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RASPBERRY PI BASED WEARABLE READERFOR VISUALLY IMPAIRED PEOPLE

[1]Mr.K.Sandeep Kumar, [2]V.Shyam Kumar, [3]M.Balaji , [4]Y.Vamsi, [5]Yaswanth Kumar, [6]Y.Yoganjaneya Reddy

[1]Associate Professor of Dept. of ECE, [2]Student of Dept. of ECE , [3]Student of Dept. of ECE , [4]Student of Dept. of ECE , [5]Student of Dept. of ECE , [65]Student of Dept. of ECE
Department of Electronics and Communication Engineering,
[1]Siddartha Institute of Science and Technology, Puttur, India

Abstract : This project presents a performance e. It is observed that they are still finding it difficult to roll their day today life and it is important to take necessary measure with the emerging technologies to help them to live the current world irrespective of their impairments. In the motive of supporting them, we have proposed a smart spec for the blind persons which can perform text detection thereby produce a voice output. This can help the visually impaired persons to read any printed text in vocal form. A specs inbuilt camera is used to capture the text image from the printed text and the captured image is analysed using TesseractOptical Character recognition (OCR). The detected text is then converted into speech using a compact open source software speech synthesizer, e-Speak. Finally, the synthesized speech is produced by the headphone by TTS method. In this project Raspberry Pi is the main target for the implementation, as it provides an interface between camera, sensors, and image processing results, while also performing functions to manipulate peripheral units.

On the other half, the software part is written by using Python programming language which head towards the Raspberry pi controller.

Keywords: Raspberry pi3b+, OCR, Usb Camera, Speaker or Headphones

1 INTRODUCTION

Raspberry Pi-Based Reader is an automatic document reader for visually impaired people using OCR technology. The proposed project uses a camera-based assistive device which can be used by individuals to read printed text. The scheme is to implement an embedded system based image capturing technique using Raspberry Pi board. The design is inspired by prior research with visually impaired people, and it is small and portable, that helps in achieving result in little setup.

Here, we have put forward a text read out system for visually impaired people. OCR and Text-to-Speech synthesis is used to convert images into audio output (Speech). The proposed apparatus has a camera which act as the input device for digitization and this digitized script is processed by OCR (software module). A procedure is followed for recognition of characters and the line of reading. In the context of software development, the Open CV (Open source Computer Vision) libraries are employed to capture image of text and character recognition. The final identified text document is given to the output devices based on the choice of the user. Headset connected to the Raspberry Pi or a speaker act as the output device.

2 NEED OF THE STUDY.

This project has been built around Raspberry Pi processor board. It is controlling the peripherals like Camera, speaker and LCD which act as an interface between the system and the user. Optical Character Recognition or OCR is implemented in this project to recognize characters which are then read out by the system through a speaker. As shown in the project setup, the camera is mounted on a stand in such a position that if a paper is placed in between the area marked by angular braces, it captures a full view of the paper into the system. Also, when the camera takes the snapshot of the paper, it is ensured that there is good lighting conditions. The content on the paper should be written in English (preferably Times New Roman) and be of good font size (preferably 24 or more as per MS Word). When all these conditions are met the system takes the photo, processes it and if it recognizes the content written on the paper it will announce on the speaker that the content on the paper has been successfully processed. After this it speaks out the content that was converted in to text format in the system from processing the image of the paper. In this way Raspberry Pi Based Reader for Blind helps a blind person to read a paper without the help of any human reader or without the help of tactile writing system.

2.1 PROBLEMS IN THE EXISTING SYSTEM

Today, there are already a few systems that have some promise for portable use, but they cannot handle product labeling. For example, portable bar code readers designed to help blind people identify different products in an extensive product database can enable users who are blind to access information about these products. But a big limitation is that it is very hard for blind users to find the position of the bar code and to correctly point the bar code reader at the bar code

2.2 OBJECTIVES OF THE PROPOSED SYSTEM

Our proposed project automatically focus the text regions from the object, we offer a novel text localization algorithm by learning gradient features of stroke orientations and distributions of edge pixels using artificial neural network. Text characters in the localized text regions are then binarized and recognized by off-the-shelf optical character identification software. The renowned text codes are converted into audio output to the blind user.

