Review on Portable Camera Based Assistive Text and Label Reading for Blind Persons

Akanksha Rathi[1], Dr. A.V. Nikalje[2]

[1]M.Tech. Student (Department of Electronics and Telecommunication Engineering, Deogiri Institute of Engineering and Management Studies, Aurangabad, India)

[2]Assistant Professor (Department of Electronics and Telecommunication Engineering, Deogiri Institute of Engineering and Management Studies, Aurangabad, India)

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Abstract - *This paper presents a camera-based label assistive system to help blind persons to read names on the products through image capturing. The portable system captures the images and text written which are placed in front of the Pi camera can be read out using speakers interfaced to the Raspberry Pi model. The Image is fed to input of Raspberry Pi processor OCR .OCR used to convert virtually images containing written text into machine-readable text data. Then Google Text to Speech Convertor (GTTS) is used to convert text entered in to the audio .That audio blind person get audio through speaker.*

***Key Words:** Raspberry PI, Optical character recognition (OCR), Google Text to Speech Convertor (GTTS), Speaker*

1. INTRODUCTION

Globally, at least 2.2 billion people have a vision impairment or blindness, of whom at least 1 billion have a vision impairment that could have been prevented or has yet to be addressed. A major part of this population is still blind even in developed countries. If blind people or people with significant visual impairment can read from hand held objects, nearby sign posts or product labels then this will enhance their independent living and thereby faster economic and social self-sufficiency. It is a fact that all over the world that the visually impaired (partially or completely blind) people face a lot of difficulties in reading, identifying a product, and avoiding the obstacles. According to the development in today's technology towards the computer vision, digital camera and portable computers it is feasible to develop a camera-based technology that combines computer vision technology with other commercial products such as OCR systems.

There are few devices that can provide better access to common hand-held objects much as product packages and objects printed with text. Formulating devices which are even more portable and sophisticated can promote independent living and foster economic and social self-dependency.

Reference to figure 1 number of people over the county with low vision and visually impaired are mentioned. India has largest blind population in the world with around 15 million blind person. It is said that one out of every three blind people in the world lives in India.
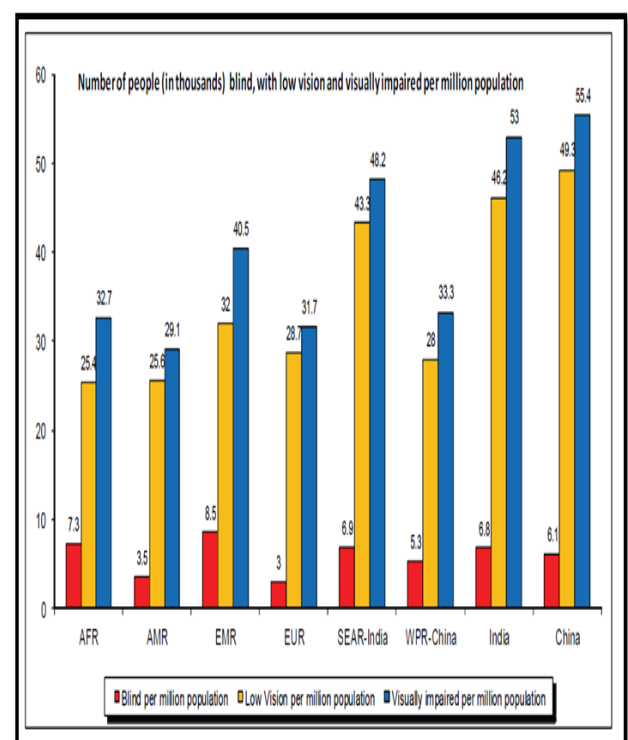

Figure 1: Overview of Blindness

The most challenging part in assistive reading system for blind people is-positioning of object of interest within the camera view. In order to focus the object within the camera view, a camera with wide-angle is used as an approximate solution. Often text from the surrounding areas is also included. Thus to extract the hand-held objects from the image we proposed motion based method to isolate the region of interest and text recognition is done only by area of interest. Reading is very essential in today's society. Everywhere the printed text is in the form of Reports, bank statements, receipts, restaurant menu's etc. so the blind users face a difficulty in reading these forms. In order to reduce the frustrated problem the method Text to Voice Adaption Using Portable Camera is referred.

