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Third eye for the blind

Chetana H[1], Gayatri V Kamat[2], Likhitha M[3], M C SuchitraHeggade[4]
1234–Students,Venkatesh55–Asso Professor
Department of Computer Science and Engineering, ALVAS INSTITUTE OF ENGINEERING AND TECHNOLOGY

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ABSTRACT:Blindness is a state of lacking the visual perception due to optic factors. This paper describes the development of navigate in order to assist blind and visually impaired people to navigate easily, safely and to detect any obstacles. Essentially, it is difficult for blind people to spend their everyday lives with We interfaced those with their disabilities to make their life smarter, With their walking stick scheme. For the visually impaired, the third eye is A progression, like hardware, with the assistance of the subject Designing, software engineering and science of well-being can aid People who are visually impaired. As per WHO 39 million individuals are assessed as blinds around the world. They are facing hardships in their daily life. In this paper contains Ultrasonic sensor connected with Raspberry pi and it send the audio information to the person using earphones to convey the distance measured for an obstacle present in front of the blind people. The device can measure up to a distance of about 3m. E-book reader for blind is a small portable device that allows blind users read all kinds of digital content. GPS location tracker which will be used to tracking the location of the blind person at the time of emergency person will press the button in the stick GPS sends an emergency message to the people whose information stored in the system.

Keywords-Raspberry pi, Ultrasonic sensor, GPS Module, Earphone, Camera.

I. INTRODUCTION

Eighty to ninety percent of legally blind individuals have an observable experience of vision or light. Many visually disabled individuals experience challenges accessing public transport and learning as well. In addition, a wellbeing screening scheme is also introduced for the visually impaired. It is difficult to navigate the everyday life of blind people. This initiative allows them to handle their lives as normal. We can create this project in their hands as a gadget. This project is more effective than the current method, which is cheaper and more reliable. We are using the raspberry phi board hare to carry out this process. To make the life to be as a normal one for the blind peoples this may be very helpful projectfor them. The machine uses an ultrasonic sensor to identify an object with its higher detection range in aWide range of fields. We are taking a survey at our institution based on this initiative. This gadgets function like the radar and the gadget's arrangement utilizes the fascicle of ultrasonic waves to tallness, course and pace. As the wave is moving, the separation between the person and the impediment is calculated. Nevertheless, all the existing mechanisms inform the visually impaired the proximity of the protest to clear separation in front of or near him. According to the WHO or the World health organization,39 million people around the world are assessed as blind. This paper suggests an innovative technology that is user friendly to achieve ease of access to public transport and learning for visually disabled people. Methodology is outlined in the experimental results of the research and discusses the potential study and conclusion. The study of the literature survey is presented. There are several methods of assistance that can be used to help blind people recognize items. This technology can be divided into two classes: Automated services, Human powered services. The inability to see is blindness. According to the International classification of diseases, there are four types of visual function: Normal vision, mild visual impairment, serious visual impairment, Blindness modern visual impairment coupled with severe visual impairment is grouped under the word 'Poor vision': low vision combined with blindness reflects all visual impairment. The third eye for the blind is aimed at preparing an item that is especially useful for those people who are externally weakened and people who also need to rely on others. Third eye for the blind task is an invention that enables outwardly weakened people to step around and move with speed and certainty between various locations by recognizing the adjacent obstacles using the

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wearable cane assistance that delivers ultrasonic waves that warm with them with vibrations. In order to support the blind we introduced smart blind stick with Raspberry pi and this raspberry pi acts as microcontroller where all other components like ultrasonic sensor, GPS, Camera module are connected to the Raspberry pi. The blind person walks on the road by holding a stick when there is an obstacle,it is begin captured using camera and image is processed and object is identified then it will send to the hearing aid.E-book reader for blind is a small portable device that allows blind users read all kinds of digital content. GPS location tracker which will be used to tracking the location of the blind person at the time of emergency person will press the button in the stick GPS sends an emergency message to the people whose information stored in the system.