3 METHODOLOGY

The Below Block diagram Shows the Implementation methodology ;

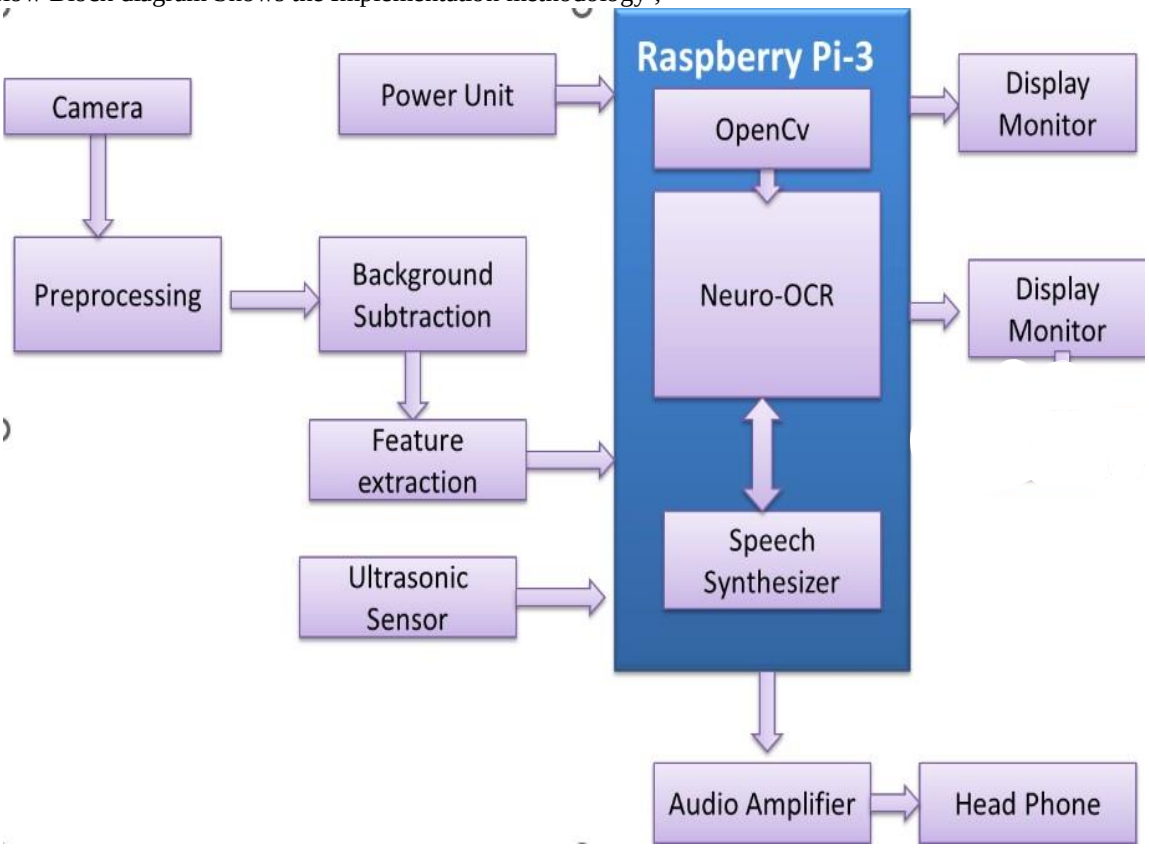


Fig 1: block diagram

3.1 CAMERA :

A camera is an optical instrument to capture still images or to record moving images, which are stored in a physical medium such as in a digital system or on photographic film. A camera consists of a lens which focuses light from the scene, and a camera body which holds the image capture mechanism

3.2 PREPROCESSING:

Pre-processing refers to the manipulation and transformation of data before it is used for analysis, modeling, or other tasks. Pre-processing can involve a wide range of tasks such as cleaning, normalization, scaling, encoding, and feature extraction, among others.

