

## Third Eye for Blind Person

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### Abstract

The third eye of the blind is a module that allows visually impaired and blind people to see and explore objects. The purpose of this research is to create a system that helps blind or partially sighted people to identify and avoid obstacles and these people bear less cost. The current method of statistical community research is sampling and virtual space tools, validation and final review and diagnostic analysis that deals with the research of the third eye of the blind with spatial analysis, the findings include system architecture, work operations, connection tools, and system flow. The device is innovative and is used for blind or visually impaired people with limited cost benefits, this project uses Arduino Pro Mini 328 and has an ultrasonic sensor inside the module, using this sensor module it can detect nearby objects. Visually impaired and blind people can effectively navigate through any sensor point. Any object they sense, the sensor notifies the person with a beep or vibration, the result is that this module will be useful for blind and partially sighted people and can enable blind people to move with confidence.

**Keywords:** wearable strap, alarm, blindness, ultrasonic

### Introduction

#### problem statement

Sight is the most beautiful and most important gift of God to all His creatures, especially to humans. But unfortunately there are some people who lack this beauty and cannot take the beauty of this world from their eyes [1].

Third Eye for the Blind <sup>2</sup> is a development that includes various fields such as software engineering, hardware design, and science that enables visually impaired people to see and explore the world confidently and independently by recognizing nearby objects using waves. Ultrasonic and individual notification with alarm or vibration. According to WHO (World Health Organization) 2.2 billion people suffer from visual impairment. They are facing problems in their lifestyle. This device

can be an innovation for visually impaired people, it has many advantages and reasonable cost [2].

### The importance of the subject

By using this sensor module, a person can see objects near him and can move effectively. Wherever this sensor detects an object, it will notify the person with a beep or vibration. In the case that this is a computer tool. Accordingly, this gadget will be very useful for blind people and can allow them to move from any place with confidence [2].

In the definition of blindness, it means a person without a sense of sight. A blind person cannot see anything. As we strive for different levels of comfort for the general public, we have reached a point where we have begun to completely ignore people who are living a miserable life because of their lack of sight. They face huge challenges in their daily life and hence they finally experience an independent life [2].

They experience a completely different life from ordinary people and experience disinterested behavior towards them due to their physical disability. They need other people to move them from place to place. Sight is the basic sense of life and therefore moving a person from one place to another in these conditions is a big challenge for visually impaired people [2].

### Research objectives and hypotheses

This project provides blind or partially sighted people with a tool that is useful for them as well as for people who are dependent on anyone due to their lack of vision. The third eye can be an innovation for visually impaired people, it helps them to move and pass between different places by knowing the nearest obstacles while using a strip that produces ultrasonic waves, and in case of obstacles with a beeping sound. This vibration can be effective for a person who is unable to move and recognize obstacles and has a lack of vision, the person should wear this gadget as a bracelet or install it on his clothes. According to WHO (World Health Organization), 2.2 billion people suffer from visual impairment. They experience many problems in their daily life. This device can be an innovation for visually impaired or blind people. People with physical disabilities used a common method that used to work, but had many limitations. Third Eye for Blindness is being developed as a moderate and highly productive approach to help the blind person more confidently and more [3].

This device acts as an innovation for curtains that helps to solve all problems. Currently, tremendous techniques and innovations are available for the

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<sup>2</sup> This article is called the third eye, which is the third guiding tool for the blind after animals and the white cane

physically challenged, almost all of these devices have solved some problems for the blind, but there are many problems that require considerable preparation and maintenance. The uniqueness of the proposed development is that it is fair for everyone, the total cost is under \$20 or INR 1500. There is no such device available in the market that looks like a product that can be worn with so much effort and clarity. As the use of the gadget increases and the changes in the model are promoted, it will definitely benefit people with low or no vision.

This device works like a radar, the orientation device uses ultrasonic waves and collects them to record the height, direction or speed of that object. The separation between the body and the person is evaluated in the movement of the wave. Therefore, the obstacle is identified in a specific space in front of or near the person [4].

This device works like a radar, the orientation device uses ultrasonic waves and collects them to record the height, direction or speed of that object. The separation between the object and the person is evaluated in the wave motion. However, all existing systems advise the person about the proximity of an object in a certain space in front of or near the person. Interesting aspects allow a blind person to recognize the clamps and allow him Choose your own path. Without any problem, this device can help detect any type of obstacle such as a clamp. Surviving the previous limitations, this project provides an original, constructive, adjustable and effective solution for visually impaired people [4].

### **Literature and history**

In the past few years, there have been innovations and development of various techniques and devices or devices to guide visually impaired people, thus achieving independent or free movement around without the support of other people. There are few parameters but there are limitations and restrictions [4].