II RELATED WORK

The literatures of third eye for blind in this project are as follows:

Sayemil [1]proposed based on ping sensor for detecting obstacle, wet electrode, vibration motor and the buzzer. The obstacle is detects by the ping sensor and the obstacle distance is communicates to the visually impaired by the vibration of the motor.

Madulika [2] proposedarm7 controller based that used ultrasonic technology for detecting the obstacle and inform the obstacle distance to the visually impaired, and also used the GPS and GSM technologies for localizationfor localization of the visually impaired.

Oladayo [3] proposedsystem uses ultrasonic detection technology and the voice module, the obstacle is detects by the ultrasonic sensor and the direction of the obstacle is communicates to the user through voice output.

Al-Barm [4] propsed system uses ultrasonic sensor for detecting the obstacle in three directions (i.e. front, left and the right sides of the visually impaired), and the vibration motor which vibrate with the intensity depending on the obstacles distance. It also uses GPS and GSM for localization of the visually impaired. In this paper, design and development of intelligent electronic travelling aid for visually impaired is presented. The device employs ultrasonic detection, GSM, GPS, voice recognition and voice synthesis technologies. The design process comprises of two parts; the first part is the obstacle detection and voice generation unit design using ultrasonic detection technology and voice synthesis technology respectively, and the second part is the localization and monitoring unit design using GPS technology GSM technology, as well as the voice recognition technology. The two units are then combines to form the complete device.

III SYSTEM DESCRIPTION

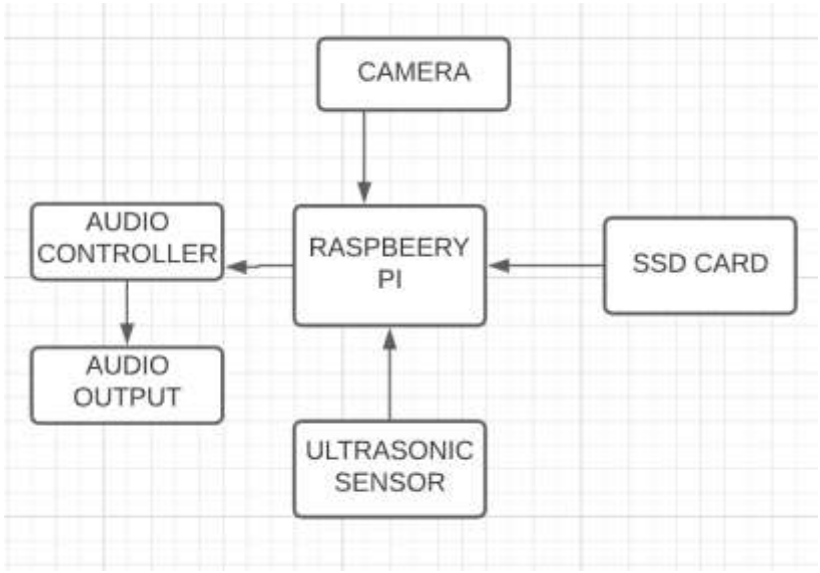

Fig 1.Block diagram system

The proposed system uses Raspberry pi as microcontroller and it is connected to all other devices Ultrasonic sensor,Camera, GPS, SSD card, Audio controller.This project proposes the design is guidance system for blind Third Eye, which

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benefits the visually impaired community and also helps in their day to day mobility.