3.3 BACKGROUND SUBTRACTION

Background subtraction is a technique used in computer vision and image processing to separate foreground objects from a background in a video or image sequence. It involves extracting the moving objects in a video or image sequence by subtracting a reference or background image from the current frame or image.

3.4 FEATURE EXTRACTION

Feature extraction is a process in which relevant information or patterns are automatically extracted from raw data, often in the context of machine learning or signal processing. It involves transforming the input data into a new representation that is more compact, informative, and suitable for a particular task.

3.5 ULTRA SONIC SENSOR

An ultrasonic sensor is a device that uses sound waves at a frequency above the range of human hearing to detect the distance of objects in its vicinity.

3.6 OPEN CV

OpenCV (Open Source Computer Vision) is a free and open-source computer vision and machine learning software library that is designed to help developers create computer vision applications. It was originally developed by Intel, but it is now maintained by the OpenCV community.

3.7 NEURO OCR

Neuro OCR (Optical Character Recognition) is a type of OCR that uses neural networks to recognize text within an image or scanned document. OCR is the process of converting printed or handwritten text into machine-readable digital text.

3.8 SPEECH SYNTHESIZER

A speech synthesizer, also known as text-to-speech (TTS), is a computer-based system that converts written text into spoken words. It works by taking input text, analyzing it, and then using an algorithm to generate a corresponding audio output that sounds like human speech.

3.9 AUDIO AMPLIFIER

An audio amplifier is an electronic device that increases the amplitude (or volume) of an audio signal. It works by taking a low-level audio signal and boosting its power to a level that can drive speakers or headphones

4 RESULTS AND DISCUSSION

Thus, Experiment outcomes of the system were performed by placing it in the rooftop. This output voltage is collected from 8:00 AM to 6:00PM.