2. RELATED WORK

Automation is the most frequently spelled term in the field of electronics. The hunger for automation brought many revolutions in the existing technologies. This project makes use of an on board computer, which is commonly termed as Raspberry Pi processor. Raspberry Pi acts as the heart of the project. Thion-board computer can efficiently communicate with the output and input modules which are being used. As before mentioned identification or recognition process. The paper- Text detection in indoor/outdoor scene images-proposes a novel methodology for text detection in indoor/outdoor scene images. It is based on an efficient binarization and enhancement technique followed by a suitable connected component analysis procedure. Connected component analysis is used to define the final binary images that mainly consist of text regions

Portable Camera-Based Assistive Text and Product Label Reading from hand-held objects for blind persons- propose an efficient and effective motion based method to define a region of interest in the video by asking the user to shake the object for isolation of objects from the cluttered background. This method extracts moving object region by a mixture-of-Gaussians-based background subtraction method. In the extracted ROI, text localization and recognition are conducted to acquire text information. To automatically localize the text regions from the object ROI, we propose a novel text localization algorithm by learning gradient features of stroke orientations and distributions of edge pixels in an Ad boost model. Text characters in the localized text regions are then binarized and recognized by off-the-shelf optical character recognition software. The recognized text codes are output to blind users in speech

Using raspberry pi processor will change slightly between different products and systems. This system consists of a Pi camera for the automated information resource of the portable system which captures the images and text written which are placed in front of the camera can be announced out using earphones or speakers. These details were verified using the Raspberry Pi for authentication. The Raspberry Pi processor system alerts the blind person through voice messages using speakers or earphones. To perform this task, Raspberry Pi processor is programmed using embedded Linux. Discusses an intelligent system visually impaired people experience difficulty and inconvenience using computers through a keyboard and mouse. This system provides a way to easily control many functions of a computer via speech. When a blind person speaks, the audio voice input is sent to the speech browser and them the output of the search is send through speakers Many applications are running on this system but not all the applications able to fulfill the required needs but this system has better aspects in future for normal people as well as blind people. This application is firstly embedded on raspberry pi is the software which is being useful to

interface this GUI with the hardware connected to Pi the method which is already existed a carries major drawback in size and not portable. To reduce this drawback, we choose an embedded platform raspberry pi (Model 3) which acts as a mini Cohere the camera is interfaced to the raspberry pi board and the captured images is processed to the Rpi board. ROI method is used to localize and recognize the text.

3. LITERATURE SURVEY

A number of portable reading assistants are designed specifically for the visually impaired. "K-Reader Mobile" is a mobile application which allows the user to read mail, receipts, fliers, and many other documents [3].But these systems/device fail to give an economic solution of the problem and are available on specific platforms. No smart phones have designed for blind person until now. Thus accessibility of the Mobile application is a different question However, the document to be read must be nearly flat, placed on a clear, dark surface and contain mostly black text printed on white background and it does not reads from complex backgrounds

Presents Darshan a Navigation System for blind people to navigate safely and quickly, in the system obstacle detection and recognition is done through ultrasonic sensors and USB camera. The proposed system detects the obstacles up to 300 cm via ultrasonic sensors and sends feedback in the form of beep sound via earphone to inform the person about the obstacle. USB webcam is connected with Raspberry Pi Embedded board which captures the image of the obstacle, which is used for finding the properties of the obstacle (Human Being). Human presence is identified with the help of human face detection algorithm written in Open CV. The constraints coming while running the algorithm on Embedded System are limited memory and processing time and speed to achieve the real time image processing requirements.

