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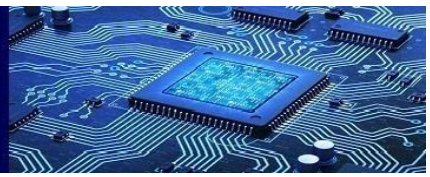

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Third Eye for Blind

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***Abstract*— Many times during the hospital visits it is common for a patient to receive medications using an IV saline, which is capable of passing the various medications like antibiotics, steroids fluids. IV saline is very useful in such cases where patient is suffering from weakness or dehydration from illness however various risks are involved in this treatment due to human mistakes in monitoring the IV bag, such risk may lead to dangerous situations like air embolism, reversal of blood to empty saline bag. This type of mistake may lead to the serious condition of patient or even may cause death of person. So in advance we proposed a system which will monitor the IV Bag, also it will alert the medical staff on duty whenever bag gets empty and needs to change the bag also added benefits of this system is it will continuously monitor the heart rate, SPO2 readings and temperature of the patient so whenever the readings will goes below the preset critical value it will provide an alert system using a buzzer and also an alert message will be sent to the medical staffs mobile or computer also it uses a cam module for live patient health condition monitoring.**

Keywords*— *Health Care, IoT, IV Monitoring, Automation

I. INTRODUCTION

Visual impairment can significantly impact an individual's independence and mobility, making everyday tasks more challenging. Assistive technologies have the potential to make a significant difference in the lives of visually impaired individuals by enabling them to navigate their surroundings with greater ease and confidence.

The objective of designing this project, 'Third Eye For Blind', is to address the day to day challenges that are faced by the visually impaired people.This project mainly utilises two microcontrollers namely, 'Arduino UNO' and 'NodeMCU' along with ultrasonic sensors and temperature sensors. With the use of ultrasonic sensors, any obstacle can be detected in the range of 3 cm to 350 cm and when it is detected, the aided person can be notified with the help of buzzer and vibration sensors which are being installed on the device.The temperature sensor installed, helps to monitor the body temperature of the person and update the temperature values on BLYNK platform which is an Internet of Things (IoT) platform that allows users to control their Arduino, Raspberry Pi, and NodeMCU devices via iOS or Android smartphones. The platform enables users to create a customised graphical interface or Human-Machine Interface (HMI) by selecting the appropriate widgets and compiling them with the appropriate address. This feature enables users to easily interact with their devices remotely over the

Internet.This feature helps the aided person's closed ones to stay updated and alert about the health of the person.

In addition to the obstacle detection system, the project also includes GPS tracking of the blind person.The GPS module helps to locate the user's position and provides real-time location information to caregivers or family members. This feature ensures that the user can be easily located in case of an emergency.

II. LITERATURE SURVEY

Third Eye is a navigation system designed to aid visually impaired individuals in unfamiliar surroundings. It incorporates an ultrasonic sensor and GPS module to detect obstacles and determine the user's location. Audio feedback is then provided, including turn-by-turn directions and obstacle notifications. The system was tested, showing it can accurately detect obstacles and offer helpful guidance, making it a promising solution for visually impaired individuals to navigate their surroundings.[1]

In general, this project can be made wearable with the use of gloves, rubber bands, and PCB materials, which allow for easy assembly of the hardware components. The PCB facilitates strong connections between the various parts of the instrument. Additionally, this project is highly cost-effective and portable, making it highly advantageous for the community.[2]

The "Third Eye" device is a remarkable innovation that aids visually impaired individuals in traversing their surroundings with ease and confidence. By utilizing ultrasonic waves to detect nearby obstacles, the device

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provides a vibration or buzzer notification, which increases in intensity as the distance between the user and the obstacle decreases. The device is designed to be worn as a band or cloth and is fully automated, requiring minimal user input. This innovative technology has the potential to significantly improve the mobility and independence of individuals with visual impairments.[3]

