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[ijrset@gmail.com](mailto:ijrset@gmail.com)

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# Visually Challenged Wearing Navigate Prototype Headset Using Echolocation Technology

V Parthasaradi<sup>1</sup>, M Meenu<sup>2</sup>, R Ranjani<sup>3</sup>

Assistant Professor and Head of the Department of Electronics and Communication Engineering, E.G.S Pillay Engineering College, Nagapattinam, India<sup>1</sup>

Assistant Professor of the Department of Electronics and Communication Engineering, E.G.S Pillay Engineering College, Nagapattinam, India<sup>2</sup>

PG student, Department of Electronics and Communication Engineering, E.G.S Pillay Engineering College, Nagapattinam, India<sup>3</sup>

**ABSTRACT:** The millions of people in the world whose vision is not perfect and they wear glasses. But for those hundreds or thousands who are blind, existing methods that merely assist them are not just enough. What they need are alternative methods by which they can navigate with greater comfort, speed, and confidence. By taking these into consideration, a wearable prototype is designed using Echolocation Technology which can resolve the problems of the existing methods. Sensors like Ultrasonic Sensors and IR sensors are used for obstacle detection and water detection. All the sensors are interfaced with Arduino UNO for processing purposes. Thus, there is hope for the visually challenged people to traverse without a stick. They can simply wear the designed prototype as a headset or a cap which can work very accurately and the only thing required is some training to use it.

**KEYWORDS:** Ultrasonic sensors, IR sensors, Arduino Uno

## I. INTRODUCTION

Vision is a significant part of life. Individuals get a large portion of the data or information about nature by sight. The Visually Challenged individuals, without this perspective, face difficulties consistently for protected and free versatility. As indicated by the insights given by the World Health Organization (WHO), worldwide at least 2.2 billion individuals are blind or facing a vision impairment. The Internet of Things (IoT) is a system of interconnected computing devices, mechanical and digital machines, objects and people that are provided with unique identifiers, unique roles and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The IoT brings the power of the internet, data processing and analytics to the real world of physical objects. For consumers, this means interacting with the global information network without the intermediary of a keyboard and screen; many of their everyday objects and appliances can take instructions from that network with minimal human intervention. These devices gather useful data with the help of various existing technologies and share that data between other devices. IoT (Internet of Things) technology is now being used for multiple operations including remote operations such as irrigation systems, military purposes, forests, etc. where human interference needs to be minimized. In practice, Internet of Things is an amalgamation of multiple technologies such as cloud technology, which leads to real time analytics, machine learning, commodity sensors, and embedded systems. Sensors, actuators, and other ICs are embedded with electronics, Internet connectivity, and other forms of hardware like LED lights and LED displays. These hardware components such as sensors and actuators interact with others over the Internet and provide the information collectively and can be monitored and controlled remotely with the help of cloud technology.

## II. OBJECTIVE

A wearable prototype is designed using Echolocation Technology. All the sensors are interfaced with Arduino UNO for processing purposes. There is hope for the visually challenged people to traverse without a stick. They can simply wear

the designed prototype as a headset hardware components such as sensors and actuators interact with others over the Internet and provide the information collectively and can be monitored and controlled remotely with the help of cloud technology

### **III. LITERATURE SURVEY**

It is observed that over years there is a vast development of devices or technology that are made available to visually challenged people. To the latest innovations using simple sensors when interfaced with either microcontroller or Arduino, have benefited the visually challenged. Apart from them, even the advanced devices which use augmented reality glasses for bringing more reality to the blind, are also present. The smart cane comes as one of the solutions to enable the visually challenged to connect with the world around them. This design comes with an ultrasonic sensor which is used to detect obstacles at a range of 4 meters and an IR sensor which is used to detect staircase, both sensors are attached to a cane a water sensor is also placed at the bottom of the cane for detecting water puddles. The output can be given as buzzer vibrator or a speech signal. The smart cane is cheap, quick response, power-efficient, lightweight, and easy to carry. Next comes the smart gloves that use ultrasonic sensors to detect an obstacle. Here the ultrasonic sensor was interfaced with Arduino UNO. The next type of prototype that came across was the smart spectacles. This design consists of a pair of spectacles along with certain low-cost sensors. The observed results prove that the smart spectacles can improve a blind person's travel experience and also serves as a useful consumer device for the visually challenged to journey safely. The main objective of this paper is to understand the working of all the current techniques used for assisting the visually challenged through the literature survey and the prototype came into the process. In this paper, one of the ideas is to remove the monotony that a blind person has to wear spectacles. This led to the idea of making a headset that works similarly to any other blind assistant device.

### **IV. EXISTING SYSTEM**

This device will help the blind to navigate without holding a stick which is a bit annoying for them. They can simply wear it as a band or cloth and it can function very accurately and they only need a very little training to use it. Designed a special wearable device based on the Arduino board which can be worn like a cloth for blinds. This device is equipped with five ultrasonic sensors, consisting of five modules which are connected to the different parts of the body. Among them, two for both shoulder, another two for both knees and one for the hand. Using the five ultrasonic sensors, blind can detect the objects in a five dimensional view around them and can easily travel anywhere. When the ultrasonic sensor detects obstacle the device will notify the user through vibrations and sound beeps. The intensity of vibration and rate of beeping increases with decrease in distance and this is a fully automated device.