Dr. Daopoulos and Dr. Bork is Wearable Barriers for Electronic Travel Aids for the Blind. In a survey, they proposed to conduct a comparative survey of mobile obstacle detection systems to inform the research community and users about project capabilities and innovations in adaptive technology for the blind. They organized the categories and they announced their qualitative-quantitative analysis on the subject.[5]

Ungar S suggested methods for blind people in urban areas. But they didn't consider people who can't afford expensive equipment. This defect is removed in the third eye for the blind [5].

Mrs. Pooja Sharma analyzed that the objects can be recognized but there are problems with angle and distance. On the other hand, the third eye for the blind has a wide angle for detection, which can be opened according to the range of the sensor [6].

Blind guide Hugo Fernandez and João Barroso state that a body area network based on ultrasound sensors to guide the blind isac. This research introduces a support formula for obstacle detection for blind people who are generally assisted by a white cane or a pet dog, so it provides a suitable solution for blind people to detect obstacles using this device. The solution is based on a body-area network of ultrasonic sensors that generate sound-based feedback. The mesh of the body area can be placed inside a cloth cloth, freeing the blind person from using a sighted eye or a white cane [7].

Today's innovative world offers many solutions for visually impaired people. A white cane with a tip to help blind people move. There are different types of canes that are used in today's technology world in the form of white cane, laser cane and smart cane. Dogs that are trained for this purpose are not very expensive and affordable for certain people [8]. This study showed that it is very difficult to move the remote control system, so this device works as the best optimized version [9].

### **research method**

The current method of statistical community research is sampling and virtual space tools, validation and final review, and diagnostic analysis that deals with the research of the third eye of the blind with spatial analysis, which is considered as a practical method as well as a fundamental method. Research tools include Windows Linux, Word 2021, Photo shop 2023, Adobe PDF 2021, Internet search engines, scientific sites in the media space [10].

### **findings**

#### **System architecture**

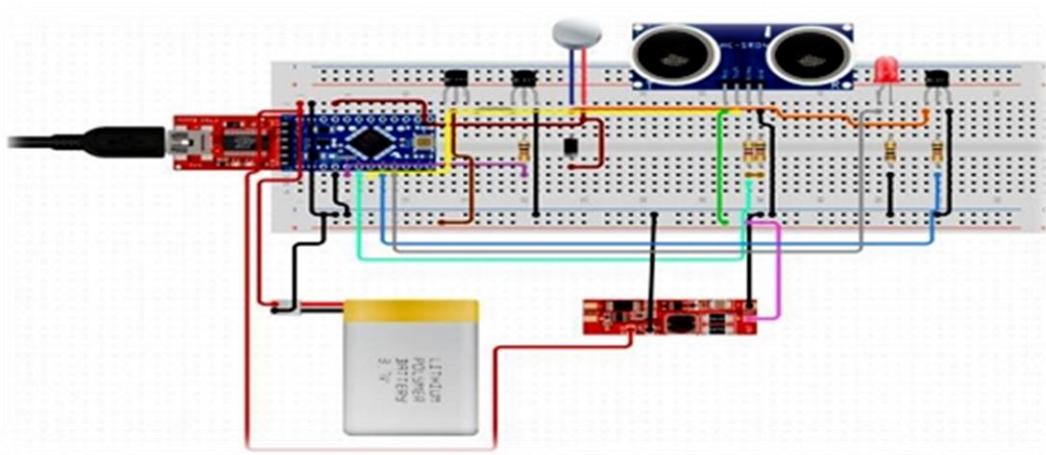


Fig. 1. Circuit Diagram (1) of the Device

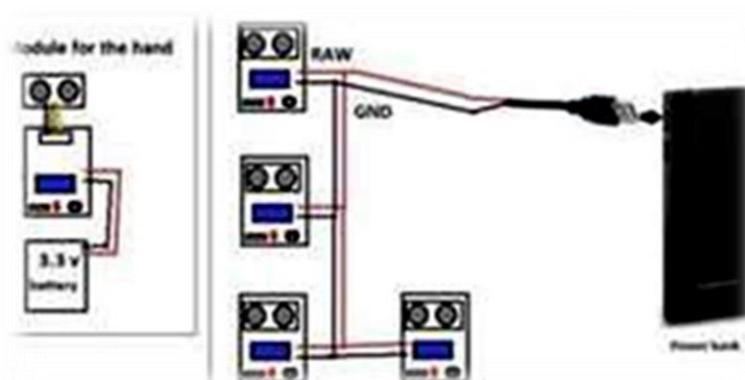


Fig. 2. Detailed Circuit Diagram (2)

➤ **Attention**

This band, bell, LED, ultrasonic sensors are all connected to the Arduino board. Connections are made with the help of soldering [10].

