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# THIRD EYE FOR BLIND

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**ABSTRACT:**

*The WHO estimates that 39 million individuals will go blind worldwide. Every day they have to cope with a range of challenges. Their primary issue is making people confused about where they need to go. The purpose of this research is to help those who are visually impaired overcome their visual impairment by integrating senses such as hearing with other senses. The framework uses vibration and auditory alerts to warn users of approaching problems. The vibration and sound intensity increase with the proximity between the device and the impediment. With this architecture, routes with glaringly short reaction times have a strong, low-force, low-cost, robust, and compact answer.*

**KEYWORD: Wearables, Obstacle and Object detection, Vibration detection, Machine Learning techniques.**

## 1. INTRODUCTION

People have employed a range of sensors and sophisticated tactics to identify accidents but the bulk of them are difficult to travel with and require extensive training as Internet of Things technology advances more quickly every day. We are here to discuss the study we have presented to reduce the number of accidents brought on by carelessness. We developed a bot as part of our suggested core study that can identify mishaps in the forest when wildlife traverses roadways or atop cars. Artificial intelligence techniques were employed in developing this wearable bot, utilizing the latest Internet of Everywhere technologies. It is made up of static components like an Arduino and an ultrasonic sensor, as well as a battery-powered motor.

The community will gain a great deal if this concept is broadly accepted, and the prototype is slightly modified. With the help of a wearable device called the Third Eye for dazzle, people with obvious disabilities may navigate a confined area on their own. People who are visually impaired are able to walk around without assistance. When an ultrasonic module and a microcontroller in this device are used to determine the distance of an obstacle, the tool becomes very useful. A person must navigate a house or specific interior areas alone.

## 2. MOTIVATION

The most precious and important gift that God has given to all of his creatures—especially humans—is vision. Regretfully, some people cannot recognize the beauty of the world with their own eyes. Thus, the primary goal of this project is to offer virtual vision for those who are blind. The third eye for the blind is a development in technology that combines several fields, including physics, hardware design, and software engineering, and it enables those with vision impairments to see and navigate the world independently and confidently by using ultrasonic waves to identify items in the vicinity and notifying the user with a vibration or buzzer sound.
For the blind, this technology may be a game-changer. This module has an ultrasonic sensor built into it. The user can notice nearby objects and navigate more effectively with this sensor module. This sensor alerts the user by buzzing or vibrating anywhere it detects an item. It turns into a computerized device in this way. The blind will so gain a great deal from this technology, which will assure them to move around freely.

## 2. SUPPORT SYSTEM

The device has a wide detection range, and the support system helps to identify obstacles accurately and successfully around it. It is made up of several parts that combine to create a whole.

1. Arduino Nano
2. Ultrasonic Sensor (HC-SR04)
3. Battery
4. Switches
5. Hot Glue
6. LED Light (green and red)
7. Pref Board
8. Buzzer sound
9. Male-female header pins
10. Velcro tape

**Arduino Nano:**

An open-source platform for electronics is called Arduino. There are two characteristics of this kind of microcontroller a USB connection and GPIO pins.

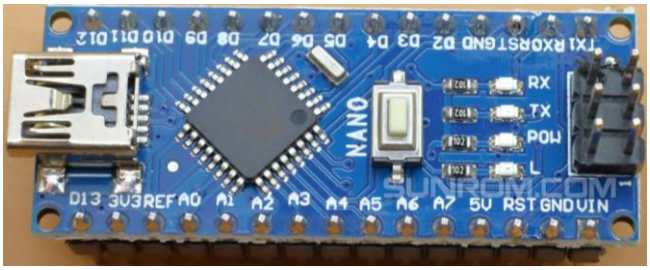


Fig-1:Arduino Uno

**Ultrasonic sensor(HC-SR04)**

The transceiver, transistor receiver, and transmitter comprise the ultrasonic sensor. Usually the receiving device, the transceiver performs the functions of both the transistor and receiver. Sound waves are converted into electrical signals by the transistor, and sound waves from the obstruction are converted back into electrical signals by the receiver. It measures how far away an obstruction is by using the sound waves that are generated.


Fig-2: Ultrasonic sensor(HC-SR04)

**Battery:**

The two terminals of a battery are referred to as the cathode and the negative end as the anode whenever the battery is producing power. Via an external electric circuit, electrons from the negative terminal will be transferred to the positive terminal.

When a battery is connected to an external electric load, a redox process takes place, breaking down high-energy molecules into smaller consumers and transferring the free-energy difference to the external circuit as electrical energy. In the past, a device with several cells was called a "battery," but in modern times, gadgets with a single cell are referred to by that word.