### **V. PROPOSED SYSTEM**

The proposed system gives enhancements to the existing techniques. It attempts to make the existing techniques more productive, advantageous, and easy to use. An Infrared proximity sensor and a pair of HC-SR04 ultrasonic sensors are mounted on a headset for the detection of obstacles, staircases, and water puddles. The sensors are interfaced with Arduino UNO for processing purposes. If the mentioned obstacles are detected by the sensors then audio instructions are invoked which can be heard through earphones for respectively detected obstacles. The proposed system gives enhancements to the existing techniques. It attempts to make the existing techniques more productive, advantageous, and easy to use. An Infrared proximity sensor and a pair of HC-SR04 ultrasonic sensors are mounted on a headset for the detection of obstacles, staircases, and water puddles. The sensors are interfaced with Arduino UNO for processing purposes. If the mentioned obstacles are detected by the sensors then audio instructions are invoked which can be heard through earphones for respectively detected obstacles. The proposed system gives enhancements to the existing techniques. It attempts to make the existing techniques more productive, advantageous, and easy to use. An Infrared proximity sensor and a pair of HC-SR04 ultrasonic sensors are mounted on a headset for the detection of obstacles, staircases, and water puddles. The sensors are interfaced with Arduino UNO for processing purposes. If the mentioned obstacles are detected by the sensors then audio instructions are invoked which can be heard through earphones for respectively detected obstacles.

Impaired vision People suffering from this severe condition are unable to move on their own. In today's fast-paced world, these people are frequently overlooked. Few methods have been used to assist them and provide some mobility comfort. Traditional methods, such as trained dogs or a cane, do not provide enough information about potential obstacles. Furthermore, training and managing dogs are difficult tasks. RFID technology is used in some

navigation systems. This technology, however, cannot be used in an open area outside This is the Software Requirements Specification (SRS) for Third Eye.

Third Eye for Visually Challenged using Echolocation Technology. The purpose of this document is to give information about the end user's requirements, both functional and nonfunctional to the reader.

1. System should be wearable and easy to use for blind person.
2. System should detect object in front of blind person using ultrasonic sensor.
3. Hands Free Feature - all task should be done without any manual work.
4. System should work in real-world.

### BLOCK DIAGRAM:

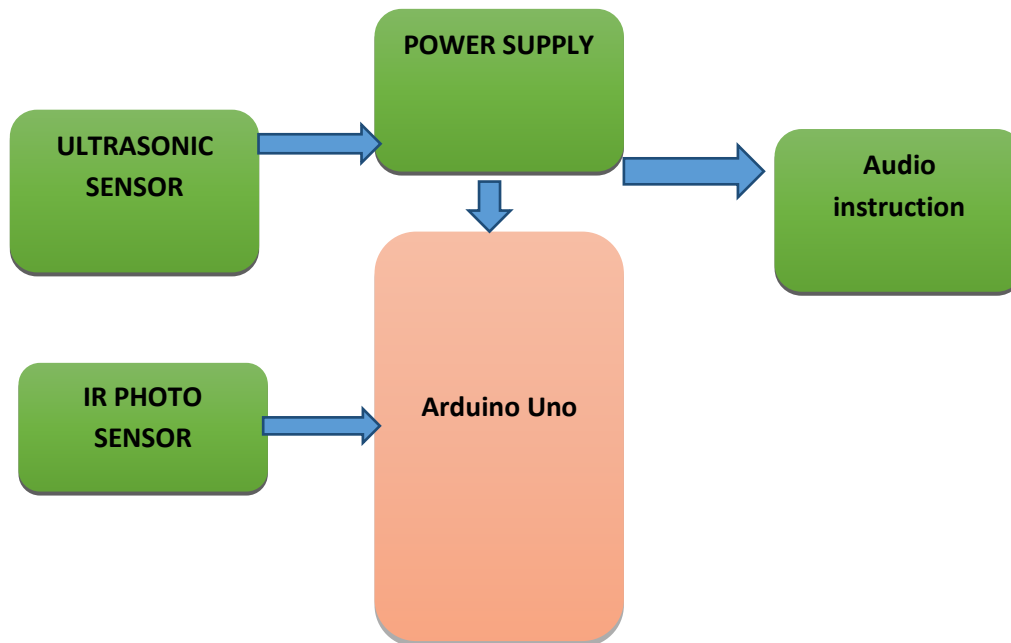


Figure.1 Block Diagram of proposed system

### VII.OUTCOMES

The aim of this proposed work is particularly, to help the blind people or those who are suffering from a lack of vision. Such persons have to encounter many obstacles while walking indoors or outdoors. we can help disabled people by making them independent persons of the society.

### VIII.RESULT

Ultrasonic sensor and IR sensor are interfaced with Arduino and tested separately. The results that are necessary for the proposed system are observed and noted down according to the person's height. Later, all the components are placed on the headset as mentioned in the working and the testing is done in a blindfold manner. An audio signal is invoked as an alert message to the user through the earphones. An extra device or a sensor is not used for the audio generation in the proposed system, but the message is programmed in the Arduino program. When there arrives a situation where the prototype senses all the applications simultaneously, all the different audio signals are Ultrasonic sensor and IR sensor are interfaced with Arduino and tested separately. The results that are necessary for the proposed system are observed and noted down according to the person's height. Later, all the components are placed on the headset as mentioned in the working and the testing is done in a blindfold manner.





An audio signal is invoked as an alert message to the user through the earphones. An extra device or a sensor is not used for the audio generation in the proposed system, but the message is programmed in the Arduino program. When there arrives a situation where the prototype senses all the applications simultaneously, all the different audio signals are given individually with a certain delay. Overall, the Proposed System is able to satisfy the needs of Visually Challenged People.

### **VIII. CONCLUSION**

This work presented a smart and intelligent system for visually impaired people to help them move around and stay safe. The proposed system is based on the needs of visually impaired individuals in their daily lives. It helps them visualize the environment and gives them a sense of their surroundings

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