

# Camera Based Assistant for Blind People Using Raspberry Pi

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**ABSTRACT:** The Camera Based Assistant for Blind People is the project contains the TTS (Text To Speech) technology which is basically used for conversion of text file into voice or audio form. This TTS technology proposed to help the blind people. According to World Health Organization 91% people are blind. So it is necessary to help blind people. This is the purpose for which Text To Speech conversion using raspberry - pi proposed in this paper. It includes camera to capture image as an input text which is then pass to TTS unit. This TTS unit is installed in raspberry pi and output of TTS is amplified by using audio amplifier and then it given to the speaker.

**KEYWORDS:** OCR (optical character recognition), TTS (text to speech), audio output

## I. INTRODUCTION

This project has represented the innovative idea as well as low cost technique that are used to hear the contents of text image without reading them. It combines the concept of Optical Character Recognition and Text To Speech synthesizer in raspberry-pi.

This system is used to help blind people to interact with computer effectively through vocal interface. Text extraction from colour image is very difficult task for computer text to speech conversion system is read the English alphabets and numbers that are in the image using OCR technique and then convert it into the voice format. This presents design implementation and experimental result of the device. This device consists of two parts, image processing module and voice processing module. The Optical Character Recognition is the process that converts scan or printed text images into the text format into the further processing.

This project has presented simple approach for text extraction and its conversion into speech. The testing of devices is done on raspberry pi module. Text To Speech system produces the more natural voice that can be closely watched by human voice. The examples of speech synthesis are voice enabled e-mail and messaging. The first step of speech synthesis is for the uses to speak a word in microphones and then that speech is converted into the digital format by using analogue to digital converter and stored in the memory.

Optical Character Recognition is the process that converts scanned and printed text images, handwritten texts into the editable text for further processing. This paper has presented robust approach for text extraction and converting into the speech. Testing of device was done on the raspberry pi platform. The Raspy is initially connected to the internet through VLAN. The software is installed using command lines. Following steps are to be followed

- The first step is to download the installation script then coding is done
- Second step is to convert it to executable form
- The last step starts in the script which does the rest of the installation work.

The webcam is manually focused towards the text. Then, it takes a picture; a delay of around 7 seconds is provided, which helps to focus the webcam, if it is accidentally defocused. After delay, picture is taken and processed by Raspy to hear the spoken words of the text through the earphone or speaker plugged into Raspy through its audio jack.

## II. OBJECTIVES

- Blind people will effectively interact with the computer through the vocal interface.
- TTS allows to understand the information in an easier way.
- Detect text on an image and convert it into audio format.
- It can convert both capital as well as small letters and remove impurity in an image.
- The main objective of project is the blind people will get the output in voice format.

## III. PROPOSED WORK

[1] Reading is important in today’s life. Printed text is everywhere in the form of receipts, bank documents, reports, books. There are many systems build to convert text to speech, but they can’t handle product labelling. This paper proposed camera based assistant text reading to help blind peoples to read the product label and other printed text. Main prototype of this system are 1) Novel based algorithm to solve aiming problem.2) Novel algorithm of automatic text localization to remove the background of the text image and collect text on the image. 3) Camera based framework used for blind people to read text.

Chaw suthu et.al proposed text to speech conversion. This paper considers computer based system that can read any text, whether it was introduced in the computer by scan and submitted to an OCR system. There are many systems which convert text into speech. The OCR system is used for the character recognition. The recognize character save in notepad file as text. Then this text file directly gives to the computer as an input. Then speech through that uses MATLAB. But this system cannot detect small letters.

Proposed that this project introduced smart device that useful for visually impaired peoples. This project uses the technology of camera based assistant device that can be useful for blind people to read documents and other printed text. The work is implementing capturing image technique in an embedded system. In this system has a camera as an input device to detect the printed text for reorganization and that scanned text is process by a software OCR.

The major goals of our new system are as follows:

- TTS technology allows them to understand information in a way that makes content easier to retain and convert it in to audio file.
- Detect text on the image and create text file then convert it into audio file
- It can convert both capital as well as small lettersand remove impurity in an image
- The main objective of Text To Speech Converter the blind people got the output in the voice format

### A.SYSTEM ARCHITECTURE

The block diagram of Text To Speech device, first block is image processing module, where OCR converts .jpg to .txt form. Second is the voice processing module which converts .txt to speech.

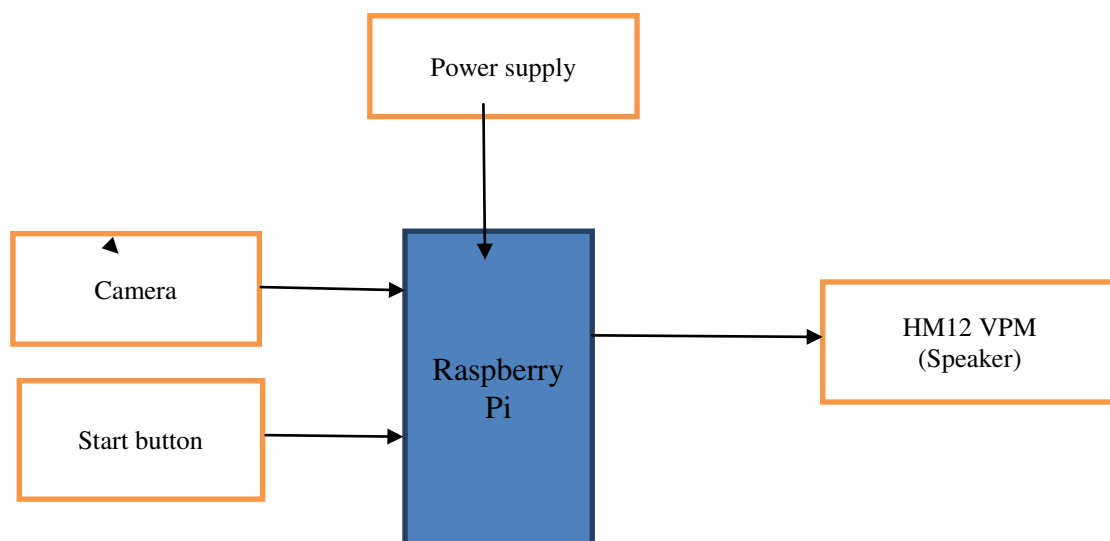


Fig.1 SYSTEM ARCHITECTURE

## B. BLOCK DIAGRAM

### Working

It contains the following components:

