Raspberry Pi Based Reader for Blind People

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Abstract – *Text and Speech is the main resources of communication. Vision is required to access the information in a text. Visually impaired people face lots of difficulties while accessing printed documents. Access various text resources and enhance their knowledge by providing technical solution is the main scope of this project. In this Proposed System we use WEB Camera for capturing the image. This captured image is then converted into text with the help of OCR (Optical Character Recognition) software. TTS (Text to Speech) engine is used to convert text to speech. .*

Key Words: Raspberry Pi, WEB Camera, Optical Character Recognition (OCR), Text To Speech (TTS) Engine

1. INTRODUCTION

While accessing printed text by using existing technology visually impaired people face numerous difficulties regarding to the alignment, focus, accuracy, mobility and efficiency. This paper proposes the smart reader for visually impaired people. To read text document camera based assistive methodology is used as a input. Captured image by web camera is converted into machine coded text by using OCR(Optical Character Recognition).The audio output is achieved by using text to speech synthesis through speaker. Tesseract library and python programming is used for conversion of printed documents into text file by using Raspberry pi.
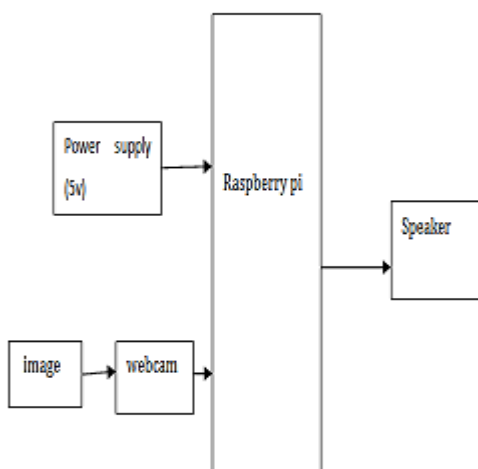
2. Block Diagram

Fig: Block diagram of raspberry pi based reader for blind

3. Methods

Image processing and voice processing are the main modules in text to speech device. Image into text is converted by image processing module and text into sound conversion is done by voice processing module.
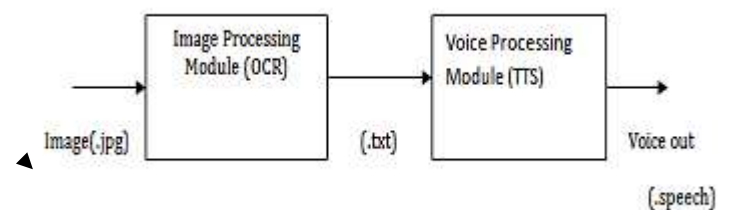

Fig: Block Diagram of Text to speech device

Fig shows the block diagram of text to speech conversion device. The first module converts .jpg to .txt form. Second module converts the .txt into speech.

3.1 Image Processing Module

In this module OCR is the main element. This technology recognize the character through optical mechanism. This technology has the ability of express the human senses of sight, where the replacement of eye is camera and the substitute for human brain is computer engine in which image processing is done. Flexibilty and extensibility of machine is the main reason for selection of tesseract engine. Image is converted into binary form before feeding to the OCR to increase the recognition accuracy. Imagemagick software is used for image binary conversion which is open source tool for image manipulation. The output of OCR is the text which is stored in file.

3.2 OCR Implementation

Webcamera captures the input image. Pixel is the minimum character size which can be read by tesseract OCR and the font size required is 14pt.
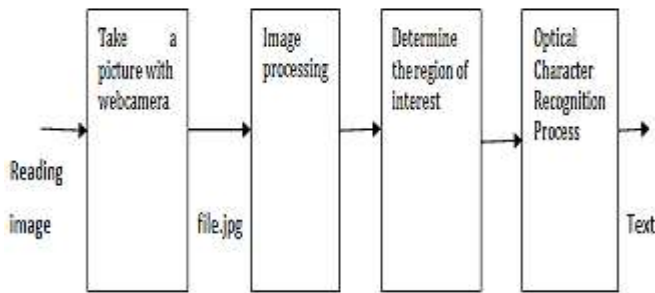

3.3 OCR Software Design

Fig- Voice Processing Module using text to speech system

Text is converted into voice by using text to speech system. The output of OCR is text which is stored in file (file.txt).Festival is the open source software is used for conversion of text to speech. Text is read by English TTS system

4. Design Implementation

1. Raspberry pi 3(model B+)

2. Web camera

3. Headset

4. Power supply

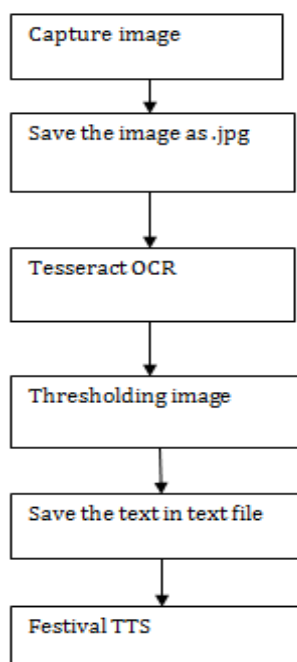5. Peripherals (Mouse, Keyboard, Camera)

5. Flow of Program

Fig: Flow chart for text to speech converter

6. Result

- Text is extracted from image as a input and converted into audio as a output.
- It extract capital as well as small letters.
- Range of reading distance from 12-14cm.

7. Conclusion

Text to speech coverter device convert the text input image into audio output. Average processing time required is less than 2 minutes. This device does not require internet connection and can be use independently by people.

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