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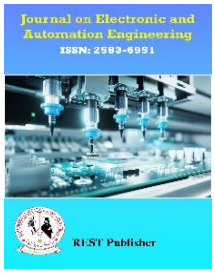

Raspberry Pi Based Reader for Blind

[*] M. Ramyasri, G. Sridevi, K. Lavanya, S. Sindhuja

Jyothishmathi Institute of Technology and Science Karimnagar, Telangana, India.

[*]Corresponding author: ramyamustyala19@gmail.com

Abstract: *The Braille machines are expensive and as a result, are not accessible to many. In particular, there is a need for a portable text reader that is affordable and readily available to the blind community. The designed system is a portable, low-cost, reading device made for blind people. The designed system also overcomes the limitation of a conventional Braille machine by making it affordable for the common masses. This paper proposes a smart reader for visually challenged people using raspberry pi. This paper addresses the integration of a complete Text Read-out system designed for the visually challenged. The designed system consists of a webcam interfaced with raspberry pi which accepts a page of printed text. This system uses OCR technology to convert images into text and reads out the text by using Text-to-Speech conversion. This system supports audio output via Speakers as well as headphones. The OCR (Optical Character Recognition) package is installed in raspberry pi which scans it into a digital document which is then subjected to skew correction, and segmentation, before feature extraction to perform classification. Once classified, the text is read out by a text-to-speech conversion unit (TTS engine) installed in raspberry pi. The output is fed to an audio amplifier before it is read out.*

1. INTRODUCTION

Visually impaired people fail to excess text using existing technology, including problems with alignment, focus, accuracy, mobility, and efficiency. This model uses the methodology of a camera-based assistive device that can be used by people to read text documents. The Internet plays a vital role in today's world of communication. But some people in today's world don't know how to make use of the internet. Some are blind and some are illiterate. So it goes very difficult for them when to live in this world of the internet. Nowadays, various technologies are available in this world like screen readers, ASR, TTS, STT, etc. This system approaches an important digital image analysis domain. Face detection represents a computer technology that determines the locations and sizes of human faces in arbitrary digital images. In object-class detection, the task is to find the positions and sizes of all objects in an image that belongs to a given class. For color images, various kinds of literature have shown that is possible to separate human skin regions from complex backgrounds. Visually impaired people report numerous difficulties with accessing printed text using existing technology. This paper presents a smart device that assists the visually impaired which effectively and efficiently reads the paper-printed text. The system proposed in this paper uses the methodology of a camera-based assistive device that can be used by people to read Text documents. The framework is for implementing image-capturing techniques in an embedded system based on a Raspberry Pi board. In this paper, we have proposed a text read-out system for the visually challenged. The proposed fully integrated system has a camera as an input device to feed the printed text document for digitization and the scanned document is processed by a software module the OCR (optical character engine). Most of the access technology tools built for people with blindness and limited vision are built on the two basic building blocks of OCR software and Text-to-Speech (TTS) engines. Optical character recognition (OCR) is the translation of captured images of printed text into machine-encoded text. OCR is a process that associates a symbolic meaning with objects (letters, symbols an numbers) with the image of a character. It is defined as the process of converting scanned images machine-printed into a computer-processable format. Optical Character Recognition is also useful for visually impaired people who cannot read Text documents but need to access the content of the Text documents. Optical Character Recognition is used to digitize and reproduce texts that have been produced with the non-computerized system. Digitizing texts also helps reduce storage space. Editing and Reprinting a Text document that was printed on paper are time-consuming and labor-intensive. It is widely used to convert books and documents into electronic files for use in storage and document analysis. OCR allows applying techniques such as machine translation, text-to-speech, and text mining to the capture /scanned page. The final

recognized text document is fed to the output devices depending on the choice of the user. The output device can be a headset connected to the raspberry pi or a speaker which can spell out the text document loud. The designed system is to convert the text in the textual image into speech efficiently.

2. PROPOSED METHOD

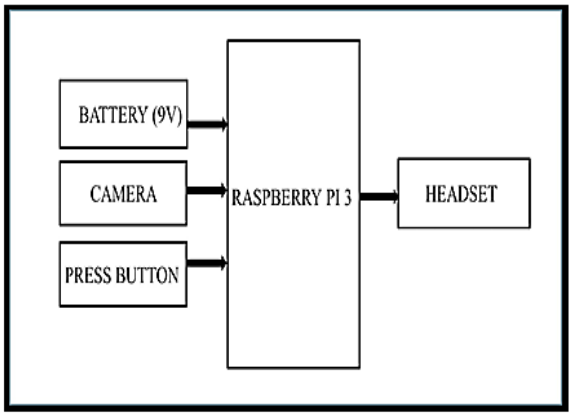

FIGURE 1. Block Diagram of Raspberry Pi Based Blind Reader

Figure 1. shows the block diagram of raspberry pi based blind reader. It consists of raspberry pi 3, battery, camera, press button, headset. Raspberry Pi is the control unit which controls the entire system. A battery of 9V is use as the power source which turns on camera for capturing the image. Press button is used to activate the program and headset for audio output. The printed text is to be placed under the camera to ensure the image of good quality and fewer distortions. Then an applicable blind-assistive system, an algorithm might prefer. It checks the availability of all the devices and also for the connection, when the applications start. Raspberry Pi 3 uses a Linux based operating system named Raspbian. The first part is booting the Raspberry Pi board by installing the Operating system Raspbian OS and installing the essential libraries and packages. Next is the image acquisition system, in which we have interfaced a camera, to capture the image of the text document. The data is transfer to the OCR algorithm which converts the image data to text data. The OCR algorithm scans the image and checks each alphabet or letter. Then it gives a corresponding text output after verifying it with its database. We can use a dictionary to compare the words detected by the algorithm for auto-correction. We have chosen text to speech engine which convert the text data to an audio output and is plays through the earphones connected to the audio jack.

3. RESULT

FIGURE 2. Enabling the pi camera

4. CONCLUSION

A survey of existing smart reading assistance for blind and visually impaired is carried out. The existing systems have many drawbacks. Here we propose a new idea where the system provides an autonomous page turning mechanism and interactive dictionary querying feature, ultimately giving a feeling of comfort for BVI. Once developed it can act

as a perfect personal device for the user. The system even finds small applications in Schools, Libraries etc. We have implemented an image to speech conversion technique using raspberry pi. The simulation results have been successfully verified and the hardware output has been tested using different samples. Our algorithm successfully processes the image and reads it out clearly. This is an economical as well as efficient device for the visually impaired people. We have applied our algorithm on many images and found that it successfully does its conversion. The device is compact and helpful to the society. In future we can use more robust and the efficient algorithms to read the images and separate the text from the images. In this analysis, we've got represented an epitome system to scan the written text and handheld objects for helping blind individuals. To extract text regions from advanced backgrounds, we've got projected a completely unique text localization formula supported models of stroke orientation and edge distributions

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