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AN EEFICIENT NAVIGATION SYSTEM FOR THE VISUALLY IMPAIRED

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ABSTRACT

The third eye, also known as extra vision for the blind, is an Arduino-based project that uses ultrasonic waves produced by an ultrasonic sensor and vibrations brought on by a buzzer to help the user discriminate between objects. The stick that blind people use to walk for long periods of time inspired this effort because it is challenging for weak people to hold a stick. As a result, it is a wearable device for the elderly and the blind, who can use it to walk more comfortably without holding anything. The ultrasonic sensor, which works to identify items nearby, sends a notification to the user via buzzer to help them get to their destination on time.The Arduino is a software-based gadget with hardware features like a buzzer, battery, ultrasonic sensor, and other things in addition to software features like coding.

Keywords: Visually Impaired, US Sensor, Arduino, Obstacles

1. INTRODUCTION

The "extra vision" or "third eye" offered by Arduino Bases enables blind people to negotiate obstacles while walking. The object detection work will be carried out by the distance measurement sensor along with Arduino. This technology is the first headgear, handwear, and garment worn by blind individuals to attempt to address every issue that arises when moving around a home or other indoor environment. The primary features of this instrument are its low cost and portability, both of which will be very advantageous to the community.In general, this device can be worn with the help of gloves and rubber bands, among other things. All of the physical items in it are made of PCB materials, and PCB permits robust connections between elements.

2. SYSTEM COMPONENTS

The developed system aids in the accurate and efficient detection of obstacles surrounding the device that covers a wide area of detection. It is made up of a number of parts that work together to make it whole.

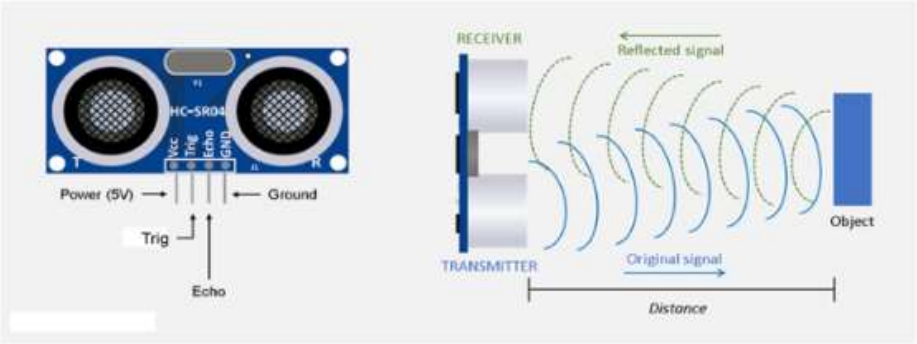
a. Arduino UNO programming
b. The ultrasonic sensor
c. Preference board
d. Buzzer
e. Battery
f. Switches
g. Jumper wires for LED lights
h. Header pins, male and female

a. Arduino UNO programming

It is an electrical device that combines software and hardware functionality to create projects that use the Arduino platform. A unique kind of microcontroller called an Arduino has extra options like a GPIO pins and USB ports etc.

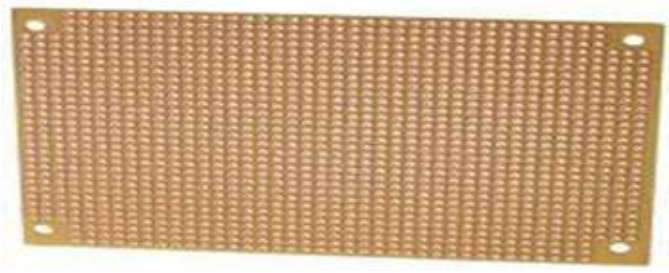
b. The Ultrasonic sensor

The transistor receiver, transceiver, and transmitter forms the ultrasonic sensor. The term "transceiver" refers to an object that serves as both a transistor and a receiver.Transceiver converts soundwaves that originate from an obstruction into electrical signal. In essence, it aids in measuring an obstacle's distance by producing sound waves.



c. Zero PCB Board

Zero PCBis a material used for prototyping any type of electronic circuit. It is constructed from a thin, rigid sheet that is properly perforated at regular intervals. Square areas are typically preferable to drilled dots. It offers a simple method for connecting electronic circuits.



d. Buzzer sound

A buzzer resembles an electrical instrument that sends a sound signal to a channel. A buzzer can be mechanical, electromechanical, or piezoelectric. It is a device that converts audio signals into sound signals.