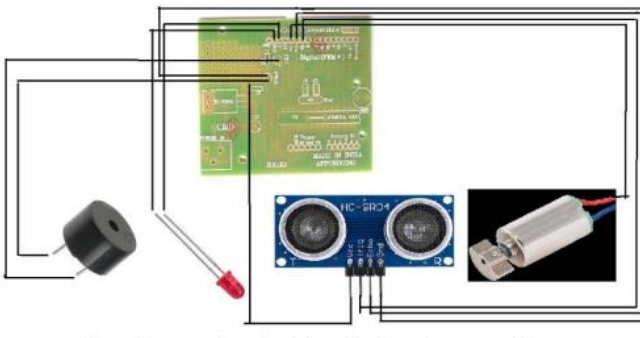
The paper presents a wearable device for visually impaired people that is implemented using an Arduino UNO board and ultrasonic sensors and buzzers. The module then is assembled on the glove, when the ultrasonic sensor detects an obstacle in the range, the buzzer which is interfaced with the Arduino creates a sound alert that signals the user of the obstacle. The working principle of the device involves the use of ultrasonic sensors and audio feedback to provide the user with information about their surroundings which enables them to navigate safely.[4]

III. METHODOLOGY

The design was created to be a wearable device that can be worn on any part of the body that the user feels comfortable with. The device is fitted with 5 ultrasonic sensors which can be worn on different parts or can be reduced to 2 or 3 depending on the choice of the user. They can either use on hand or attach it to the shoulders or the knees. Through the 5 ultrasonic sensors the visually impaired are able to detect obstacles and objects in 5 different depths of the environment which we considered to be sufficient.

The ultrasonic sensor detects obstacles which then will be interfaced with the vibration motor and buzzer. Which then notifies the user with beeping and micro vibrations which are natural enough to be detected by the user. The vibration intensity increases and the rate of beeping as well when the distance between the obstacle and the user decreases The features of the Third Eye for Blind will help visually impaired people in many ways. By wearing this device, they can fully avoid the use of the white cane and other devices.

3.1.1 Circuit Diagram:



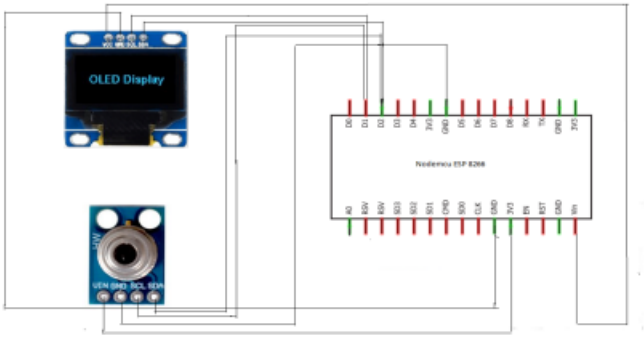


Fig. 1 Circuit diagram of proposed system

This suggested system is made up of the following components: an Arduino Uno, an ultrasonic sensor, a PCB board, a vibrating motor, buzzers for obstacles to be detected and alerting the user, Red LEDs, Switches, Jumper cable, power bank, Male and Female header pins, an old, unused, 3.3-volt battery, some elastic and double tape to make the device wearable as a band for users. OLED, node MCU, temperature sensor, and GPS tracker. The device is wired in the manner described below. The Arduino's GND is connected to the Ground of the buzzer, vibration motor, and LED. The middle leg of the switch and the +ve of the LED are connected to Arduino pin 5. The +ve of the Vibration motor is wired to the third leg of the switch, and the +ve of the Buzzer is wired to the first leg. Accordingly, the ultrasonic sensor is wired. The pins of the ultrasonic sensor are connected to the pins of the Arduino: VCC pin, GND pin, Trig pin, Echo pin, and 12 pin. The pins of the ultrasonic sensor are also connected to the pins of the Arduino: pins 12 and pin GND. Here, the mode is chosen using the switch. (Vibration or buzzer mode.) The prefboard is first cut to 5 x 3 cm, and the female headers for the Arduino are then soldered to the board. The buzzer is then soldered after that. After that, solder the wires to the vibrating motor and attach it using glue. After that, the LED is connected. Connect the switch next. Connect the battery input header pins and the pins for the ultrasonic sensors. Connect the Arduino and ultrasonic sensor to the board after everything has been soldered. Additionally, attach the elastic band to each module. Connect the ultrasonic sensor to the board using 4 jumper cables to create the module for the hand. Then join this module to a 3.7-volt portable battery. The elastic band is then connected. When everything is connected to the Arduino board, upload the code to each board and then use a power bank to run the other 4 modules.

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Fig. 2 Actual prototype

Many modifications are done in this project. In the future, the whole body of blind people will be controlled by using many types of sensors. Using WIFI our mobile phone is connected to the device and we monitor the temperature using the Blynk app. GPS tracker is used to tracking the blind person for detecting their location..