- Power supply – It is an electrical device that can supply the electrical power. 5v supply is used in that.
- Ethernet – It is used to access the e-dictionary website.
- Camera – This is used for capturing image
- Raspberry pi – This project has been built around Raspberry pi B+ processor board.

## C. OCR PROCESS

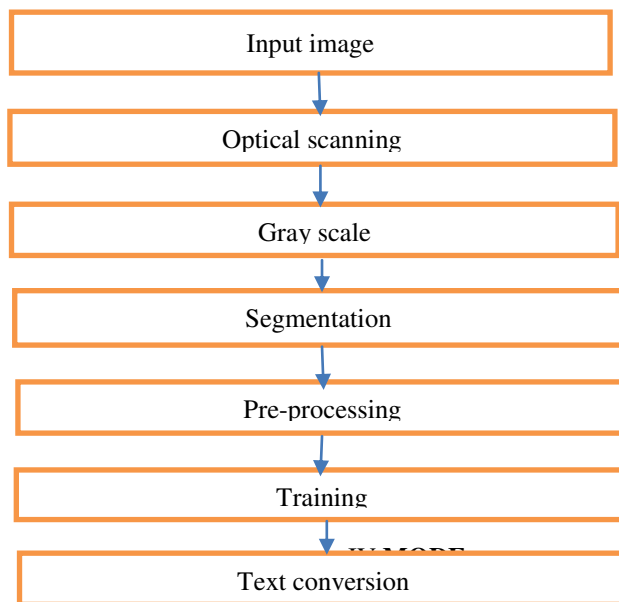


Fig.2: OCR Process

- Webcam capture the image then image can be read.
- Pre-processing is done in second step
- Color image is converted into gray scale and then gray scale is converted into the binary image.
- Character is extract and resize the image.
- Load templates can be matched.
- Remove the background.

Above process is done in the image processing and remaining process are done in voice processing. The image is converted into text and text is converted into the speech.

**D. TEXT TO SPEECH CONVERSION**

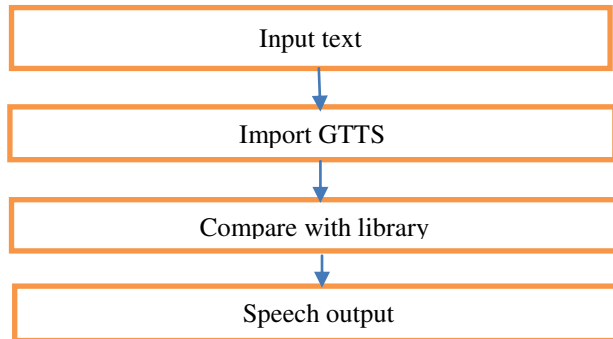


Fig.3 TEXT TO SPEECH CONVERSION

**Following steps are required:**

- In that e-speak library is used
- So that first we check the e-speak library is available in computer or not. If e-speak library is not available then then we can get error.
- Comparing the input string with e-speak string.
- Extract the voice.
- Initialize the wave player for convert the text to speech.
- Finally we can get the output.

**E. BLOCK DIAGRAM OF IMAGE TO SPEECH DEVICE**

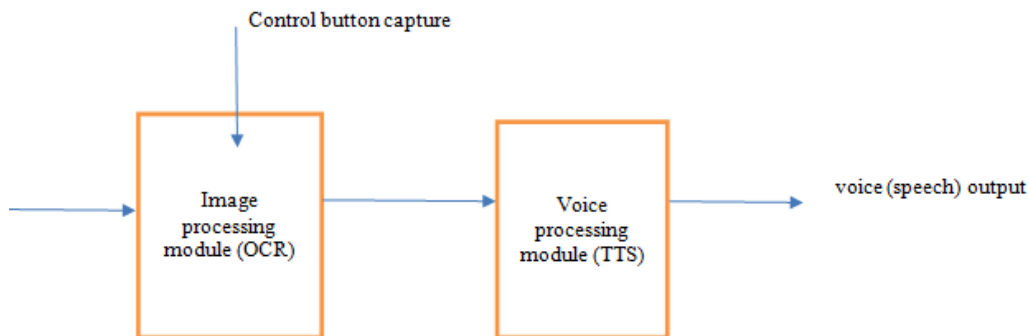


Fig.4 BLOCK DIAGRAM OF IMAGE TO SPEECH DEVICE

In this project we are identifying English alphabets. Before feeding the image to OCR, it is converted to a binary image to increase the recognition accuracy. Image binary conversion is done by using Image Magic Software which is another open source tool for image manipulation. The output of OCR is the text which is stored in a file (speech.txt)

**ADVANTAGES**

- It helps to improve reading, spelling, writing skills.
- Quick response.
- Output will be in voice format which is easily understand to blind people



#### IV. CONCLUSION

Text To Speech can convert the text on image into sound. For this conversion does not require internet connection. By implementing this system visually impaired people can easily listen the text printed on the products whichever they want to buy. And with the help of translation tools he can convert the text to the desired language. And again by using Google speech recognition tool he can convert that changed text into voice. By that they can be independent.

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