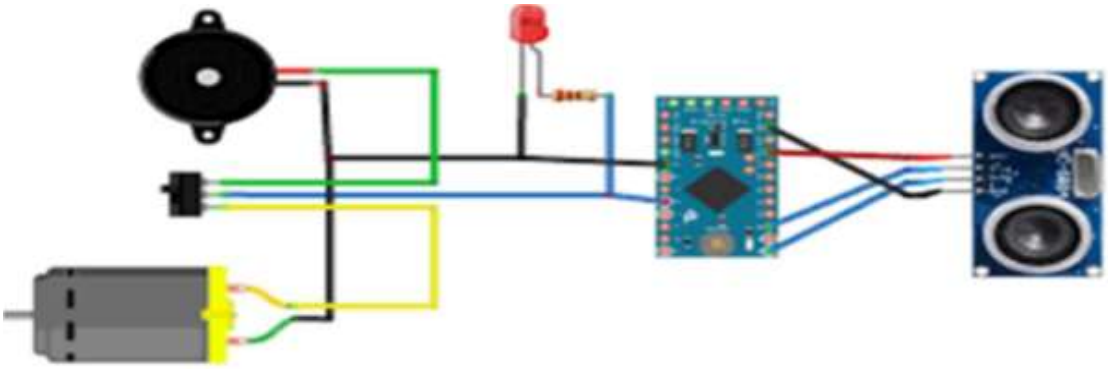
e. Special Connecting Wires

Special Connecting wires are virtually identical to all other connection lines, with the exception that they feature connector pins at both ends. Special Connecting wires are commonly used in prototyping boards such as zero PCB and breadboards, where one corner is associated to the device and the other to the zero PCB board.

f. IDE by Arduino

IDE by Arduino is one of the environments for all of the aforesaid operations that completes the total project. With a few extra special functions and techniques added, the coding is written in the C++ programming language.

g. System Architecture



The Arduino UNO is ready for connection to the ultrasonic sensor, and the control signal from the sensor moves to the Arduino, which has the appropriate coding input that will perform the needed or required actions, and the output from the Arduino travels to the buzzer, which aids the blind person in noticing the obstacle. The led bulb, battery, and jumper wires are also part of the proposed system of the Arduino-based third eye for the blind, and they are used to interface Arduino to various pieces of hardware such as an ultrasonic sensor, buzzer, led, and so on.

3. WORKING PROCEDURE

An Efficient Navigation System for the Visually Impairedproject is ready to help the blind people dealwith their lack of vision and sight. This specially fabricated system warns users of impending obstacles in his way via an audio and vibration signal. When an object passes in front of the device holder, the device emits a beep sound. As the distance between the gadget and the object reduces, so does the sound and vibration.As a result, the technology makes it simpler for those who are blind and cannot see objects around them to detect them.

The Arduino UNO pin 6 is wired to the ultrasonic sensor pin Echo, and pin 7 is used to link the ultrasonic pin trig. The buzzer sound will play depending on whether the switch is depressed or not. Code will be uploaded to the Arduino board at the conclusion. By completing the aforementioned tasks, our project will be effective for blind individuals to use.

4. INFERENCES

Our crew has developed a technology that enables visually impaired people to simply detect the obstruction and move freely without colliding. As living standards rise, so do human requirements, and in order to meet all of these wants and work on them, humans need a proper vision to observe and conduct work.This project doesn't help as much as real eyes do, but the person using it will feel that they can move from one place to another without the assistance of a third party. It is also eco-friendly, meaning it doesn't harm the environment, and it is a wearable piece of technology that people won't hesitate to use because, as we can see in the above illustration that depicts the actual application, blindness is a very significant challenge that people must overcome.

Some advantages of our project include:

a) It is portable

b) affordable

c) small, light, and easy to wear with hats, shoes, and hand bands.

d) Simple and clear mechanism

5. CONCLUSION

As a result, our team's project fully explains the design and construction of an Arduino-based third eye or supplementary vision for blind people. With proper and straightforward usage instructions, simple configuration, and controllable technology, an electronic guidance system can help blind persons in need. It is a fantastic device because of its straightforward design, practical functionality, low cost, portability, and ease of use. Speaking of this project, it has a feature to measure object distance, which is a significant problem for blind people. After measuring object distance, they also informed us of the object's direction, such as left, right, top, and bottom.The blind person can easily move in any direction without running into an obstruction. If the project is completed according to the guidelines provided, it will let blind individuals walk in any direction without the aid of a third party. It will also help people become independent from other people, so if they have job to do, they can handle it on their own. Our project is successfully reducing the issue with current navigation strategies, such as carrying a stick while walking, using another person to move from one location to another, and many other issues.

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