IV. TOOLS AND TECHNOLOGY USED

Arduino integrated development environment is open-source software designed to program microcontroller boards such as Arduino and Nodemcu. it is an open platform where users can easily do any programming. Arduino ide is compatible with all operating systems such as Windows, Mac OS X, Linux

With pre-installed libraries, it is simple to use in Arduino projects, the Arduino IDE uses a concentrated version of the C++ programming language. A library manager is one of the features of the IDE that allows users to install libraries outside the Arduino ide for the efficient performance of the project

These are the libraries of IDE which are used in the "Third Eye for Blind" project:

The TinyGPS++: This library is used for GPS tracking .it extracts the latitude, longitude, and altitude of the GPS module and decodes the data and the location is shown on the map.

The DHT11: This library allows the user to easily interface LM35 to the microcontroller and the temperature is continuously displayed on the app.

Oleddisplay : OLED Displays (Organic Light Emitting Diodes) display which provides the best contrast and resolution for applications such as these in a affordable form factor. It is constructed using organic material in series between two conductors.

Fig. 3 OLED Display

Ultrasonic sensors: ultrasonic sensors are used to identify the obstructions /obstacles in the user's path. The HC-SR04 is the most popular ultrasonic sensor used as it is low-cost and simple to even connect. High-frequency sound waves are sent by the ultrasonic sensor, which then notes the time of how long it takes for the waves to return after hitting an item. This sensor can then determine the distance of how long it takes sound waves to return.

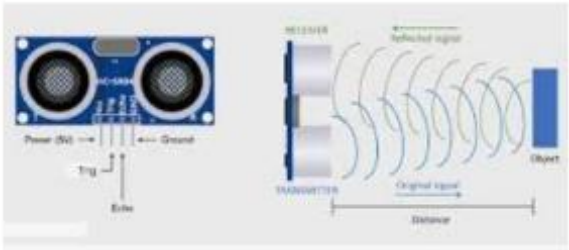

Fig. 4 Ultrasonic Sensor

Vibrator motor: The second important component is the Vibrator motor. When an obstacle is spotted, the vibrator motor is employed to give haptic input to the users. Even when the user cannot hear the buzzer, the motor vibrates the user to warn them of the obstruction in their paths.

Fig. 5 Vibrator Motor

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Temperature sensor MLX90614: The third most important component is temperature sensors. The MLX90614is a thermometer which produces an analogue output that is proportional to the temperature. The MLX90614temperature sensor is used in the project to collect the outside temperature and transfer that information to the Blynk app.

Fig. 6 Temperature Sensor

Nodemcu: The microcontroller board NodeMCU ESP8266 is based on the ESP8266 Wi-Fi chip. It can be programmed using the Arduino IDE and features a built-in Wi-Fi module. The NodeMCU ESP8266 has used the project to communicate with the GPS module and send location to the Blynk app.

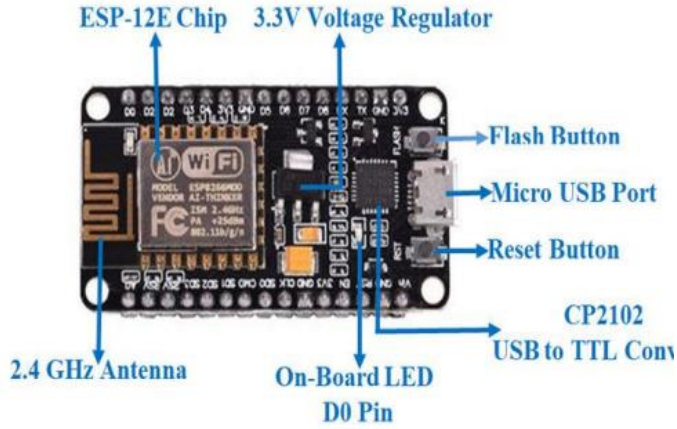

Fig. 7 Nodemcu ESP8266

Buzzer - when an obstacle is spotted, the buzzer informs the user with a sound. the buzzer also makes a loud noise as a warning when the user cannot hear.

Fig. 8 Buzzer

Arduino Uno: Ariduno uno is a microcontroller board . It can be programmed using the Arduino IDE. It features a total of 6 analogue inputs. Although it is used in the project to interact with the temperature sensors and GPS module, also controls buzzer and vibration motors.

