AUGMENTING VISIBILITY FOR VISUALLY IMPAIRED PEOPLE

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Abstract: *God's essential and beautiful gift to all his creatures,especially humans is vision.But there are more humans who are lacking this beauty and are unable to see the wonders through their own eyes. Third eye for the blind is a project involving more than a few fields such as software programming engineering, hardware design, and science that lets in visually impaired human beings to confidently and independently see and explore the world by means of recognizing nearby objects using ultrasonic waves and informing the blind or visually impaired with a beep sound or vibration. According to the WHO (World Health organization),there are 285 million visually people in the world,39 million of whom are blind, and 264 million who have low vision. In daily lives third eye highlights the concept of deep learning and neural network task in python programming and its implementation on the raspberry processing unit.*

Keywords: **Blind,WHO,Ultrasonic Sensor,Daily.**

1. INTRODUCTION

The third eye for blind is to create a product that will be extremely valuable to persons who are vison impaired and frequently depend on others.[3] The Third Eye for Blind project is a development that allows externally disabled people to move around and go from one place to another with confidence and speed by notifying them to nearby obstacles using a wearable band that emits ultrasonic waves that they are alerted to with a buzz sound or vibrations According to the definition of blindness, we are referring to a person who is unable to see. [6] A person who is blind is unable to see anything. While battling for various type of comfort for the normal people, we have come to the point we have begun to utterly disregard those who are living in misery without of vision.[7] They confront significant challenges in their day to day lives, and as by it. The goal of this project, The Augmentable visibility for visually impaired people a result, they become dependent.[2] They live a life that is very different from that of the general public, and they are treated in a disconnected and indifferent manner because they are physically disabled.[10] They require the assistance of others in order to move from one place to another. Sight is the most basic sense of existence, therefore a person's travel from place to place is governed   is to create a product that will be extremely Valuable to persons who are vision impaired and frequently depend on others.[9]
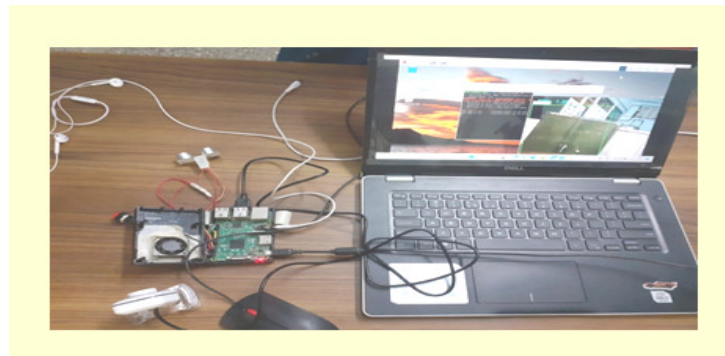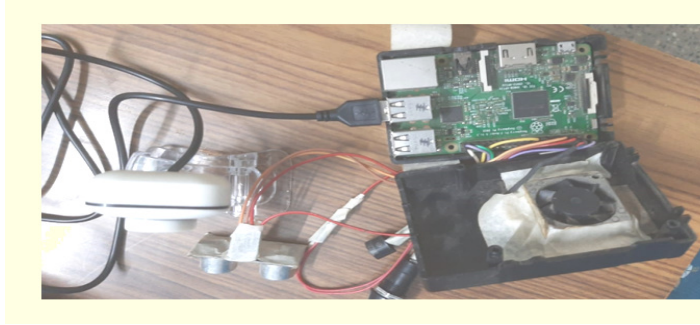

Fig.no.1.1. Practical setup

Fig.no.1.2. Practical setup

* The system is designed using various technologies, which work together in order to run third eye smoothly.
* The controlling device of the whole system is a raspberry pi. This system is very helpful for blind people.
* It can detect the face with the help of raspberry pi, camera used with face detection and recognition process.
* It can detect objects with the help of ultrasonic sensor. It can detect the name of the object.
* We have made the android applications for the family member for blind people to track the location of blind people.

System specifications

Input and Output Specifications:

- Inputs   = Video Stream.
* AC Supply Voltage   = 230V, 50 Hz.

* DC Supply Voltage   = 5V/500mA.

