

A Smart Aid for Visually Impaired People

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Abstract

Discourse and text is the fundamental mechanism for human correspondence. An individual needs vision to get to the data in a book. Anyway the individuals who have helpless vision can accumulate data from voice. This task has been worked around Raspberry Pi processor board. It is controlling the peripherals like Camera and Bluetooth headset which go about as an interface between the framework and the client. Optical Character Recognition or OCR is realized in this endeavor to see characters which are then scrutinized out by the system through a Bluetooth. The camera is mounted on scenes; it gets a full viewpoint on the paper into the system. In like manner, when the camera takes the see of the paper, it is ensured that there are worthy lighting conditions. The substance on the paper should be written in English and be of adequate content measurement. Exactly when all of these conditions are met the structure snaps the image, measures it and in case it sees the substance made on the paper it will cover the Bluetooth headset speaker that the substance on the paper has been adequately taken care of. After this it stands up the substance that was changed over in to message design in the framework from handling the picture of the paper. In this manner Raspberry Pi Based Reader for Blind causes a visually impaired individual to peruse a paper without the assistance of any human per user or without the assistance of material composing framework. It likewise accomplishes the impediment shirking by utilizing the ultrasonic sensor and it is educated to the client by vibration detecting strategy. This Project presents a ladies security discovery framework utilizing GPS and IoT module. The framework can be interconnected with the caution framework and alarm the neighbors utilizing cloud. This location and informing framework is made out of a GPS collector, Microcontroller and IoT module. GPS Receiver gets the area data from satellites as scope and longitude.

Keywords— Raspberry pi, OCR, Camera, Visually Impaired, GPS, IoT, Ultrasonic Sensor

1. Introduction

As per the World Health association (WHO), 285 million individuals are assessed to be outwardly weakened worldwide among which 90% live in creating nations and 45 million visually impaired people around the world. In spite of the fact that there are many existing answers for the issue of helping people who are ignorant concerning perused, anyway none of them give a perusing experience that in any capacity matches that of the located populace. Specifically, there is a requirement for a versatile book per user that is moderate and promptly accessible to the visually impaired network. In our reality data is commonly accessible as books and documents. It is completely usable for the located individuals. From an antiquated time, data is taken after in aural arrangement as no other portrayal of it is established in printing design. At the point when a time has happened to printing it encourages the located individuals halfway to secure knowledge. A serious issue for a visually impaired or outwardly weakened individual (BVI) to associate with the world to share knowledge. For them data must be in an extraordinary material language or in voice design.

The arrangement is fairly basic; present a brilliant gadget with a multimodal framework that can change over any archive to the deciphered structure to a visually impaired. A visually impaired can peruse report just by tapping words which is then discernibly introduced through content to discourse motor. "Dazzle Reader" – created for contact gadgets which is easy to understand and compelling intuitive framework for visionless or low vision individuals.

In this proposed structure text affirmation is done by Open Computer Vision (Open CV), a library of limits used for completing picture planning techniques. Picture getting ready is a procedure of using mathematical exercises in picture, any kind of wellsprings of data, for instance, picture, a movement of pictures, or a video can be used for dealing with. An image or a ton of characteristics or limits related to picture is the yield of picture getting ready. Picture dealing with has various applications like PC plans, checking, facial affirmation, text affirmation, etc. Various features of text like its printed style, text measurement, course of action, establishment, etc impacts in its affirmation. Number plate affirmation is a sensible model for text extraction. In this system the difference in text to voice yield is by e-Speak computation. (Text To-Speech (TTS))

2 .Relatedwork

Identifying and locating object is the need for mobility of blind people by travel assistance and aid to navigation. Smart reader is developed as an efficient system for visionless people. The OCR (Optical Character Recognition) is used which has the functions of MATLAB for converting image to text [1]. A wearable visual aid for visionless people was used, in which the language commands are received from the people who created. Its usefulness tends to the distinguishing proof of obstacles and sign sheets. This encourages them to oversee everyday things and to explore through surroundings [2]. Raspberry Pi is the principle focus for the usage, since it gives an interface between camera, sensors, and picture handling results, and furthermore performs capacities to control the secondary units [4]. A camera based structure is worked with respect to the Raspberry Pi, which is converged with Image processing calculations, OCR and TTS synthesis element. The printed content picture is caught by the camera module and it is then exposed to pre-process before being encouraged into the impaired can tune in to the content which was proposed be perused.