Fig-3: Battery

**Perf Board:**

Perf board, often referred to as DOT PCB is a material composed of a thin, inflexible sheet that has appropriate holes punched into it at uniform intervals. A square area is not as good as a drilled dot. It makes it possible to connect electronic circuits simply.

Fig-4:Perf Board

**Buzzer:**

Sound signals are created by converting audio signals. In addition to electromechanical and piezoelectric buzzers

Fig-5: Buzzer

## 3.1SOFTWARE:

**Tinker cad:**

Tinker Cad is a popular free online 3D modeling program that is well-known for being simple to use. It uses a web browser to function. It began available in 2011 and has developed into a popular modeling platform ever since.

**Arduino IDE software:**

One of the best programming tools for the aforementioned tasks that finish the project is Arduino UNO. The C++ programming language is used to write the Arduino software, along with a few more special functions and techniques. Before constructing any project, code must be written and uploaded to the board. The free and open-source Arduino Software (IDE) may be used with any Arduino board and simplifies the process of developing and uploading code.

Fig-6: Arduino IDE software logo

## 4. SYSTEM ARCHITECTURE:

All set to connect to the ultrasonic sensor is the Arduino UNO. The Arduino receives the input signal from the ultrasonic sensor and uses that signal to do the required or desired actions based on the coding input. The ultrasonic sensors veer away from the obstruction as a result of the Arduino output being recorded. Building a bot, connecting the necessary tools to the system, and providing input using the Arduino IDE software to create the code in Arduino are the key components. Tinker CAD allows us to simulate the output, and the online tool allows us to show the results of our simulation.

This device features an ultrasonic sensor that uses dynamic direction calculation to identify obstacles such as people, animals, or impediments and then moves in that direction. It vibrates, changes direction to avoid obstacles, and aids in the avoidance of accidents by inexperienced users.

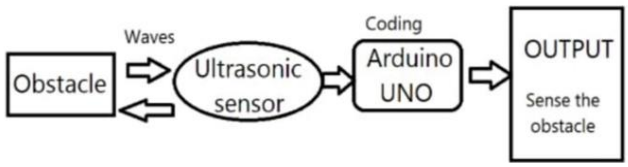


Fig-7:Flow Chart

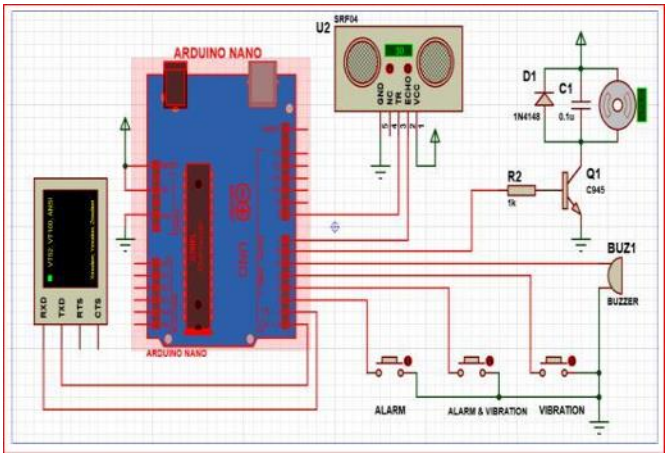


Fig-8:system architecture

## 5. EXPERIMENTAL RESULTS:

| Statistical Analysis | Precision | Recall | Accuracy | F_Measure |
|---|---|---|---|---|
| Methodology- to Build - Wearable System for Assisting Blind- People in Purposeful-Navigation,[ Andrés Alejandro Diaz Toro, Sixto Enrique Campaña Bastidas et al] | 90% | 93% | 92% | 91.40% |
| Virtual-Blind-Road Following-Based Wearable Navigation Device for Blind People [ Jinqiang Ba, Shiguo Lian et al] | 93.60% | 92.10% | 92.50% | 90.40% |
| Electroactive elastomeric actuators for biomedical a-bioinspired systems [ F. Carpi, G. Frediani, and D. De Rossi et al] | 94.00% | 91.30% | 94.60% | 92.30% |
| Third Eye: An Eye for the Blind to Identify Objects Using Human-Powered Technology [ L. Albraheem et al] | 95.00% | 92.00% | 94.00% | 93.00% |
| **Third Eye for Blind [ Our Proposed Research]** | **98.10%** | **97.60%** | **97.50%** | **98.50%** |

