Product Label Reader for Visually Impaired People and Blind People

Sandesh Patil[1], Indrajeet Naik[2], Kailas Gangan[3], Sajid Mahimkar[4], Prof.Mrs.R.R.Kulkarni[5]
Department of Electronics and Telecommunication Engineering
[1,2,3,4,5] Finolex Academy Of Management And Technology, Ratnagiri.

Abstract- *We propose a camera based assistive text reading framework to help blind person to read text labels and product packaging from hand-held objects in their daily lives. The device we have proposed aims to help people with visual impairment. In this project, we developed a device that converts an image's text to speech.here used a Raspberry Pi and a Raspberry Pi camera. The captured image undergoes a image pre-proceessing steps to locate only that part of the image that contains the text and removes the background. Two tools are used convert the new image (which contains only the text) to speech. They are OCR (Optical Character Recognition) software and TTS (Text-to-Speech) engines. The audio output is heard through the raspberry pi's audio jack using speakers or earphones.*

I. INTRODUCTION

In our planet of 7.4 billion humans, 285 million are visually impaired out of whom 39 million people are completely blind, i.e. have no vision at all, and 246 million have mild or severe visual impairment (WHO, 2011). It has been predicted that by the year 2020, these numbers will rise to 75 million blind and 200 million people with visual impairment [11]. In order to help visually impaired people to read text we have developed a camera-based assistive text reading framework to track the interested area within the camera view and extract printed text information from the object.

The overall process flow involves capturing the image using a web camera, then the captured image is converted into binary representation. That is, the image is converted into a gray scale image. From the gray scale image, individual letters are extracted and recognized. All these processes are carried out by Optical Character Recognition algorithm. After undergoing various stages like scanning Preprocessing, Segmentation and Feature Extraction. finally, the extracted text is read via a speaker connected to the Raspberry Pi.

II. OPTICAL CHARACTER RECOGNATION(OCR)

Optical Character Recognition or OCR is the text recognition system that allows hard copies of written or printed text to be rendered into editable, soft copy versions. It is the translation of optically scanned bitmaps of printed or written text into digitally editable data files. An OCR facilitates the conversion of geometric source object into a digitally representable character in ASCII or Unicode scheme of digital character representation. OCRs are of two types: for recognizing printed characters and for hand written text OCR PROCESS The process include scanning, document image analysis (DIA), pre-processing ,segmentation and recognition.

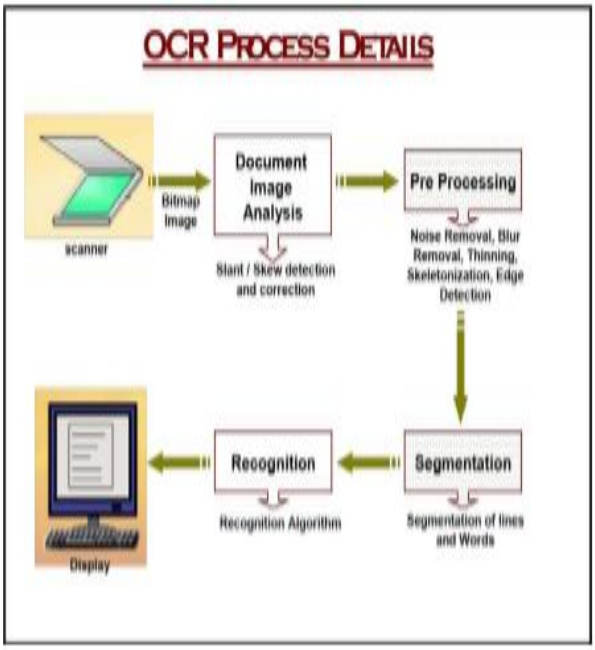

Figure1. OCR PROCESS

III.TEXT TO SPEECH(TTS)MODULE

The process of converting text to speech by a computer is called speech synthesis. A text to speech system (TTS) is used to perform speech synthesis. A TTS is composed of two parts: front end and back end. The front end converts the text to a symbol, for example, a number. Each symbol generated is assigned a phonetic. The back end then converts the phonetic into sound. In our project, we have used Festival TTS. Festival is the most widely used open source TTS. It has a wide variety of voices and support English,

Spanish and welsh language. We have used the English language.

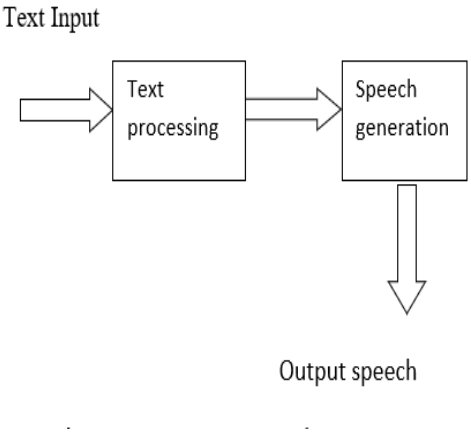

Figure 2.Text To Speech system

III. LITERATURE REVIEW

In this paper, they have presented a robust approach for text extraction and convert it to speech. Testing of device was done on raspberry pi platform.web cam is connected to Raspberry Pi to capture the images.The required region of image containing text done by wrapping and cropping. Optical character Recognition (OCR) is convert scanned or printed text images, handwritten text into editable text for further processing [5]

Present navigation System for blind people to navigate safely , in the system obstacle detection and recognition is done using 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. [2]

There is no existing reading assistant can read text from the kinds of challenging patterns and backgrounds found on some books. Such text information can appear in multiple scales, fonts, colours, and orientations. The proposed algorithm can be effectively used to handle different background patterns, and extract text information from any kind of hand-held objects or books. [7]

Sim Liew Fong, Abdelrahman Osman Elfaki, Md Gapar bin Md johar and kevin Loo Tow Aik[8] have discussed the method to developed system for text to speech conversion or image to text conversion and then text to speech conversion using MATLAB. They have used methods like pre-processing, Unicode conversion, segmentation, concatenation, prosody and smoothing. Various methods used for TTS conversions are concatenative synthesis which include unit selections, diphone and domain specific synthesis. Also, for text to phoneme conversion challenge like determining the tone and pronunciation of a word based on the spelling. Also emotional contents are important for producing vocal futures. For image to text conversion firstly, RGB image is converted to grayscale image and then image regeneration is to use to extract the characters out of image which are compare to the database and the text is produced. [6]

IV. APPLICATIONS

1. for Visually Impaired and blind person
2. library
3. Telecommunication and Multimedia
4. Market

V. CONCLUSION

This presents a camera-based label reader to help blind persons to read names of labels on the products. Camera acts as main vision in detecting the label image of the product then image is processed internally and separates label from image by using open CV library and received label image is converted to text by using tesseract OCR. The converted text is converted to voice to hear label name as voice through ear phones connected to audio jack port using e speak engine

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