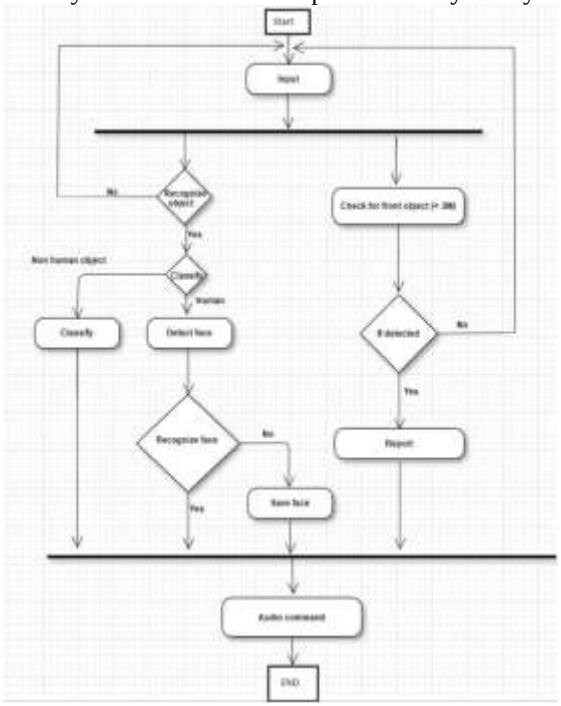

Fig 2.flow chart

Third eye provides the visually impaired community a new way to visualize the world by explaining them about their surroundings. The whole system is controlled by Raspberry Pi microcontroller. Third eye harnesses the maximum capabilities of Raspberry Pi microcontroller which has enough potential to up hold the system with one advantage being the inbuilt graphic card. The prototype uses various sensors such as ultrasonic Sensors and a Camera module which helps the system to gather the required data. Additionally, text to speech module is used to talk to the user. Python forms the heart of the system. It is used to program the whole system which helps the raspberry pi microcontroller to communicate with all the sensors. It then processes the collected data and converts it into information which is finally delivered to the end user. The IR sensor is used to map the object‘s shape and size while the sonar sensors get the data about the distance of the object at regular intervals. Camera module plays an important role as it takes the pictures which is then processed using image processing technique to properly visualize the object. All the information is processed and converted to text which is then fed into a text to speech module. The text to speech module delivers this information to the end user in ear using headphones.

In The proposed system consists of these units:

- Obstacles and Image processing unit
- GPS Module unit.
- Espeak Text to Speech unit

A.Obstacle and Image processing unit

When the blind person walks on road by holding a stick where the Raspberry pi is embedded with walking stick at the same time the camera should be connected to ultrasonic sensor where both should face on the same direction on the road. When there is an obstacle ultrasonic sensor will sense and camera will take the picture which is sent to the image processing and it will be pixel and the input image will be considered. The input image will identify the object using R-CNN technique. The network does not look at the entire image it will only take the part of images which have higher chance of containing an object. Then the yolo first takes an input image. The framework will divides the input image into grids and then image classification and localization are applied on each grid. Then yolo predict the bounding boxes and this corresponding class probability for object. Then the image is stored and recognize image or object and then convert into text to audio.

B. GPS Module unit.

GPS module deals with the navigation of blind person from particular source to destination. This phase starts by Obstacle Detection. First the ultrasonic sensor gives voice command about the

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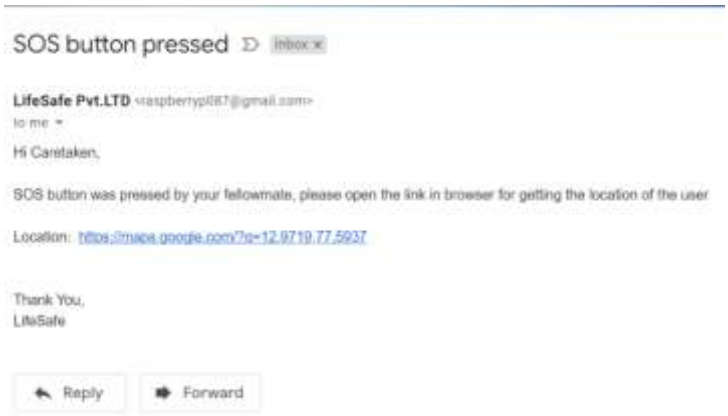
distance measurement between the obstacle and the blind person,If the blind person when he suddenly have a problem then there is button when the person press the GPS location tracker which will be used to tracking the location of the blind person at the time of emergency person will press the button in the stick GPS sends an emergency message to the people whose information stored in the system.