To see objects and for subtitling them, the highlights are extricated utilizing the Histogram of Oriented Gradients and the grouping and naming of the article is finished by utilizing K-Nearest Neighbor classifier [6]. Reading is one of the main problems faced by the blind. Written text is a form of data which is not an accessible method for the blind but it is shown in Braille [10].The image recognition work was performed by utilizing a smart phone application ran by the artificial intelligence [11]. The tasks of collision and object detection uses ultrasonic sensors to give awareness to the blind about the obstacles exist in the way [7]. An approach is utilized to extricate and perceive content from image by utilizing PC vision innovation and is utilized to change over the perceived content into articulation so it tends to be joined with equipment to improve Electronic travel help for vision less people in future [8]. A visually impaired can peruse report just by beating words which is then obviously open through content to discourse engine[9].

3. Methodology

The proposed work empowers the outwardly hindered to catch the content picture subtleties as opposed to understanding them. This is a brilliant gadget which helps individuals to peruse the paper printed text viably and productively. It utilizes the approach where the camera based assistive gadget is utilized by the outwardly weakened to peruse the content archive. The Proposed framework comprises of Pi camera, sound amplifier, ultrasonic sensor, Raspberry

pi, earphone for voice and vibration engine. So as to convey the printed text archive with the end goal of digitization, the Pi camera is used as an info gadget. The product module OCR motor is utilized for handling the checked archive. This framework is utilized to distinguish the character succession and the line of perusing. This system consists of three modules such as voice searching module, image processing module and voice-processing module. These modules are implemented by using the keyword operation search, which is in the form of voice, which is given by the user. After the keyword is received by the Raspberry pi, the pi camera will capture the image according to the given keyword. It integrates OCR and TTS concepts. It includes the image text extraction and transforms the text into speech; this allows the blind people to read the text easily.

OCR is a process in which the system is associating with a symbolic meaning with letters, symbols and numbers with the character image. It is the method of transforming the machine printed scanned images into the process the computer process. OCR is used to digitize and reproduce the works that have been made with non-electronic structure. The Proposed system comprises of a webcam interfaced with raspberry pi which gets the printed text pages. The Raspberry Pi coding is performed through PYTHON language. The camera captured image is then transformed into text. Raspberry pi contains the audio port in which the headphone or the speaker is used for hearing the output. After transforming the image into text, the raspberry pi acquires few milliseconds in order to transform the text as a voice or audio output. Contingent upon the client's decision, the last recognized content record is given to the yield. The earphone and the Raspberry pi are connected to the board or a speaker so as to spell the content report boisterously without the assistance of others.

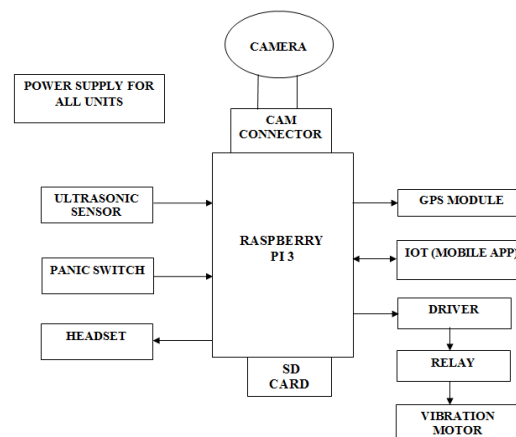


Fig.1. Block diagram

4. Results And discussions

This system performs few techniques: Image Capturing, Pre-Processing, Segmentation and Image to Text converter, Obstacle Detection and Location forward. The flow of process is given as follows.

