Text To Audio Conversion And Automation For Blind Person Using Raspberry Pi

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Abstract- *Human communication is based on Speech and text. To access text, a person needs to have vision. However those who have poor vision can gather information from voice.The system helps visually impaired person to hear the text. Also it is very difficult for blind people to operate electrical devices this paper offers Google Home's voice recognition with the conception of machine-learning to prove the feasibility analysis about fulfilling the users' needs by a smart home. The idea involves two methods optical character recognition and text to speech conversion. This is a prototype for blind people to recognize the products in real world by extracting the text on image and converting it into speech. The method is carried out by using Raspberry pi and portability is achieved by using a battery backup. Thus theuser can carry the device anywhere and able to use at any time.*

Keywords*- Optical character recognition, Text to speech conversion, Raspberry Pi, Raspbian OS.*

I. INTRODUCTION

In humans day to day life speech plays an important role to explain one's thoughts. One of the most significant difficulties for a visually impaired person is to read. Recent developments in mobile phones, computers, and availability of digital cameras make it feasible to assist the blind person by developing camera based applications that combine computer vision tools with other existing beneficial products such as Optical Character Recognition (OCR) system. In this system text recognition is done by Open Computer Vision (Open CV), a library of functions used for implementing image processing techniques. The binary image is converted to text by Tesseract library in OCR. In this system the conversion of text to voice output is by e-Speak algorithm. The e-Speak is a Text- To-Speech (TTS) system which converts text into speech. This paper aims to build an efficient camera based assistive text reading device This is carried out by using Raspberry pi where the portability is the main aim, which is achieved by providing a battery backup. Along with this paper consist of voice based home appliances control system for blind people.

II. RELATED WORK

There are a lot of devices which assist the visually challenged for navigation indoor and outdoor. A couple of them are [1]autonomous walking stick helps visually impaired person to hear the text in which text file converted into audio signal using MTLABB16.This system is cost effective and user compatible without use of internet connectivity. System Consume more power to operate. [2] Serves an electronic long cane for blind person. This system was designed using haptic sensors that are used to detect obstacles above the waistline. But this system can detect obstacles only above the waistline. Late years have seen various text to speech conversion system for visually impaired people.[3] system is developed to help visually impaired person to hear the text.An optical character recognition technology is used. An algorithm development is done with the help of MATLAB16 software. Product label reading and speech conversion system is developed for blind person. Which serves a productive and efficient motion based technique for defining a region of interest (ROI) in the video by shaking the object in the image. Gaussian based background subtraction method is used for extracting region of movement of an object. Optical character recognition technique is used for recognizing text character. Augmented reality based multimodal system is developed which used (OCR) and text to speech technology used.

III. SYSTEM ARCHITECTURE

The system helps blind person in reading the text present on the text labels, printed notes and products as a camera based assistive text reader. The system has two different modes the text modes and automation mode.

Text mode and automation mode

Text mode involves the text recognition and text to speech conversion process. In the beginning Image is captured with the help of raspberry pi camera. Captured image is loaded to the tesseract OCR so as to perform text recognition. Output of the Tesseract OCR will be text file which is the input of the e-Speak.Captured image is converted into gray scale image .every character from the image is then extracted and feed to

the OCR engine to obtained the complete text present in the image. In the next step extracted text is converted into speech using speech synthesizer named as TTS engine.
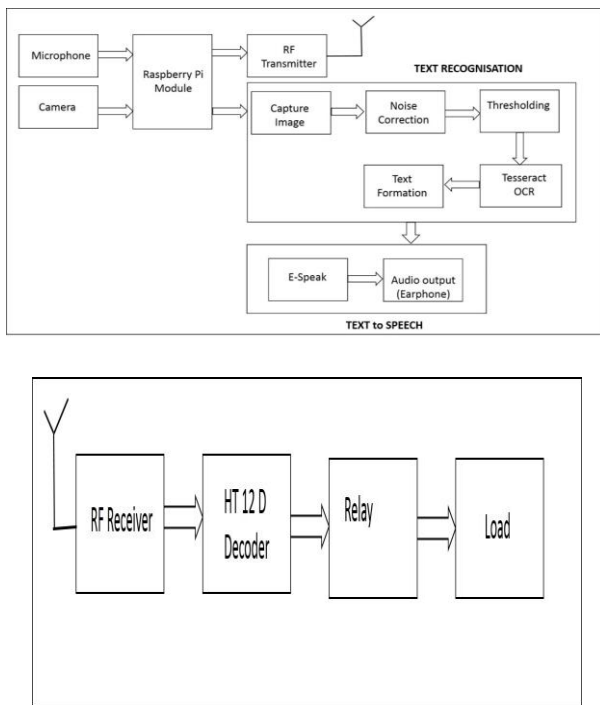

Fig.1: System Architecture

Text to speech conversion is performed using E-speak software. An analog signal produced by the e-Speak is then given to ahead phone to get the audio output signal. System uses OCR and TSS methods along with raspberry pi as operating system for text to speech conversion as basic tools.In the automation mode by providing voice command to the device person can easily control the home socket. With the help of microphone blind person give command to the module in the form of audio signals. These audio signal processed in the raspberry pi module at receiver side using RF transmitter. RF receiver decoded the signals with the help of HT 12 D decoder and transfer the signal to the relay. Using verbal command device ON/OFF is carried out.

