testing issue to consequently limit articles and content returns for money invested from caught pictures with complex foundations, on the grounds that content in caught pictures is in all probability encompassed by different foundation anomaly "clamor," and content characters normally show up in various scales, textual styles, and hues. For the content introductions, content strings in scene pictures keep give or take flat arrangement. Numerous calculations have been created for restriction of content locales in scene pictures.

All these existing methods are implemented to determine text from the images on horizontal or flat surfaces. This is the main limitation. In this paper a solution is given in which the text from the images of the non horizontal surfaces can be extracted and is converted into the audio format.

3. PROPOSED WORK

In this, a prototype system is developed that converts the object name which is in text format to the audio format. This helps the blind people to know the name of the hand held object. Fig 3 shows the block diagram of the proposed proto type system.

The main blocks in the system are microcontroller, PC, Webcam, Bluetooth module and the Android mobile.

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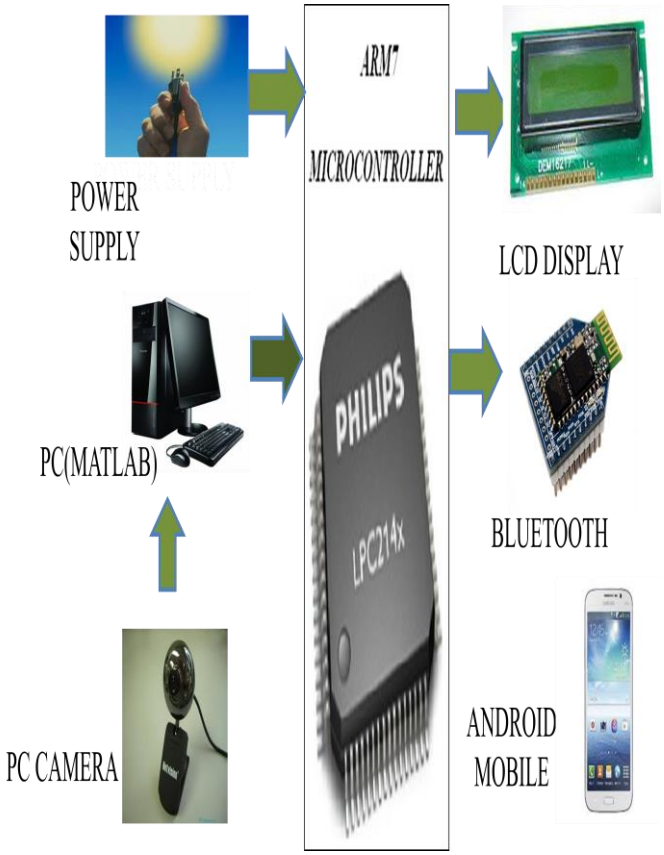

Fig 3. Block Diagram of the Proposed System

Microcontroller is the control unit of the system. In this system LPC2148 micro controller is used. It is the heart of the system which controls all the devices connected to it and also communicates with them depending on the program in the micro controller. The ARM 7 TDMI-S processor is in built in the micro controller which is a RISC processor.

Personnel Computer with MATLAB software is used. Matrix laboratory is a multi standard numerical processing environment and fourth era programming dialect. It is developed by the Mathworks. It is used for processing the images of the objects. It is broadly utilized as a part of scholastic and exploration establishments and additionally modern undertakings.

Webcam is an USB camera which is connected to the PC. These are the USB cameras that use USB 2.0 or USB 3.0 technology to transfer image data. These Cameras are designed to easily interface with dedicated computer systems by using the same USB technology that is found in most computers.

Power Supply is connected for supplying Power to all the devices said above. It fundamentally comprises of a Transformer to venture down the 230V A.C. to 9V A.C. took after by diodes. Here diodes are utilized to convert the alternating current to undulated direct current. The undulated D.C. is separated utilizing a capacitor Filter. A positive voltage controller is utilized to manage the acquired dc voltage.

Bluetooth is a remote innovation used to exchange information between distinctive electronic gadgets. The separation of information transmission is little in examination to different methods of remote correspondence. This innovation annihilates the utilization of ropes, links, and connectors.

