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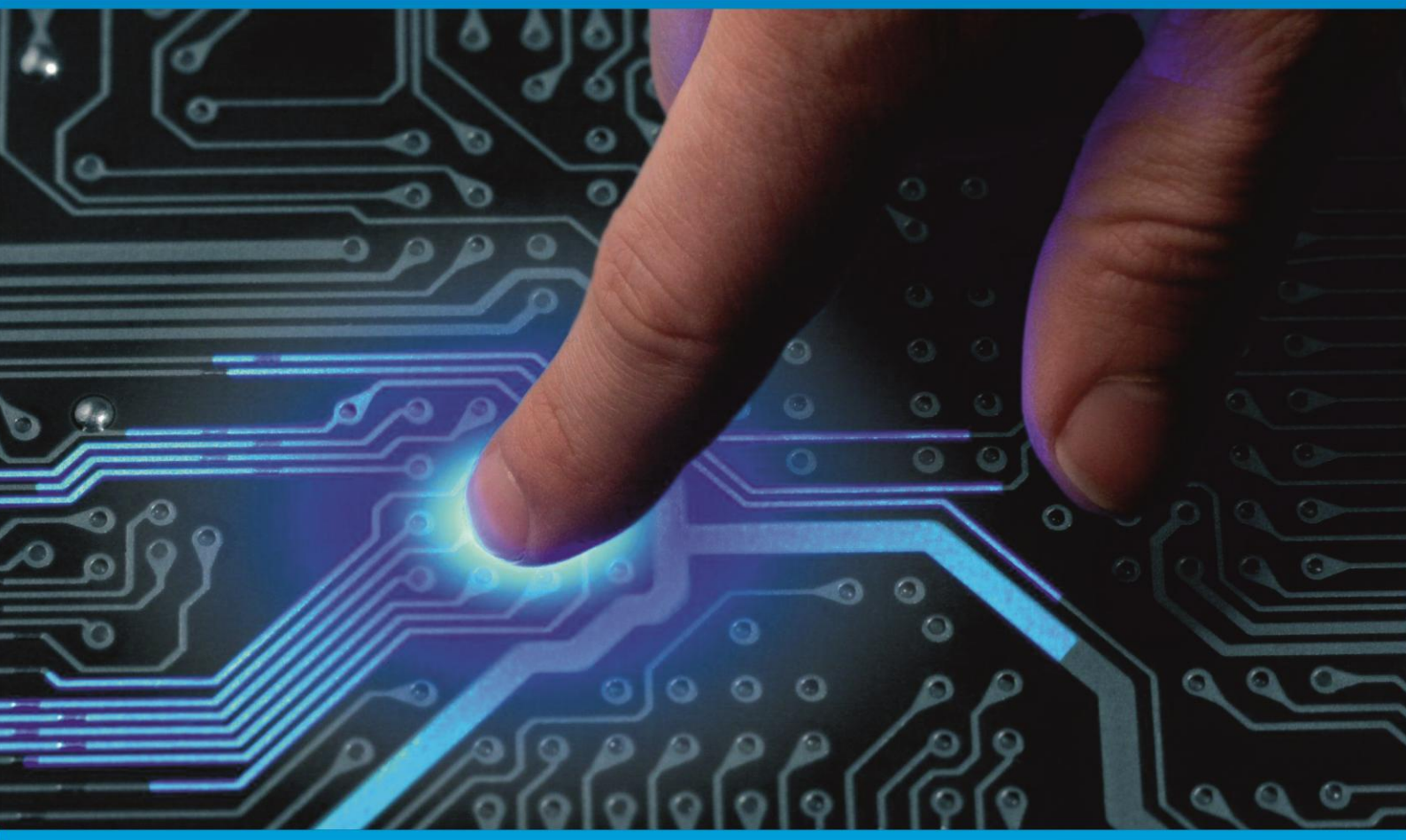

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Smart Blind Stick System Using Arduino UNO & Sensors

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ABSTRACT: Visually impaired people face many challenges while walking in the streets or climbing stairs and facing other obstacles which may cause severe injuries to them. The smart Blind Stick will help them to identify the environment around them. In this paper we came up with a solution, using a smart stick with ultrasonic sensors to detect the obstacles in front of the user within a range of 10-50 cm. A buzzer is also used as an indicator to the user that an obstacle is in front of him. Moreover we also used an LED to let people around the user know that the user is a visually impaired person. This system uses Arduino UNO, ultrasonic sensor, 9V battery for power supply and button for toggling the stick on and off. The Smart Blind Stick is low cost and lightweight.

