



TEXT TO SPEECH CONVERTER USING RASPBERRYPI

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ABSTRACT

The present paper has introduced an innovative, efficient and real-time cost beneficial technique that enables user to hear the contents of text images instead of reading through them. It combines the concept of Optical Character Recognition (OCR) and Text to Speech Synthesizer (TTS) in Raspberry pi. This kind of system helps visually impaired people to interact with computers effectively through vocal interface. Text Extraction from color images is a challenging task in computer vision. Text-to-Speech conversion is a method that scans and reads English alphabets and numbers that are in the image using OCR technique and changing it to voices. This paper describes the design, implementation and experimental results of the device. This device consists of two modules, image processing module and voice processing module. The device was developed based on Raspberry Pi v2 with 900 MHz processor speed.

Keywords: Image Processing, OCR, Text Extraction, Text-to-speech, Voice Processing.

INTRODUCTION

This paper has represented the innovative idea as well as low-cost technique that is used to hear the contents of the text image without reading them. It combines the concept of optical character recognition (OCR) and Text to speech synthesizer (TTS) in raspberry pi. This system used to help the blind people to interact with computer effectively through vocal interface. Text extraction from color image is very difficult task for computer the text to speech conversion system is read the English alphabets and numbers that are in the image using the OCR technique and convert it into the voice format. This paper presents the 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 (OCR) is the process that converts the scan or printed text images into the text format for the further processing.

This paper has presented the simple approach for text extraction and its conversion into speech. The testing of devices was done on raspberry pi module. Text to speech (TTS) system produces the more natural voice that can be closely matched with human voice. The example of the speech synthesis is the 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 analog to digital converter and stored in memory.



LITERATURE REVIEW

Reading is important in today's life. Printed text is everywhere in the form of receipts, bank documents, reports, books. There are many systems done text to speech conversion, but they can't handle product labeling. But big limitation is use of this is difficult for blind people. This paper proposed camera-based text reading to help blind peoples to read the product label. Main prototype of this system is:

- 1) Novel based algorithm to solve aiming problem.
- 2) Novel algorithm of automatic text localization to remove the background of the text image.
- 3) Camera based framework used for blind people to read text.

Chaw su thuet.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 a input. Then speech through that using MATLAB. But this system cannot detect small letters.

Proposed that this project introduced smart device that useful for visually impaired people. This project uses the technology of camera-based device that can be useful for blind people to read documents. 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 recognition and that scanned text is process by a software OCR.

Sohaib Eshan Bazai, “Motion based smart assistant for visually impaired people” June 2020

The present paper deals with building a smart assistant with the aim of assisting the visually impaired people in mobility with confidence by realizing the nearby obstacles and also implement image processing techniques to recognize people.

Saidur Rahman, “Design and Implementation of a Smart Assistive System for Visually Impaired People Using Arduino” November 2019

Now a day’s many visually impaired people face many problems when they walk on the streets or roads. These visually impaired people need a device that is used in avoiding an obstacle and also aware people by using voice guidance.

EXISTING METHOD

The below figure explains the flow of the text to speech module which is explained in detail as follows: Text to speech conversion can be accomplished by starting with the method of pre-processing of the input text. Here the text abbreviations, acronyms and numbers are expanded. The pre-processed text will then be converted to Unicode. Unicode has the explicit aim of transcending the limitations of trad encodings. Here the pre-processed text is used to identify the fonts of input text and is converted to Unicode. Now, the encoded text is segmented into syllables and the duplicates are removed.

The syllabled text is then mapped with the syllable sound files in the database. These syllables will be then concatenated and smoothened for resultant outputs. This is done by optimal coupling algorithm. This gives a smooth human speech output. Variations can be applied to the resulting output. Voice, rate, volume, of the output speech can be suitably by the user.

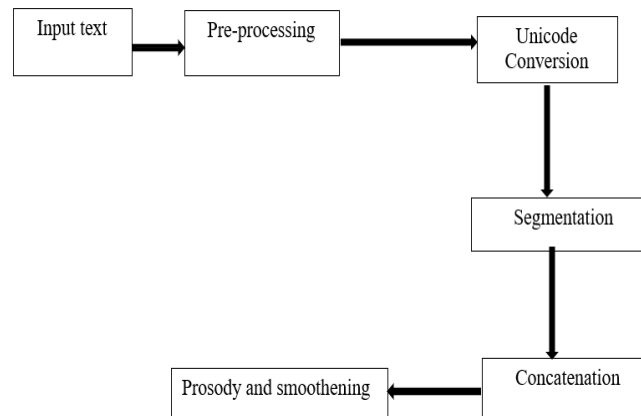


Fig 1: Block diagram of Existing method

PROPOSED METHOD

OCR is main element. It can convert the scanning image into editable text. OCR is implemented in this project to recognize characters which are then read out by the systems through a speaker. It is method that scans and reads English alphabet and numbers. Webcam focused on text and it taking a picture. there are some delays is required. after the delay, it taking the picture and the processed by raspberry- pi So that the steps for character recognition.

- Webcam capture the image then image can read.
- Pre-processing is done in 2nd step color image is converted into gray scale and gray scale is converted into the binary image.
- Character is extract and resize the image.
- Load templates that can be matched.
- Remove the background
- Edge detection is done in last step of character recognition in that open the text file and write the file.so that the output is stored in text format.