The algorithm is implemented in Open CV, which runs on Debian based Linux environment Discusses an intelligent system visually impaired people experience difficulty and inconvenience using computers through a keyboard and mouse. This system provides a way to easily control many functions of a computer via speech. When a blind person speaks, the audio voice input is sent to the speech browser and them the output of the search is send through speakers Many applications are running on this system but not all the applications able to fulfill the required needs but this system has better aspects in future for normal people as well as blind people. This application is firstly embedded on raspberry pi and Qt creator is the software which is being useful to interface this GUI with the hardware connected to Pi.
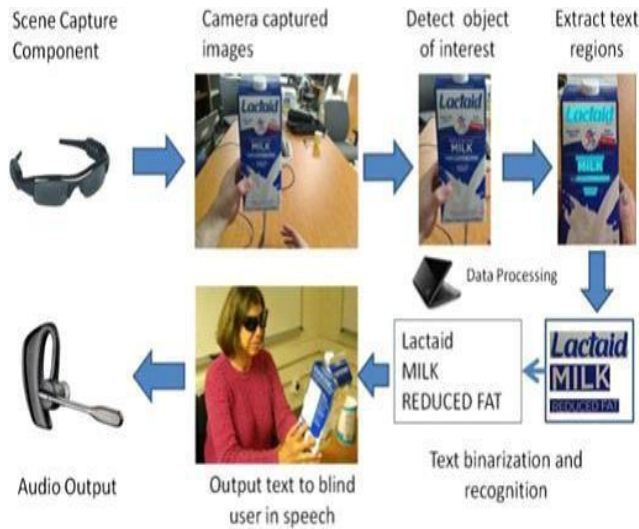
Figure 2: Proposed Casing Work Flowchart to peruse content from Hand-held items for visually impaired clients

As outlined in Fig. 1, the framework structure practical parts: scene catch, information handling, and sound yield. The catch part gathers scenes containing enthusiastic objects for pictures or video types. In model, it compares to a camera connected to a couple of shades. The information handling segment convey proposed calculations, including 1) object-of-interest identified specifically remove the item held by the visually impaired client from the jumbled foundation or other impartial articles in the camera view; and 2) content limitation to get picture districts, and content acknowledgment to change picture based content data into meaningful codes. Utilize a smaller than normal portable workstation as the handling gadget in this present model framework Word, use either the Microsoft Equation Editor or the Math Type add-on (http://www.mathtype.com) for equations in your paper (Insert | Object | Create New | Microsoft Equation or Math Type Equation). "Float over text" should not be selected.

The sound yield segment advices the visually impaired client of perceived content codes. A Bluetooth earpiece with smaller than expected amplifier used for discourse yield. This straightforward equipment arrangement guarantees assistive content perusing framework. Portrays the framework flowchart. An edge grouping V by a camera worn by visually impaired clients, containing their hand-held protests and jumbled foundation. To concentrate content data from the items, movement article location is initially connected to decide the client's object S by shaking it while recording video ground from movement based item detection and R speaks to the ascertained forefront object at every casing. The interested object restricted to closer view veils.

Then, novel proposed confinement calculation connected to the enthuse object to concentrate content locales. At to

begin with, hopeful areas created by format examination of shading consistency and even arrangement After content district limitation, off-the-rack OCR utilized to perform content acknowledgment in the restricted content locales. The perceived words of visually impaired client are changed as discourse.

4. PROPOSED SYSTEM

The system captures the document and image which place in front of PI camera. It connected to Raspberry PI model in that Optical Character Reader (OCR) present .The Image is fed to OCR, It is electronic conversion of image and document in to the computer language. So computer can recognize the data and given to the Google text to speech converter .The Goggle Text to speech converter is used to convert the data in to the audio .The audio is then listen by earphone or speaker connected to the Bluetooth.