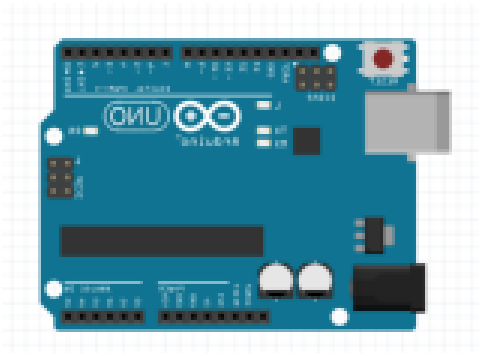

Fig. 9 Arduino Uno

V. Results and Analysis

"Third Eye for the Blind" is a project which has been implemented successfully over the years. This initiative is a boon for all blind people as it improves the quality of their life. It allows blind people to know more about their surroundings and it's quite safe as well.

The project includes a tool which has an obstacle detection system that finds obstructions in the user's path using ultrasonic sensors. A buzzer and vibration system are built into the system and both of them are turned on at the same time to inform a user when an obstruction is spotted.

This device is connected to the Blynk app and it shows the user's location and temperature on it .real time access to this information is made possible by the Blynk app so that the guardian can keep track of a blind person.

Fig. 10 Result

VI. Future Scope

The third eye for the blind has innumerable future scopes. Some of the examples are as follows

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1: Integration with other devices:
This project is connected to many other gadgets but one of the most important among this
called as 'voice assistants ' or haptic feedback devices could also be integrated with the device
2: Enhanced obstacle detection:
The current version of the detection system uses ultrasonic sensors but future iterations of this project may use more sophisticated sensors namely radar and LiDAR. Both of these are used to deliver information about the obstruction more precisely.
3. Recognition of objects using machine learning:
The current version of this device here uses straightforward distance calculations to find all the obstacles but future iterations may use machine learning algorithms to find and differentiate environmental objects. This allows users to know more about their respective surroundings.
4. User input and device customization:
This system can make up for the unique requirements of every single user according to their comfort. For example, a user can change the alarm frequency or even the sensitivity of obstacle detection.
This system can also use feedback tools to assist the system which will eventually lead to more efficiency over time.

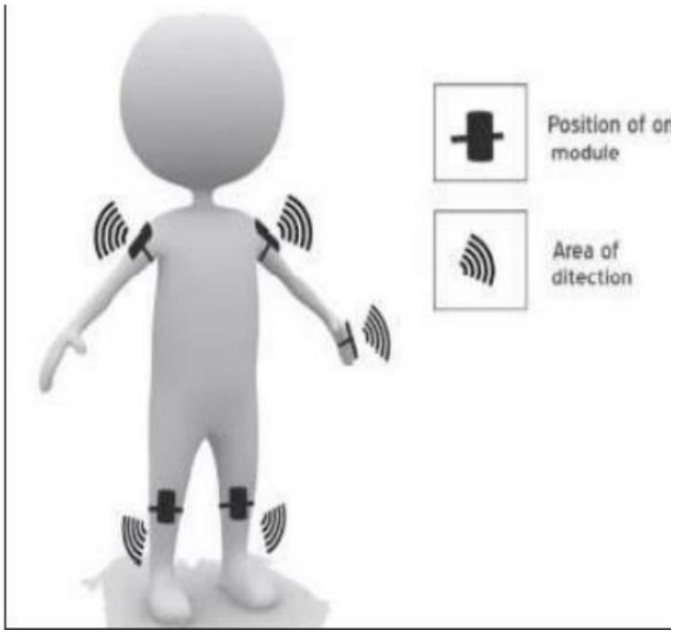

Fig. 11 Future Scope

VII. CONCLUSION

Thus, this project has presented a meticulously crafted design and architecture of a concept named "Third Eye for Blind". Which is simple, cheap, effective as well as efficient, and easy-to-use wearable technology having electronic guidance. This system with amazing properties provides many advantages to visually impaired people. This system can effectively detect the obstacles in front of the device it can detect the obstacle in the direction where the user is waving the hand. If this device gets constructed with maximum accuracy the visually impaired person can travel from one place to another place without the help of any person. For the security purpose of the visually impaired person the temperature sensor and GPS trackers and added to this device so that the guardians of the person will be assured of the safety of that person.

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