

BLIND READER USING RASPBERRY PI

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Abstract - This project presents the automatic document reader for visually impaired people, developed on Raspberry Pi. It uses the Optical character recognition technology for the identification of the printed characters using image sensing devices and computer programming. It converts images of typed, handwritten, or printed text into machine encoded text. In this research these images are converted into the audio output (Speech) through the use of Text-to-speech synthesis. The conversion of printed document into text files is done using Raspberry Pi which again uses Python programming. The text files are processed by Open CV library & python programming language and audio output is achieved.

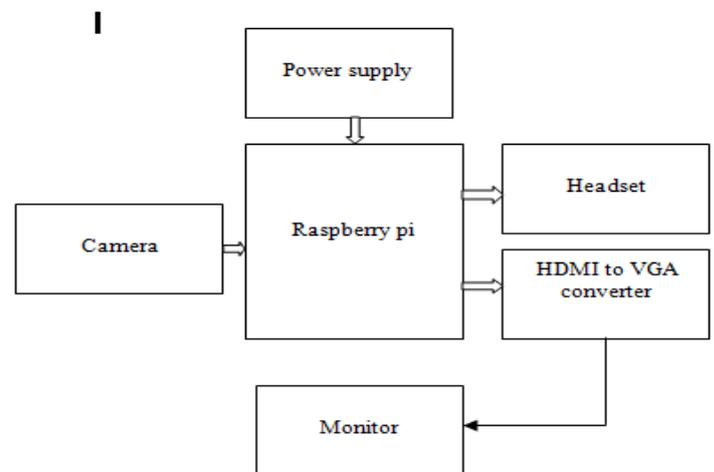
Key Words: HDMI display IOT, Raspberry Pi-3, Tesseract OCR engine, Pi camera, Speaker.

1. INTRODUCTION

The estimated number of people visually impaired in the world is 285 million, 39 million blind and 246 million having low vision. In that 41% are illiterate. The cost of books for the blind people is more than our conventional books and that books are read only by the literate blind. So we are trying to overcome these problems by using our project. In our project we are going to develop a system in which we will convert the text message into speech. Which will be convenient for blind people by the use of our project? This project will be useful for illiterate blind people as well as normal illiterate people.

Visually impaired people report numerous difficulties with accessing printed text using existing technology, including problems with alignment, focus, accuracy, mobility and efficiency. We present a smart device that assists the visually impaired which effectively and efficiently reads paper-printed text. The proposed project uses the methodology of a camera based assistive device that can be used by people to read Text document. The framework is on implementing image capturing technique in an embedded system based on Raspberry Pi board. The design is motivated by preliminary studies with visually impaired people, and it is small-scale and mobile, which enables a more manageable

2. Block diagram



2.1. Hardware Implementation

A. Raspberry pi:

It has four USB ports through which four models can be connected at a time and used simultaneously. Python, which is the programming language of raspberry pi is an object oriented programming and it is comparatively easier to read and understand because of its similarity to English language.

The raspberry pi 3 model B which is the 3rd generation of the raspberry pi is employed here. It is a powerful credit card sized single board computer that can be used for many applications and supersedes the original model b+ and raspberry pi2 model. Whilst maintaining the popular board format, the raspberry pi 3 model B brings a more powerful processor, 10 times faster than the 1st generation raspberry pi. It adds wireless LAN and Bluetooth connectivity making it the ideal solution for powerful connected devices.

The technical specification of raspberry pi 3 model B includes

Raspberry pi 3 is a credit card size single board computer with 40 pin extended GPIO, Broad cam BCM2387 chipset, 1.2GHz

Quad-core ARM Cortex-A53(64Bit), 802.11 Wireless LAN and Bluetooth 4.1, GPU, Camera connector, Display connector, Memory card slot, 1GB LPDDR2 memory, Ethernet port, USB host, Micro HDMI on it. Raspberry pi3 is a general purpose computer usually with Linux OS.

B. Camera:

Camera feeds its images in real time to a computer or computer network, often via USB, Ethernet or Wi-Fi.

C. HDMI to VGA Converter:

HDMI to VGA converter is used to connect the Raspberry Pi board to the Projectors, Monitors and TV

D. Power Supply Unit:

It is the device that supplies electrical energy to the output loads.

It gives a well regulated power supply of +5v with a output current compatibility of 100 mA

3. SYSTEM SOFTWARE DESIGN

The system software design consists of various phases which help in producing the end result. A machine understand the next embedded in the image and gives a voice output with the processing of these phases principally, the camera captures the images and stores it as an image file with jpg extension. The OCR engine converts it from image file to text file by extracting the numbers and characters of the language. The file is given as an input to a python program which gives a translated speech output using pi-tesseract library

A. Image to text conversion

Optical Character Recognition is a text recognition method that allows the written text or printed copies of the text to be rendered into editable soft copies or text files. OCR is used for the scanning of text from the images and converting that image into the editable text file.

It is a common method of digitizing printed text so that they can be electronically edited, searched, stored more compactly, displayed online and used in machine processes such as cognitive computing, machine learning and translation, Text-to-speech etc.

OCRs are of two types- For recognizing printed characters and for recognizing hand written text.

B. Text to speech conversion:

The scope of this module is initiated with the conclusion of the preceding module of Character Recognition. The module performs the task of conversion of the transformed text to audible form. The Raspberry Pi has an on-board audio

jack, the on-board audio is generated by a PWM output and is minimally filtered. A USB audio card can greatly improve the sound quality and volume.

Text File

Text to Audio Conversion

As the recognition process is completed, the character codes in the text file are processed using Raspberry

4. CONCLUSION

The prototype has been described reads printed English texts and delivers voice output which highly assists the visually challenged people to understand the same the system is compact and user friendly. The prototype is highly advantageous when compare to the braille system.

5. REFERENCES

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