4.1 OCR- Optical Character Reader:

Optical Character Reader (OCR) is the electronics or mechanical conversion of imaged type, handwritten or printed text in to a machine encoded text .OCR is used for first scanning the data then converting in to the text. Widely used as a form of information entry from printed paper data records whether passport documents, invoices, Bank Statements computerized receipts, business cards, mail, printouts of static-data, or any suitable documentation
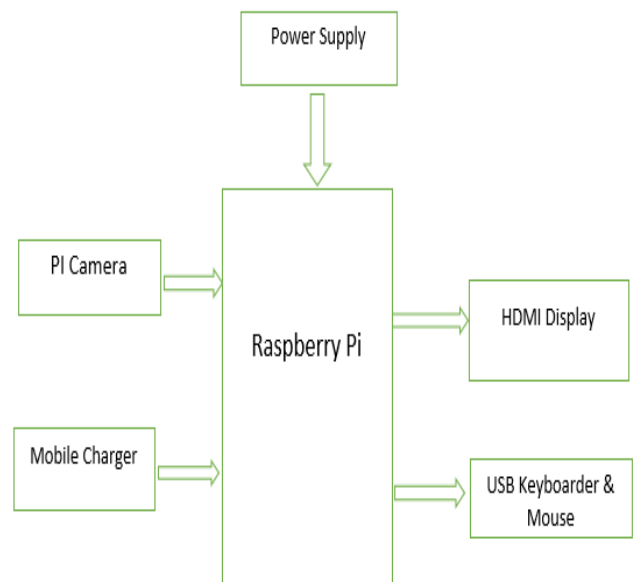

Figure 3: Proposed System

4.2 Raspberry Pi:

The Raspberry PI is small single board computer developed in the Kingdom, it is small in size, low cost and it works as a normal computer at low cost server to handle web traffic. There are two models - Raspberry Pi 2 and Raspberry Pi 3

Advantages are as below

- A 1.2GHz 64-bit quad-core ARMv8 CPU
- 802.11n Wireless LAN
- Bluetooth 4.1
- Bluetooth Low Energy (BLE)
- 4 USB ports
- 40 GPIO pins
- Full HDMI port
- Ethernet port
- Combined 3.5mm audio jack and composite video
- Camera interface (CSI)
- Display Interface (DSI)
- Micro SD card slot
- Video Core IV 3D graphics core

4.3 Operating System:

Rasbian is a Debian –based computer operating system for Raspberry PI.Since 2015 it has been officially provided by the Raspberry PI foundation as the primary operating system for family of raspberry Pi single board computers .It is highly Optimized for Low performance ARM CPU .It is light weight as it is main desktop environment
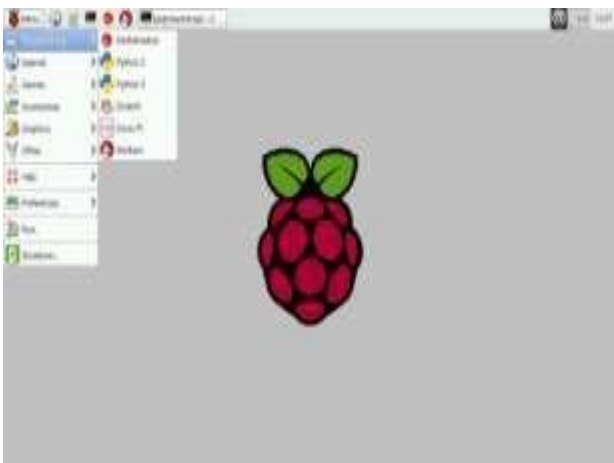

Figure 4: Rasbian OS

5. CONCLUSION

This system helps blind people or people with significant visual impairment can read from data or nearby sign posts or product labels then it will enhance their independent living and indirectly growth of the country .Camera captured the photo of Raspberry PI 3 in Pi camera, that feed to the Raspberry PI model, OCR converts the image file in to the machine code that recognize by the computer and converted in to the text with the use of GTTS (Google text to speech converter) the text data is converted in to the speech and output audio is audible by Bluetooth or speaker connected to it.

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