**Suggest practical work**

The shape of the gadget that is to be worn like band or we can say like a material by the blind person depends on an surprising wearable gadget in light of the Arduino board. The project can be made by five ultrasonic sensors, consisting five modules linked to different parts of the body. The five module scan be set as two for shoulders, two for knees and one for hand [10].

**A. Module 1-vibration mode**

whenever the obstacle is nearer, it will be sensed by the module and a vibration along with the beep sound will be felt by the person which will help to traverse in a better way [10].

**B. Module 2-Buzzer mode**

It will produce a beep sound on sensing the obstacle and if the way is clear then it won't produce any sound.

**C. Module 3**

Using Google Street View Service To provide voice feedback to a blind person

**D. Module 4**

GPS (Global Positioning System) for live tracking of the person This module will follow the current location of the unseen individual.

**work operation**

The suggested system consists of components like Arduino mini pro, ultrasonic sensor, vibrating motor, buzzers, perf board or zero PCB for the detection of obstacles and there is need of few components like red colored LED, switches, jumper wire, power bank, male and female header pins, 3.3. volt battery, with which the user identifies an object. some rubber is

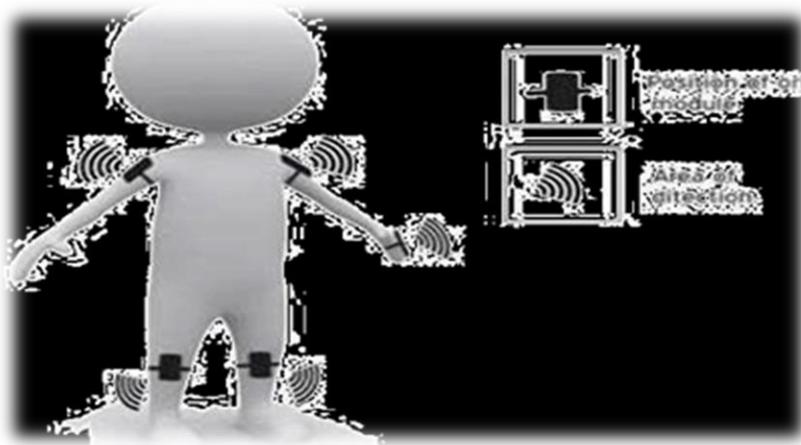
used to make the device wearable like a bracelet/band [10].

**The connections of this gadget are developed as follows:**

The -v e terminal of led, buzzer and vibration motor are grounded with the ground of Arduino. Led' s +v e terminal, central terminal of switch is linked to pin number 5 of the Arduino. The buzzer's +v e terminal has to be connected to the switch's 1 st terminal and +ve terminal of the vibration motor is connected to the switch's 3 rd terminal Now the connection of the ultrasonic sensor module is as follows VCC pins of sensor module and Arduino as well as GND are both connected respectively. The trigger pin of the ultrasonic sensor and pin 12 of the Arduino are connected. The ultrasonic sensor echo pin is connected to pin number 12. Mo d k 12 in Arduino. A switch is attached which is used to select the mode i. e. ring mode or vibrate

mode. Cut the PCB in dimensions of 5x3 cm and solder the female heads on the Arduino board. Now solder the bell [10].

Glue is used to connect the motor and wires are soldered to it. Now after connecting the LED, connect it, the ultrasonic sensors and battery input, connect the headers, then solder all the parts and connect the ultrasonic sensor and Arduino to the PCB. Attach the elastic band to each module. Using 4 wire jumpers, connect the ultrasonic sensor to the board to make a module for the hand and connect a 3.7V mobile battery to this module. The elastic band is now attached. Finally, after making the Arduino board connections, upload the program to each Arduino board and provide power to the other 4 modules [10].