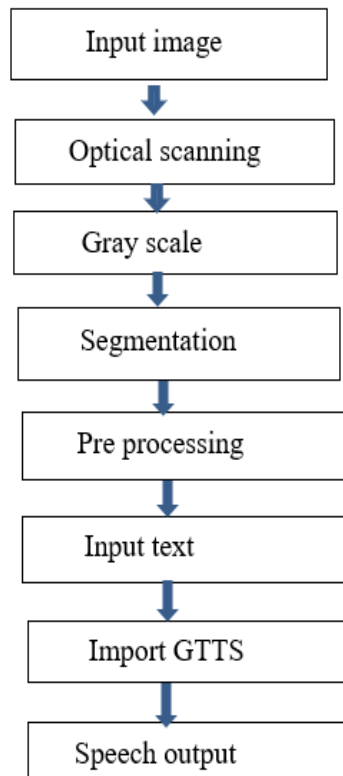


Fig.2 Block diagram of Proposed method

METHODS OR TECHNIQUES USED

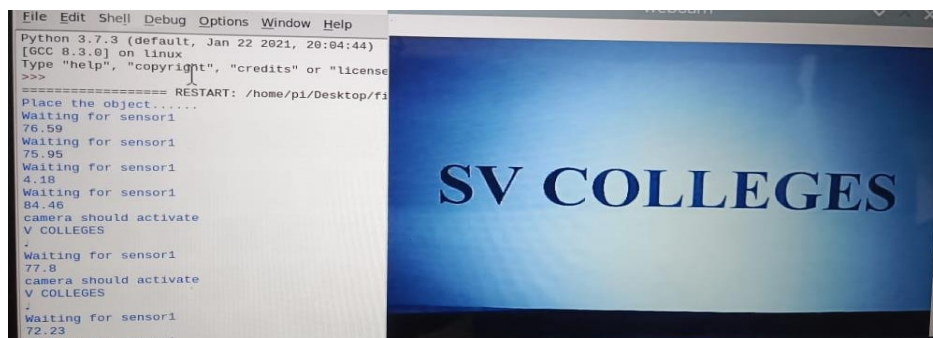
Python software is installed in raspberry pi. This software is used to convert the image file to text file.py extract the text. VNC Viewer is also used in order to connect deices such as local computers and mobile devices or smart phones with VNC Viewer software installed can access and take control of a computer in another location.

RESULT

Testing for different Text

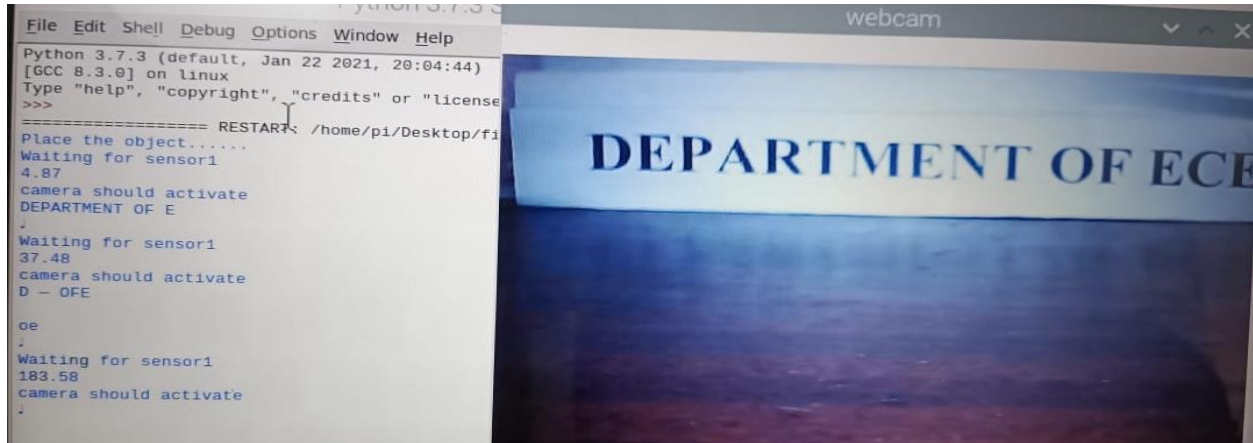
INPUT TEXT 1: SV COLLEGES

OUTPUT 1:



INPUT TEXT 2: DEPARTMENT OF ECE

OUTPUT 2:



ADVANTAGES

1. Visually impaired people can live an independent life. They do not dependent on other people for their own work.
2. Due to the graphical user interface (GUI), the visually impaired people can interact with the application easily.
3. It also helps to learn the pronunciation of the word in the written language with help of text to speech module.
4. It can be used by normal or illiterate people who can't read the language but understands it.
5. We also employ the Microsoft's speech synthesizer for text to speech conversion due to this we can use this application in Laptop as well as Tab.
6. To read English character from images.
7. This system is portable and easy to operate.

APPLICATIONS

1. For visually impaired people in public places like mall, bank statement, hospital, hotel menus, any shops etc.
2. For normal and illiterate people.
3. It is use for foreign language. Such type of technology will help people travelling abroad for understanding sign, destination of buses and trains, names of streets etc.

CONCLUSION

Text-to-Speech device can change the text image input into sound with a performance that is high enough and a readability tolerance of less than 2%, with the average time processing less than seven minutes for A4 paper size. This portable device, requires internet connection, and can be used independently this method, we can make editing process of books or webpages easier. To evaluate the effectiveness or efficiency of our proposed system, we apply this algorithm on various captured images. We have collected images of book covers, product labels, natural scene images names, documents etc.



FUTURE SCOPE

We have proposed a system to read printed text on various handheld object, natural seen images, book covers, hotel menus and so on. Our future work will extend our project to handle non-horizontal text string. It can effectively extract the text regions from images with complex background. In future we will enhance this work with higher accuracy and large number of input samples. In future we can improve this project for handicapped people also by using speech to text module for writing purpose.

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