KEYWORDS: Ultrasonic Sensor, Visually Impaired, Buzzer, IoT.

I. INTRODUCTION

Visually impaired people are the people who are not able to see things as clearly as normal people see or they are completely blind. They are not able to identify everyday objects near them. Such people need assistance like blind sticks and other visually aiding devices. The smart electronic devices are designed to help these people more effectively.

To detect the obstacle present on the streets or floor where the blind person is walking, sensors can be used. Buzzers can be used to notify the blind person using a beep sound that an obstacle is present in front of them.

In this paper a fully automated blind stick is proposed. This system will automatically detect the obstacles and will give a warning to the user in the form of beep sound coming from the buzzer.

II. IMPLEMENTATION

In this system the ultrasonic sensors are used to sense the obstacle. The sensors are set at a threshold limit if any obstacle is found within that range it gives a beep speech through the speaker. The ultrasonic sensors emit soundscapes with frequency lying in the ultrasonic spectrum(20kHz), Which is inaudible to human ears. The soundwaves hits the obstacles and bounces back to detectors.The ultrasonic sensors is used for detecting objects/obstacles which are in front whereas the two IR sensors are used to detect the obstacles on the sides.After the collection of data the calculations are done according to the formula: uS/58 centimeters or uS/148 inch.Once the distance of the obstacle is calculated then the conditions are checked.The signal is then sent to microcontroller to operate a buzzer. The microcontroller reads the distance of the obstacle using a sensor and then commands the buzzer.

Ultrasonic Distance Sensor

Ultrasonic sensor (Fig.1) is used to detect the obstacle on the street or floor. In short it is used to detect the presence of an object by measuring frequency and listening for that sound wave to bounce back. The range distance of the ultrasonic sensor is between 0-10 cm.

Fig 1

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Arduino Uno

The Arduino Uno is used as the interface. Arduino Uno is where the coding part of the system is programmed. All the components such as Ultrasonic sensor , Buzzer , LED etc. needs to be coded according to the project requirement. A software is used where the coding part is written. This software is Arduino CC. When code is written it can be compiled independently but to use the code it needs to be uploaded in the Arduino Uno.

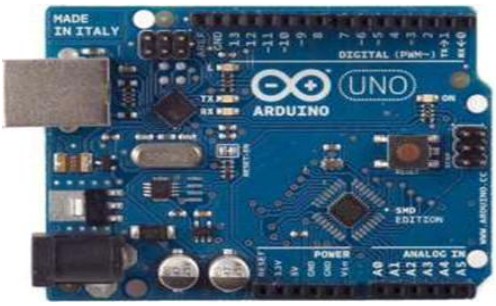

Fig 2.

Buzzer

The buzzer consists of an outside case with two pins to attach it to power and ground. This buzzer is responsible for the warning beep sound which will notify the blind person that some object or obstacle is in front of them.

Fig 3.

Arduino CC

The Arduino CC is a free software used to write code for the Arduino Uno component. The Arduino Uno will work according to the code which is written in the Arduino CC software.

Fig 4.

Schematic Diagram

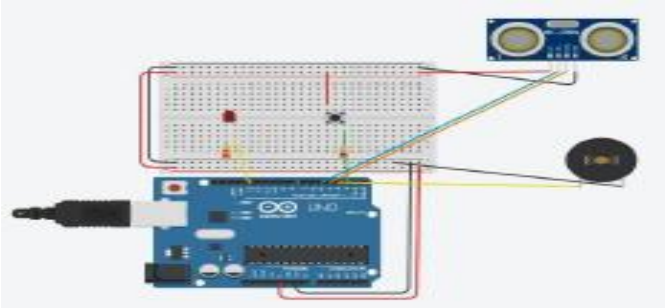

Fig 5.