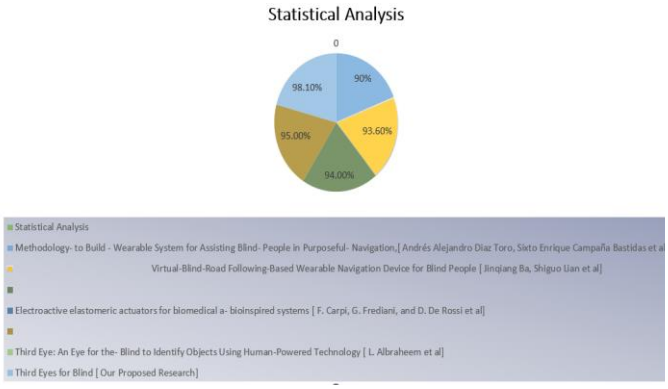


Fig-9:Satistical Analysis

## 6. RESULT AND DISCUSSION

An ultrasonic sensor interfaced with the Arduino Nano is tested separately. The findings needed for the proposed system are seen and recorded based on the individual's age. An audio signal is activated to warn the user through the buzzer sound. If the prototype perceives a possible complaint, it modifies the audio output level. Overall, the demands of people with visual impairments may be satisfied by the suggested method. Visually impaired persons may now see and explore the world with confidence and freedom because of a technical innovation called the third eye for the blind, which combines numerous disciplines like science, hardware design, and software engineering.

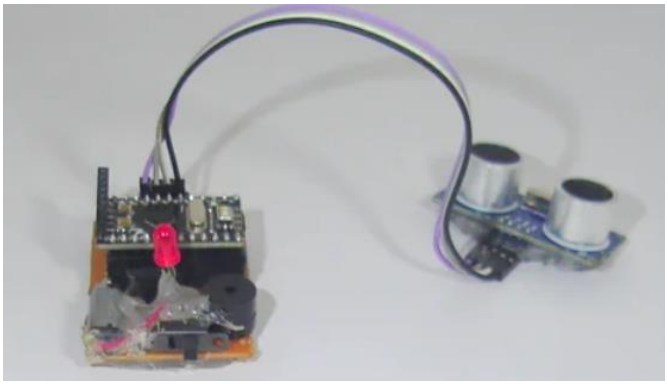

Fig-10:Implementation

## CONCLUSION:

The model and architecture of an Arduino-based third eye, or supplementary vision for blind people, are thus fully explained in the project that our team developed. The remarkable qualities of an electronic guidance system that aids blind individuals in need are made possible by its controllable hardware, easy configuration, and appropriate and straightforward usage instructions. It is an excellent instrument because of its straightforward design, practicality in usage, portability, affordability, and simplicity of handling. This project, incidentally, includes an object distance measurement component, which poses a serious challenge for blind individuals. The intensity of sound rises with decreasing distance. Assuming the task guidance we were given is accurate, it will aid visually impaired individuals in moving toward any path without requiring third-party assistance. It also helps them become independent from others, enabling them to complete tasks on their own when necessary, such as when they have work to complete. By doing this assignment, we are successfully resolving several issues related to the current route processes, such as carrying a stick while walking and using a third party to get from one location to another. This activity has a stronger impact on the local community and the wider public when it is used more widely and communicated to all visually impaired people.

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## BIOGRAPHIES

Padmatej Gajula is a committed student at Vellore Institute of Technology studying computer science. He has concentrated his study on the Internet of Things (IoT) since he has a deep love for this new technology. In addition to his academic endeavors, he published a research article in the subject to demonstrate his knowledge.

Jitendra Unna is a focused computer science student at Vellore Institute of Technology. Due to his keen interest in the fast-emerging field of the Internet of Things (IoT), he has focused much of his academic work on it. In addition to his academic pursuits, he showcased his subject matter expertise by publishing a research article in the field.

Kishan Kumar Reddy is a motivated student pursuing a Bachelor of Technology (B. Tech) in Computer Science and Engineering (CSE) at the Vellore Institute of Technology (VIT), with an emphasis on the Internet of Things. In his IoT initiatives and research, he makes use of his strong experience in networking, data analytics, and programming.

At Vellore Institute of Technology (VIT), Jayanth is a driven and aspirational student pursuing a bachelor's degree in computer science engineering with a focus on the Internet of Things (IoT).He participates in talks on the most recent developments and studies in the area.

Golla C Venkat, a Computer Science student at Vellore Institute Of Technology, is keen to delve into the world of IoT, a rapidly growing technology field. With a background in projects involving machine learning and web programming, he possesses a comprehensive knowledge of programming languages such as Java and C++. Additionally, he has a solid understanding of fundamental computer science subjects like Database Management Systems, Operating Systems,and Computer Networks.

Manikanta Chanda, a Computer Science student at Vellore Institute Of Technology, is enthusiastic about diving into the growing IoT field. With experience in machine learning and web programming, he's proficient in Java and C++. Manikanta also possesses a solid understanding of computer science essentials such as Database Management Systems, Operating Systems, and Computer Networks, making him well-equipped for IoT innovation.