4. FLOW CHART AND ALGORITHM

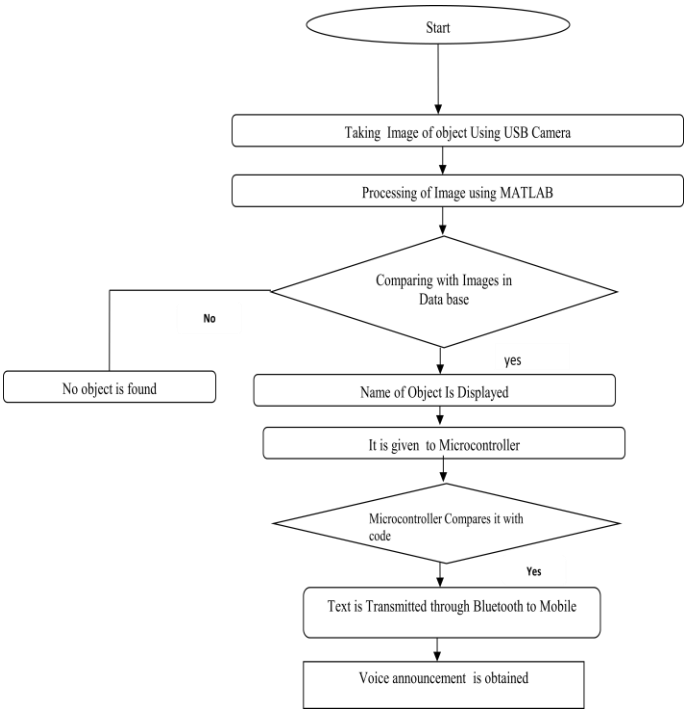

Fig 4. Flow chart of the proposed system

The process of detecting an object and converting into voice announcement is shown in fig.4.In the first three steps the images of the hand held objects are captured by using webcam which is connected to the PC with MATLAB. These images are processed in the MATLAB. In the MATLAB the RGB mean values of the images are measured and are compared with the RGB mean values of the related images in the data base. If those values are related then the name of the object is displayed as the output of the MATLAB. This is given to the micro controller.

In the next steps the text is checked with the names of the objects in the source code that was in the micro controller. If the name matches then the output is given to the Bluetooth module. From this only the text is transferred to the other block i.e., the android mobile.

In the mobile an application is developed such that the received text is automatically converted in to the audio. The blind people can hear to this audio from the mobile by connecting ear phones or in loud speaker mode. The brief description of the object is also made available.

5. EXPERIMENTAL RESULTS

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The result of the MATLAB code in the PC is shown in the figure 5. Here the product "TIDE packet" was taken for testing. The MATLAB code has to give the name of the product in text format as "Given object is TIDE" as a result which is also shown in the below figure.

The output from MATLAB was given to the micro controller board which is shown in figure 6 and then the output is displayed in the LCD which is shown in Figure 7.

By using Bluetooth the data is transferred to the android mobile. The related information of the product is displayed in the mobile and the same can be heard by connecting ear phones as shown in figure 8.

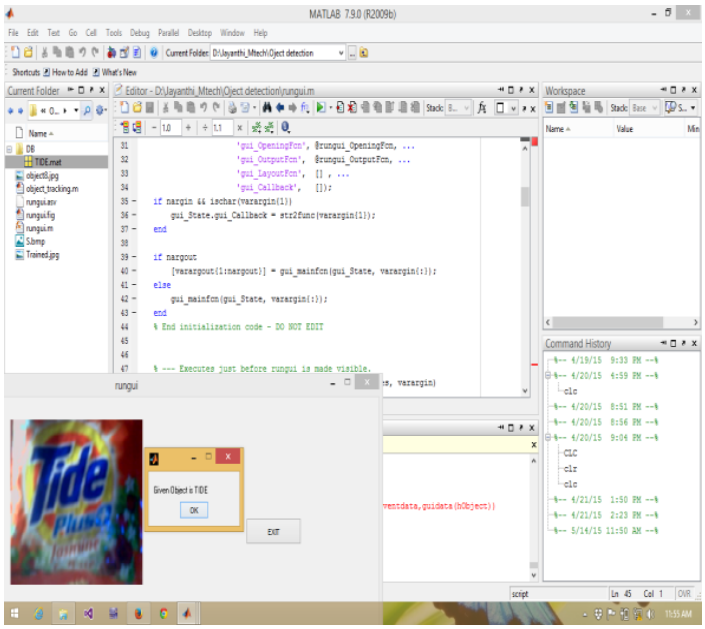

Figure 5. The output of the MATLAB

Figure 6. The micro controller Board

Figure 7. The LCD displaying the name of the product

Figure 8. The details of the product is displayed in android mobile.

6. CONCLUSION AND FUTURE WORK

The object is identified by using camera and is given to MATLAB for image processing. In MATLAB images will be detected thereby after recognizing particular thing data is given to Bluetooth module by microcontroller and this is transferred to Bluetooth inbuilt android mobile.

The corresponding information or application related to the tag is opened in the android mobile. The image and the text related to that thing are displayed in the mobile and also voice announcement of the same text will be announced from the android mobile. So that the user can know information by connecting earphones in android mobile. This finds application in shopping malls, super markets and so on.

Our future work will extend this almost to the real time application. In this Wi–Fi can be implemented for data transfer from controller to the android mobile and also from camera to PC for processing the image. By this may blind peoples can be used at a time with single PC and Processing unit is the required steps have been taken.

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