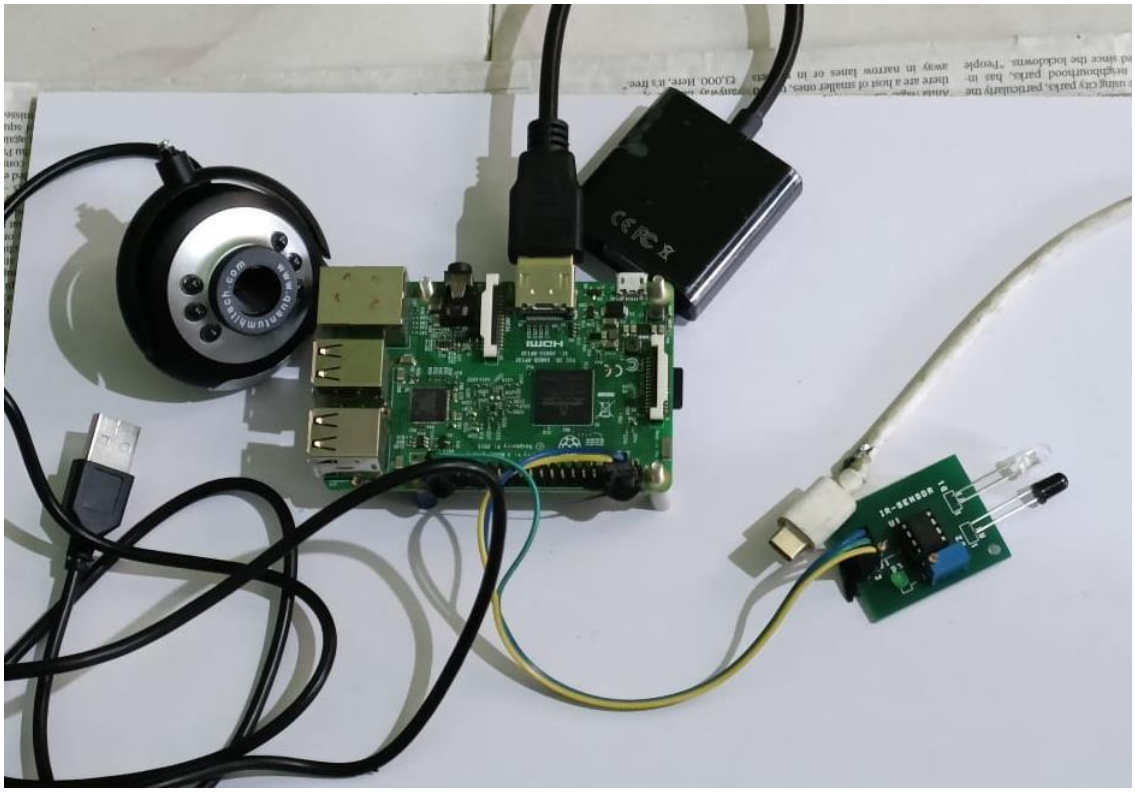
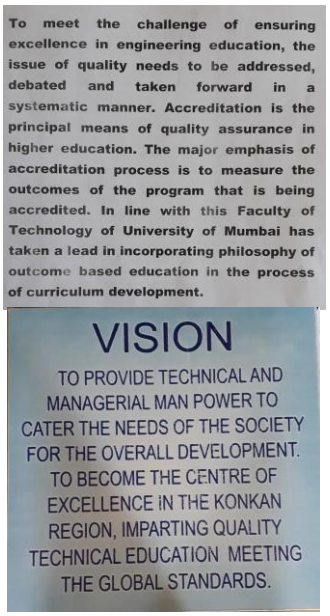
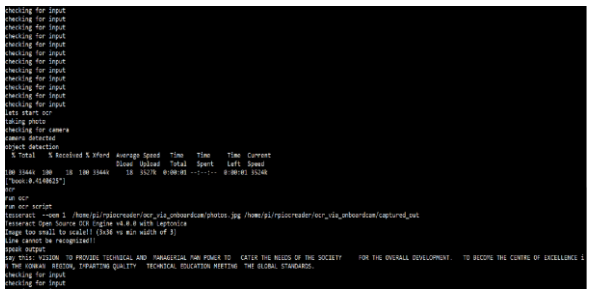


Figure 2: Model

Output of the above Experiment





Here we mentioned the output of the above experiment.

5 FUTURE SCOPE OF THE PROJECT

A Raspberry Pi-based wearable blind reader has the potential to revolutionize the way that visually impaired people access information. There are several areas where this technology can be applied:

Navigation: A wearable blind reader can be used to help visually impaired people navigate through unfamiliar environments. It can use sensors and cameras to detect obstacles and guide the wearer through a safe path.

Object recognition: A Raspberry Pi-based wearable can also be used to identify objects and read out their labels. This can be particularly helpful when shopping or trying to identify household items.

Text recognition*:* A wearable blind reader can also read out text from books, newspapers, and signs. This can be particularly helpful for visually impaired students or professionals who need to access written information.

Facial recognition: A wearable blind reader can also use facial recognition technology to identify people, which can be particularly helpful in social situations.

Health monitoring: A Raspberry Pi-based wearable can also be used to monitor the wearer's health, such as heart rate, blood pressure, and glucose levels. This can be particularly helpful for visually impaired people who may have difficulty monitoring these parameters on their own.Overall, the future scope of Raspberry Pi-based wearable blind readers is very promising. With the continued development of artificial intelligence and machine learning, these devices will become even more powerful and useful in the coming years.

6 CONCLUSION

In this , we've got represented a epitome system to scan written text and handheld objects for helping the blind/impaired 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. The corresponding feature maps estimate the worldwide structural feature of text at each component. Block patterns project the projected feature successfully does its conversion. The device is compact and helpful to the society.Image is captured and processed using OCR technology and Google Cloud Vision. Text to speech conversion is done using flite algorithm.

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