Design of Smart Blind Stick using Arduino

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Abstract— This paper includes ultrasonic blind walking stick with the use of arduino. If u notice the blind people, you can observe that they unable to walk without the help of other. One has to ask guidance to reach their destination. They have to face more struggles in their daily life. Using this blind stick, a person can walk more confidently. This stick detects the object in front of the person and give response to the user by buzzer. So, the person can walk without any fear. This device will be best solution to overcome their difficulties.

Keywords: Ultrasonic Sensor, Infrared Sensor, GSM, Arduino Uno, Arduino IDE

I. INTRODUCTION

This walking stick is an advance to the traditional walking stick. Here, Arduino UNO, ultrasonic sensor, IR sensor, GSM, buzzer and buttons are used. Arduino is a microcontroller which is used to do all the calculations very fastly and quickly with great accuracy. Ultrasonic sensor is used to detect the obstacle in the front of the person. For obstacle detection, IR Sensor is used which is very small in range. So, it detects the obstacle which are near to stick. Use of more ultrasonic sensor may create calculation problem. So, IR Sensor is Preferred. The buzzer will assist the blind person to reach the destination through the indication alarm. If any critical situation occur with the help of GSM module it will send message to convenient person.

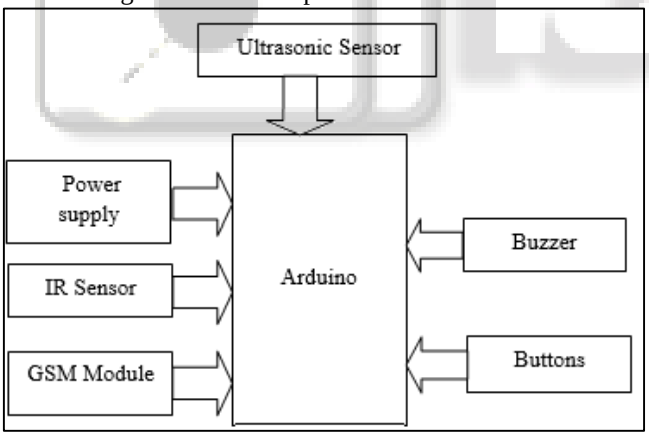

Fig. 1: Block Diagram

II. BLOCK DIAGRAM DESCRIPTION

A. Arduino:

Arduino is one type of microcontroller. It is a kind of computer which is about open source. It is the board which takes the input signal from the surrounding environment or from connected devices to it. Then Arduino processes it and then gives the output signal. There are different arduinos with different processors and controllers. Arduino IDE is the software used for programming the Arduino. Arduino is compatible with PC and it can be easily connected to PC with the help of a USB cable.

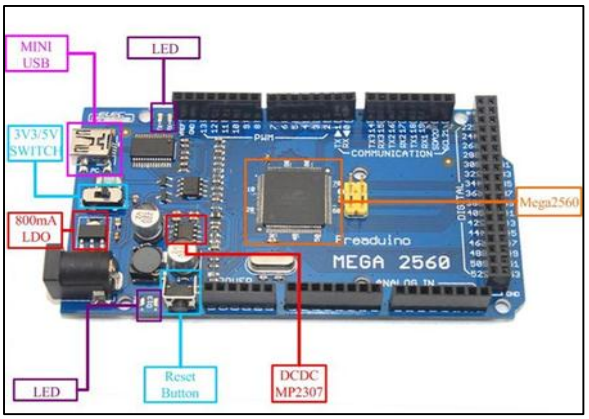

Fig. 2: Arduino2560

B. Buzzer:

An occasional frequency piezo buzzer is employed to point that the obstacle is extremely on the point of the person and there can be an opportunity of collision. A buzzer is employed in conjunction with the vibration motor as associate alerting the user in huddled areas.

Fig. 3: Buzzer

C. Sensors:

1) Ultrasonic sensor:

Ultrasonic detector is employed, as, it's less tormented by target materials or by color, it's capable of detecting objects at intervals a variety of four meter. These supersonic sensors ir designed to resist external disturbances like vibration, infrared emission, close noise, and EMI radiation. The detector used may be a SRF-04. It needs a brief trigger pulse associate degreed it provides an echo pulse. Supersonic waves ir emitted from the module associate degreed heal once hits an objects and obstructions within the path of the user. The output of the detector provides modification in voltage with regard to the gap of the obstacle. Conjointly potholes will be detected mistreatment this technique.

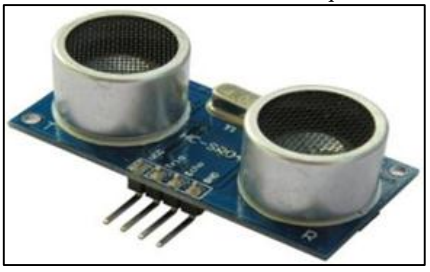

Fig. 4: Ultrasonic Sensor

D. GSM Module:

Fig. 5: GSM Module

When the GSM electronic equipment receives a message the microcontroller can method the message with the keyword saved in it. Then, it'll transmit the message through GSM electronic equipment so as to retort to the sender. Just in case of associate degree emergency, the user of the stick will press the emergency button the microcontroller transmit the message to the GSM electronic equipment which is able to send a SMS messages to the saved variety within the system.

1) IR Sensor:

This is associate Infrared Transmitter and receiver that along compose a photoelectrical device.

The device features a long detection distance, and has less interference by actinic radiation as a result of it uses modulated infrared emission. This device features a screwdriver adjustment to line the detected distance, then offer as digital output once it senses one thing inside that vary. This device doesn't come a distance worth.

Fig. 6: IR Sensor

III. SOFTWARE USED

A. Arduino IDE:

This software is used for programming the arduino. We can do the different codes in this software and Then we need to burn in arduino board.

Fig. 7: Arduino IDE

B. Proteus:

For the simulation, we can use the Proteus software. While using this software, we need to add some libraries like arduino, GSM, Ultra sonic sensor etc. Which do not exist already.

IV. FEATURES

A. Detection of Obstacles

The obstacle detection circuit consists of an unhearable device interfaced to the Arduino Uno Board. The device detects the presence of obstacle in every direction so the vary of the obstacle is calculated. If the space is among70cm then vibration motor are going to be vibratory with highest intensity and conjointly the buzzer are going to be on. If the space is between 70cm and 150cm then the vibration motor can vibrate with medium intensity and if the space is on top of 250cm then the intensity of the vibration motor are going to be less.

B. Detection of Steps

The hollow detection system consists of an unhearable device and a buzzer interfaced with the Arduino Uno. The operating of this circuit relies on the belief that the peak of the un hearable device mounted on the stick can stay constant just in case of an understandable path. However if there happens any noticeable increase in its height from the bottom on top of a particular intensity then the buzzer can begin abuzz. This may facilitate to visually impaired person in police investigation a steps ahead.

C. Emergency Electronic Communication

The GSM_ module is employed in emergency scenario. This module transmit the knowledge as SMS message to a predefined mobile range just in case of emergency.

V. CONCLUSION

It is necessary that visually impaired people get access to an efficient and comfortable object in order to live their daily life comfortably. In a developing country like India, there is a

need for a cost effective solution so that most of the people can have an effective product as proposed in this paper.

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