IV. PROJECT IMPLEMENTATION

Our system involves of image capturing, text extraction and text to speech conversion. We can easily operate this system using pc or mobile for using with mobile we have to use VNC viewer app An image is taken with the help of camera. Captured imager is fed to the raspberry pi module where text extraction is done with help of OCR engines. Tesseract OCR engine is used which helps to extract the recognized text.The extracted text is then firstly converted into speech with the support of speech synthesizer named as TTS engine.

TTS engine having the ability to convert text into speech using predefined libraries. E-speak software is used for carried out the text to speech conversion process. Person can get the speech signals using earphones.
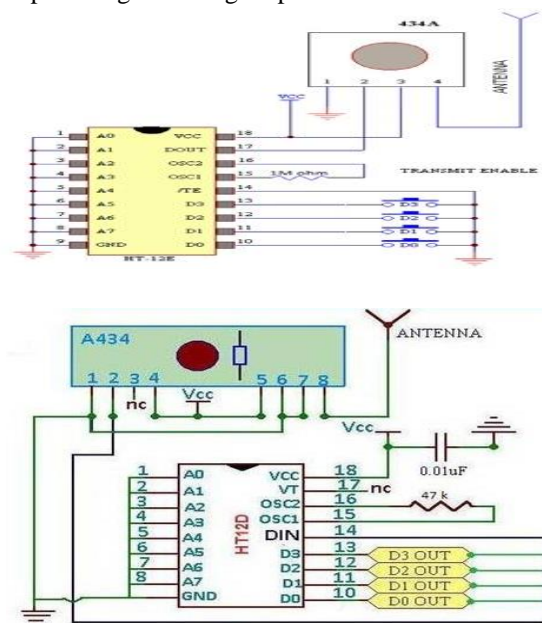
Block diagram for home automation

In the automation block blind people gives the voice command. Audio signals are processed in to the raspberry pi module Using RF transmitter signal are send to the receiver side where RF receiver received the signal decode them using HT 12 decoder IC. Decoded signal is then fed to the relay. Using relay the particular device get ON/OFF with the help of voice command.

V. APPLICATION

Visually impaired person can easily access the text reading service. Provide a platform for blind person to do their daily task more easily like controlling the switches of home with voice command.The device is compact and helpful to the society. This system is an economical as well as efficient device for the visually impaired people.Visually impaired person can easily access the text reading service.It is useful in both the places official as well as domestic.

VI. RESULT

For text to speech conversion and Automation mode

When the person gives the command CAPTURE, camera will capture the image with the help of USB web camera System can compare the captured image character with stored database in OCR algorithm. Tesseract OCR algorithm extract the character from image.Then the

recognized character converted into audio using TTS tool that is PY TT SX algorithm .this algorithm is used for speech conversion. This extracted feature compared with stored database with PY audio speech recognition algorithm and gives the voice output through speaker. Person can control the home appliances like fan, lights with the help of voice command. For that the separate circuit is used.
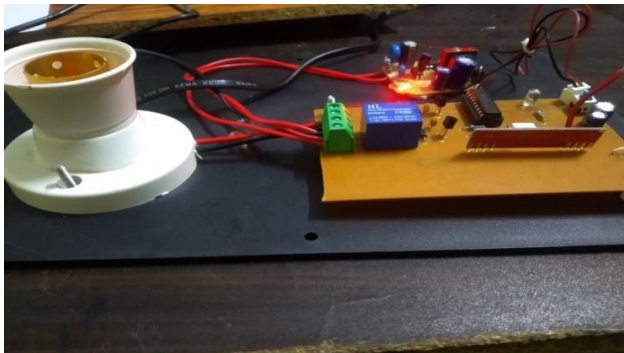

Fig. setup for text to speech conversion an automation mode

A person gives light ON command through microphone that audio signals passed to the RF transmitter. RF transmitter encode the signal using HT 12 encode IC and supply to the RF receiver where audio signals get decoded using HT 12decoder IC that signal then fed to relay and light gets ON.Vice versa using the light OFF command light gets OFF.

VII. CONCLUSION

We have made the system text reading and automation for blind person using raspberry pi system is more suitable to use for visually impaired person. Image is captured using raspberry pi camera and text extraction is done using OCR tesseract engine and text to audio signal is done using TTS from e-speak software. The home devices can be easily process ON/OFF function using voice command. With the help of microphones audio signal applied to the module using relay the home control operation is possible.

VIII. FUTURE SCOPE

Travel aid project can be implemented using this system to assist visually impaired people in the unknown and known area as well as indoor and outdoor zone.In future we can generate text to speech conversion for different languages. Can be developed in android app.

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