**Fig. 3. Position of the Modules**

**System flow**

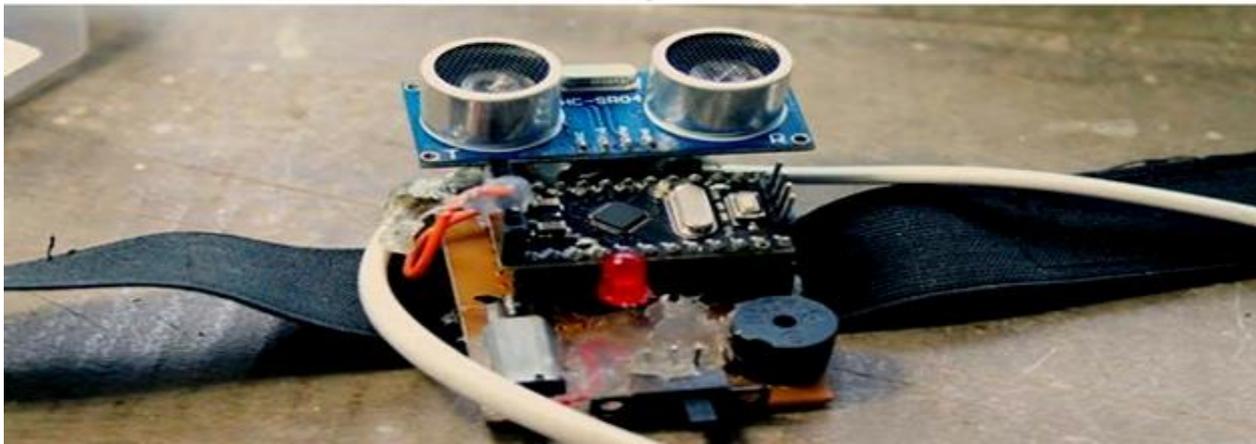
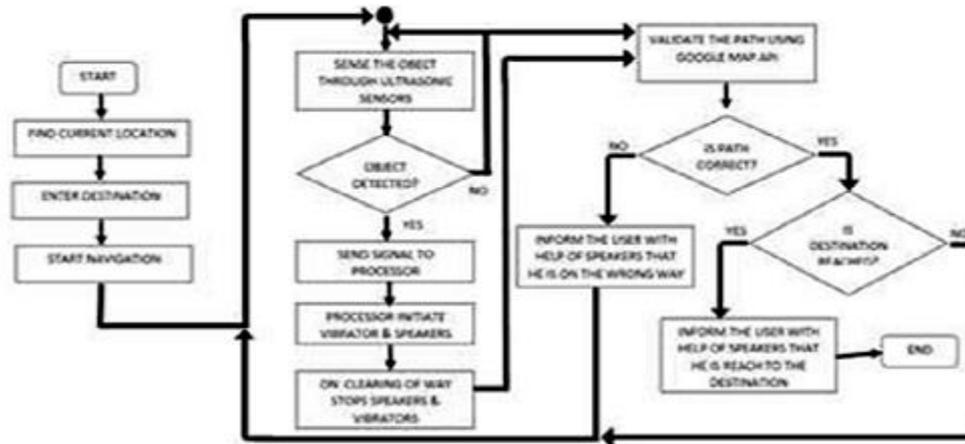


Fig. 4. Module for Hand

Transceiver: The transmitter emits ultra-fine waves, these waves hit the obstacle if there is one in the path and then are reflected by the obstacle. The receiver receives this reflected wave. The ultrasonic sensor consists of a transmitter and a receiver. The total time spent to launch and collect the ultrasonic wave can be evaluated, which then contributes to the calculation of the distance between the sensor module and the object [10].

- The equation for evaluating the sensor to object distance is
- given below:

$$S = (H * V_s) / 2 \quad (1)$$

Where, S = distance in centimeters, H = High time of pulse width,  $V_s$  = velocity of sound in centimeters/second = 343 m/s in air

The sensors used in the middle part of the belt should be placed in a place where the US pulse of the sensor is received by the system. In this way, along the above lines, the third eye is considered for the blind, so it can be effortless and useful because a device that it can be worn and thus it can be useful for a person to travel and recognize obstacles during the journey [10].

## The results

## Conclusion and discussion

This system is created and designed for visually impaired people. This device helps visually impaired people experience multiple modes and the system responds to the user in any environment. By using an ultrasonic sensor and an Arduino board, all conditions can be easily met for the blind. This device helps the visually impaired to be aware of obstacles in any direction, if the obstacle is on the left/west side of the person, the device informs the person that there is an obstacle to the left/west, if the obstacle is to the right/east of the person, the device informs the person that the obstacle is to the east/right, if the obstacle is in front of the user, it informs the user that there is an obstacle in front of it, and in the same way the person throws about the obstacle in all directions such as back, left, right, etc. This is why the third eye project for the blind has made people less sighted can live independently and perform their daily activities more easily and confidently with a high level of safety. This Arduino-based concept for the blind is simple, inexpensive, and easy to carry and maintain. This system is able to detect obstacles in all directions regardless of the height or depth of the object. Scan and identify. With this project, if the construction is done properly, blind people can enjoy the taste of sight and move freely from one place to another without the help of another person. The aim of my research is the same as the current article and has no contradiction.

## Proposals

In the future, it can be made very useful with the development of faster sensor response, such as the use of first-class sensors, and also modules that a person has to wear as a bracelet or any other part of the body, can become a wearable like a jacket. So that it can be made to work properly and make more progress in this device, for example we can use piezo electric plates in the user's shoes that can generate enough electricity for the modules to run.

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