* Supply Current   = 500mA

* Processing   = fetch data, preprocessing, classification using ML

* Output   = Result of classification in the form of speech

Hardware Specifications:

* Controller   =Raspberry Pi 3

* Camera   =Quantum USB webcam

* Speaker   =USB / Bluetooth Speaker/Headphones

* Power   =5v DC

Software Specifications:

* operating system   =Raspbian

* Programming Language   = Python

* Libraries   = NumPy, TensorFlow, Keras, OpenCV

* Tools   = Visual Studio Code

* Algorithm   = CNN

Raspberry Pi: The Raspberry Pi is a portable computer that can use a normal TV or a computer monitor as its display and standard keyboard and standard mouse as input devices. [6]. It can be used to browse the internet and to play high-definition video. Additionally, it can be used to make spreadsheets, word processing, and playing games. Furthermore, the raspberry pi has something which regular desktop computers do not have. It has the ability to interact with the outside world. It has been used in a lot of projects of all kinds, from music machines to weather stations [6]. It has been used also to create tweeting bird houses with infra-red cameras. Raspberry pi microcontroller is shown in Figure. [2]
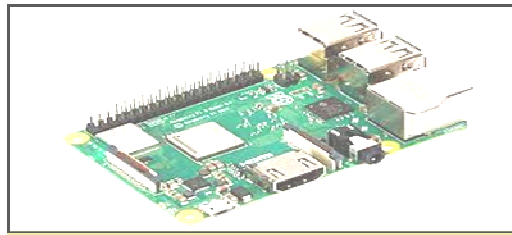

Fig.no.1.2.Raspberry pi Microcontroller

Ultrasonic Sensor: The ultrasonic sensor used in the Third Eye system is a key component for distance measurement between the user and nearby objects.[7] This time measurement is then used to calculate the distance between the user and the object.The ultrasonic sensor operates based on the principles of sound waves and their propagation. Here is a mathematical formulation that describes the relationship between time, distance, and the speed of sound:[8]
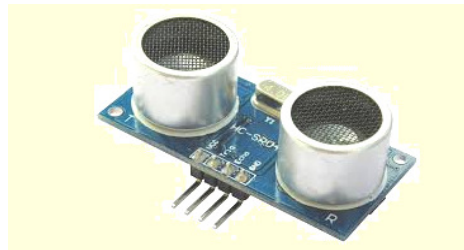
 Distance = Speed of Sound × Time /

Fig.no.1.3.Ultrasonic Sensor

Buzzer;In the context of a "third eye" device, a buzzer can be utilized to provide audio feedback or cues to the wearer. When an obstacle is detected, the buzzer can emit a specific sound or pattern to alert the wearer. Buzzers can also be used to indicate the proximity to objects or surfaces. As the wearer gets closer to an obstacle, the intensity or frequency of the buzzer sound can increase, providing a clearer indication of the proximity.[10]
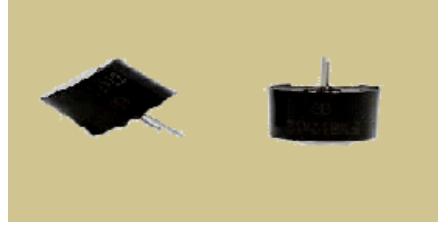
Fig.no.1.4.Buzzer

Camera Module: This module takes pictures and sends them to the micro controller.Frequency of taking images can be altered depending on the program and usage.QHM495B supports 480P high-definition images and true colour images.[5] Anti-flicker 50Hz, 60Hz or outdoor. The webcam comes with a built-in sound-absorbing microphone that can reduce background noise to provide the best experience even in a noisy environment.The USB Webcam supports 360-degree head rotation, so you can adjust the angle according to need. Multifunctional practical base design can be placed on the desktop or clipped above the screen. [4]

Fig.no.1.5.Camera

Headset: With the help of audio signals, a blind person can receive the message for finding direction.The headphone is used in this Project for guiding the visually impaired persons to navigate independently by amplifying the predefined voice signal. Bluetooth headphones used in the Third Eye system provide audio feedback and alerts to the visually impaired user. These headphones wirelessly connect to the Raspberry Pi and deliver spoken instructions, warnings, and other [4].
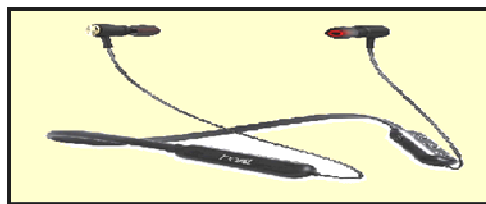

Fig.no.1.6.headset

Disadvantages:

*   It is not useful for determining the shape and size of the object.
*   Less accurate in dark environments.

Applications:

*   Smart wheelchair.
*   Autonomous navigation system

Conclusion

Visually impaired people find difficult to do their daily work, they need someone to guide them and help them. Therefore, our system which is a camera base visually assistance with raspberry pi which can detect objects, differentiate between known and unknown person, to give the latest news, reading books aloud, can help the visually impaired person.

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