A. Image Capturing

In Image Capturing, if the watchword is given by the client, the framework is passed on over the printed page and the content picture is caught by the pi camera. The caught picture will be high caliber and the ideal acknowledgment, this is because of the high goal camera.

B. Pre-Processing

In Pre-processing, it involves three steps, they are

- Noise removal
- Linearization

- Skew Correction.

The confined image is examined for skewing.

C. Segmentation

After the pre-processing stage takes place, the image without noise is handled to the segmentation phase. It is a method that accompanies an image to partition into sub- images. The binarized image is then checked for inter line spaces.

D. Image to Text Converter

After the extraction process takes place, the ASCII values of the characters are processed. Every characters is correlated with its corresponding template and revived it as a normalized text data. This process is further delivered to audio output by the audio jack.

From the fig.2, first the Pi camera is initialized and then the program is added to the Raspberry Pi kit. The program is in the form of Python. The program file is added to convert the text to audio. Then the Wi-Fi module is configured. After the configuration, the Application Programming Interface (API) is interfaced for the microphone interface. Then the API is interfaced for the Audio interface. If any keyword is found, it loads the API for audio search. If there is no keyword is found, it goes back to interface API for microphone interface and then the following steps take place. If there is any keyword is found, it loads the API for the audio search. Then if the keyword is READ, it reads the book. If the keyword is BUS, it reads the bus number and bus name. After the keyword is identified, it loads the Pi camera file to capture the image. By using the OCR technique, it converts the image to text header processing. The text is converted into Audio file processing by TTS technique. Finally the audio file is interfaced with the output audio jack. Similarly, the next process takes place. By using this technique, the visually impaired can read the book and identify the bus easily.

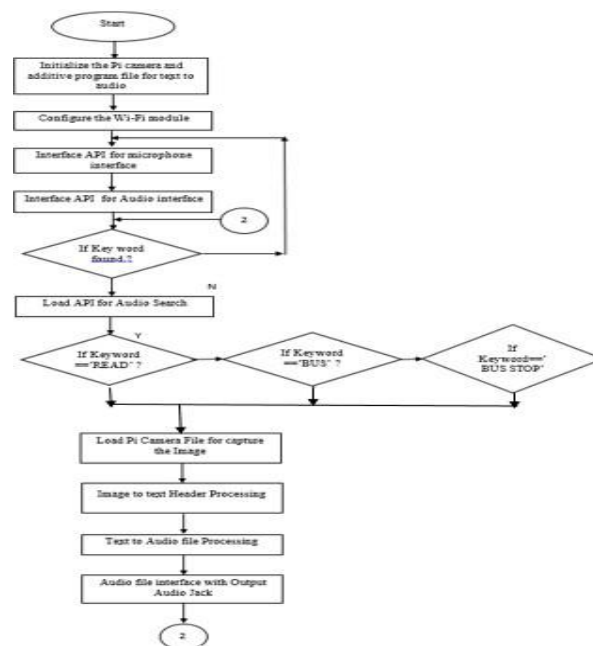


Fig.4.1.Flow diagram for Key Word search and Audio Processing

E. Obstacle Detection

Obstacles found by Ultrasonic Sensor. In terms of ultrasonic sensor transmits the ultrasonic waves and receives the ultrasonic waves. Obstacles found after it warns via vibration motor.

F. Location Forward

When the Panic switch is pressed the current location is transferred to the IoT in the type of latitude and longitude.

5. CONCLUSION

Conveyability problem is resolved using Raspberry bi in the anticipated approach. The MATLAB is uproot with Open CV and it accomplishes smart dealing with. Open CV is the widely used mechanical gathering for images with raw supporting libraries compared with MATLAB. The contraption includes a camera in front on the scene. The processor exploit is infinitesimal and can be placed in the structure with working the contraption for around few hours These illustrates the contraption become principal, solid and even more easy to use.

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