C.Espeak Text to Speech unit

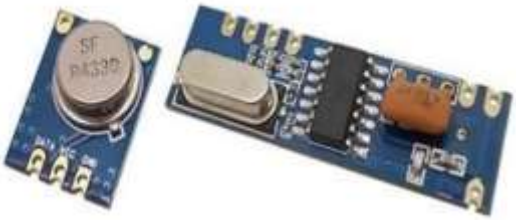
Espeak module which used read the pdf into audio. As we know it is very difficult to the blind person to read the book so there we have introduced aeBook reader. First eBook reader will take the picture form the camera and the image is passed to tesseract library. Where tesseract library is an optical character recognition engine with open source code,this is most popular and qualitative OCR-library. OCR uses artificial intelligent for text search and recognition on images.when the picture passed to tesseract library it will convert image to text and the text will converted to audio.

COMPONENTS

Raspberry pi

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics.

Rf transmitter and rf receiver



As the name suggests, RF module operates at Radio Frequency. This frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This types of modulation is an Amplitude Shift Keying (ASK) . The RF

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transmitter receives serial data and transmits it wirelessly through its RF antenna. The transmission occurs at the rate of 1 Kbps – 10 Kbps. RF receiver receives the transmitted data and it is operating at the same frequency as that of the transmitter. We use RF modules to transmitting and receiving the data because it has a high volume of applications than IR. RF transceiver module will always work in a pair that is it needs a Transmitter and Receiver to send and receive the data. A transmitter can only send information and a Receiver and can only receive it, so data can send from one end to another and not the other way around.

Ultrasonic sensor

Ultrasonic sensor is a very popular sensor used in many application where measuring distance or sensing objectHigh frequency sound waves is generated by ultrasonic sensor. It evaluates the echo which is received back by the sensors. The time interval between sending the signal and receiving the echo is calculated by sensor to determine the distance to an object. Ultrasonic is like an infrared where it will reflect on a surface in any shape, but ultrasonic has a better range detection compared to infrared. In robotic and automation industry, ultrasonic has been highly accepted because of its usage. In our Project the Ultrasonic sensor distance measurement Module deals with the distance measurement between the obstacle and the blind person. This module starts the process when the user turns on the device using power supply. Firstly when the device turns on, the ultrasonic sensor will automatically gives the distance measurement of the obstacle in front of the blind, and then the distance measured is stored in the SD card.

Camera

In this project camera hold the an important role as the project relays on image processing. The image that is captured by the camera is processed and the desired output is obtained . Image processing is the process of transforming a view into a digital form and performing some operations to obtain an enhanced image or to get useful information from it. An image, such as a video frame or photo and output, may be an image signal or an image or feature associated with the image. Generally, the Image Processing system involves processing images as two-dimensional signals while applying pre-set signal processing methods.

GPS

The GPS Module allows you to know the exact position of your device. It is using SAM-M8Q module from ublox**.** It understands 3 global positioning standards GPS, Galileo and GLONASS. The 2.5 m position accuracy is possible thanks to combining position from all three standards together.

IV APPLICATIONS

Third eye for blindis for people who are blind is an innovation which helps the blind people to navigate the speed and confidence by detecting the nearby obstacles using the help of ultrasonic waves.Main aim of this project is to help the one who face the consequences in their day to day life. This project is mainly used social caused to help the blind people.

V CONCLUSION

The goal of this project, Third Eye for the Blind, is to create a product that will be extremely valuable to persons who are vision impaired and frequently rely on others.The third eye for the Blind project is an innovation that allows blind people to walk around and go from one location to another with speed and confidence by detecting nearby impediments using a Smart stick that emits ultrasonic waves that alert them with sound or vibrations.The only requirement is that you keep the stick in your hand. As a result, this Raspberry Pi-based obstacle detector project for blind people offers a novel way to handle their challenges.To give help for the blind, a less complex portable, cost-effective, easy-to-manage, and effective system with many more astonishing qualities and advantages is proposed.It will be relatively simple for the system to determine the distance between the items and the sensor. It can detect items in all of the blind person's directions. A blind individual can walk from one location to another and lead a normal life without the assistance of others.GPS location tracker which will be used to tracking the location of the blind person at the time of emergency person will press the button in the stick GPS sends an emergency message to the people whose information stored in the system. Espeak module which used read the pdf into audio. By using this project blind person can lead normal life.

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