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III.FUTURE SCOPE

The system is well designed for the user but it can also be updated by adding new features in which not only the user but also the user's friends and family will be able to detect the location of the user in an emergency situation. The system can be supplemented with an actual GPS module used in cars and we can provide a vibration sensor for the partially deaf person. It can be further enhanced by using VLSI technology to design the PCB unit. This makes the system further more compact. A wall following function can also be added so that the user can walk straight along a corridor in an indoor environment.

IV.RESULT

Step 1when button is turned on then SOS message is being sent to the close contacts. Also the Ultrasonic sensor detects the distance as shown in simulation.

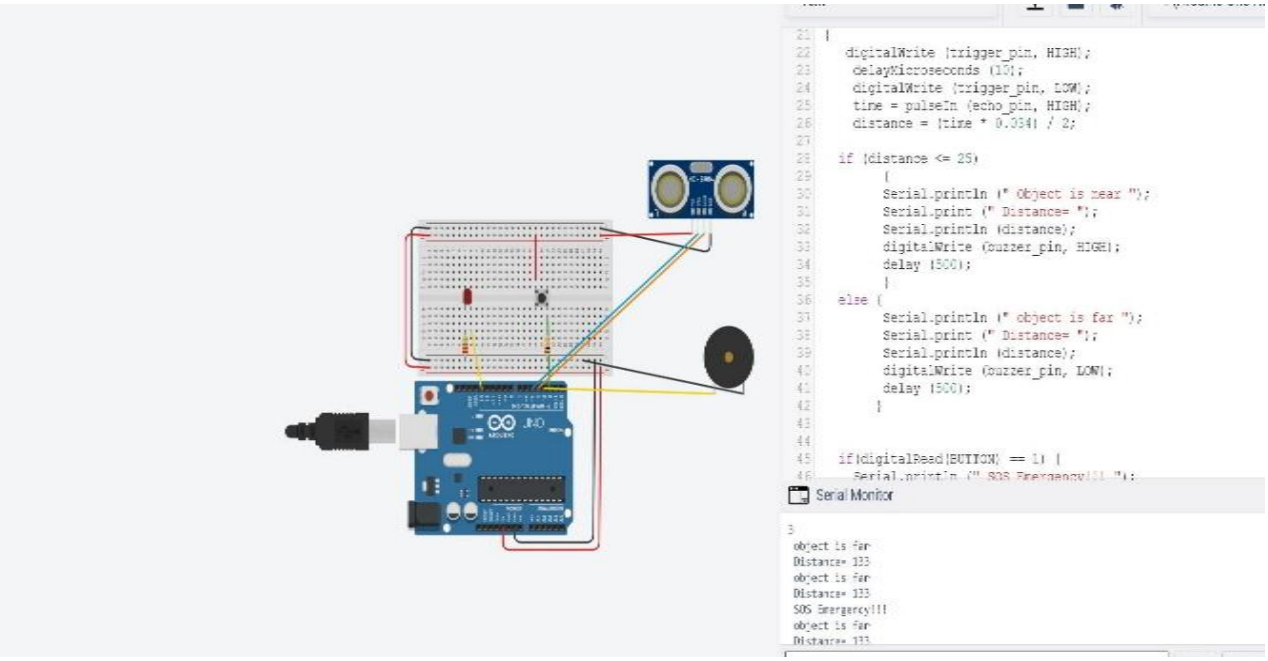

Fig 6.

V.CONCLUSION

In this paper a detailed explanation about the Blind Stick has been given. With the introduction of this prototype the life of the visually impaired will become much easier and independent. The main drawback of the visually impaired is that they deprive themselves of what they deserve. Smart Blind Stick helps them in giving confidence and independence. This product uses the technology of IOE, which is one of the most demanding topics in the current scenario. It is user friendly, easily adaptable and has functionality. We analyzed the current problems faced by the blind in India and came up with the solution of creating a smart stick. As described in the section the components used enable the product to work in a desired field and hopefully help the blind.

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