SMART GLASS FOR VISUALLY IMPAIRED PERSONS

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Abstract - *This device includes a pair of glasses and an obstacle detection module fitted in it in the centre, a processing unit, an output device i.e. a beeping component, and a power supply. The Obstacle detection module and the output device is connected to the processing unit. The power supply is used to supply power to the central processing unit. The obstacle detection module basically consists of a ultrasonic sensor, processing unit consist of a control module and the output unit consists of a buzzer. The control unit controls the ultrasonic sensors and get the information of the obstacle present in front of the man and processes the information and sends the output through the buzzer accordingly. These Ultrasonic Smart Glasses for Blind people are a portable device, easy to use, light weight, user friendly and cheap in price. These glasses could easily guide the blind people and help them avoid obstacles.*

***Key Words:** Ultrasonic sensors, Blind people, Processing unit, Obstacles , Arduino microcontroller.*

1. INTRODUCTION

In this project, the smart glass will help the visually challenged persons to reach their destination independently. The reason it is more reliable is because it is developed on the Android operating system and Android-based smartphones are very common and highly available almost everywhere [9]. The glass is built using an Arduino microcontroller with sensors and buzzers. The glass warns the user by making noise with the buzzer when he/she walks in front of an obstacle. The walking cane is a portable mechanical device to detect static obstacles only within a specified range. The device range is very limited and it is not flexible for protection from obstacles near to head area [12]. This wearable smart device application helps the users or we can say patients to reduce the number of home visits. This in turn reduces their operational costs. Health parameters recorded by any devices are now updated instantly in the application used by doctors. Physicians could monitor patient conditions remotely and suggest appropriate medicines [14]. Data is secured at higher rate and kept confidential. Doctors can view consolidated reports on each individual without any time delays [5]. Using this wearable technology, the work becomes easier and the following result or output is displayed faster. The main objective of our present work is to provide a reliable, cost effective, low power solution for a blind people which would help them to move almost like any other normal pedestrian.

The velocity of the sound in air is used to calculate the speed of the sound in air. The distance that sound travels is equal to the speed of sound in the medium multiplied by the time that sound travels [13]. With the large number of sensors available in the market, it is necessary to choose the right sensor. There are certain features which have to be considered when we choose a sensor: Accuracy, Environmental condition, Range, Calibration, Resolution, Cost and Repeatability [14]. But if objects are too far away from the sensor, the signal takes so long to come back (or is very weak when it comes back) that the receiver cannot detect it [10]. The impulse width is proportional to the time required for the echo return. This time is called time-of-flight (TOF) [15]. But there are other factors which may also affect the propagation of sounds such as: ambient pressure, gas density and humidity [11]. The cost of this system makes it affordable for the majority of the society which in turn an effective device for them to spend on, just for once and assures wonderful travel guidance for them.

2. PROPOSED SYSTEM

In our proposed system, the blind people have sensor enabled smart glass to examine which object it is. Here, we have distance sensor detects depth or height the staircase step and tells to people. The proposed system deals with the cheaper and effective obstacle detection with a wide range of coverage. The advantages are Low cost, Easy to use and Helps the care taker to monitor that person.

3. SYSTEM SPECIFICATIONS

3.1 HARDWARE REQUIREMENTS

➢ Arduino Uno.

➢ Ultrasonic Sensor.

➢ Vibration Motor.

➢ Switch.

➢ Gsm.

➢ Power Supply.

➢ Apr 9600 Voice Ic

3.2 SOFTWARE REQUIREMENTS

➢ Arduino Ide.

➢ Embedded

4. WORKING

The ultrasonic sensor is used to detect the obstacle in front of a person using the soundwaves for a particular distance. The Ultrasonic sensor here used as a transceiver. The ultrasonic waves are emitted by the transmitter when the objects are detected. Both the transmitter and receiver re resent inside the ultrasonic sensor. We calculate the time interval between the transmitted and received signal. The distance between the object and sensor is calculated using this [7].
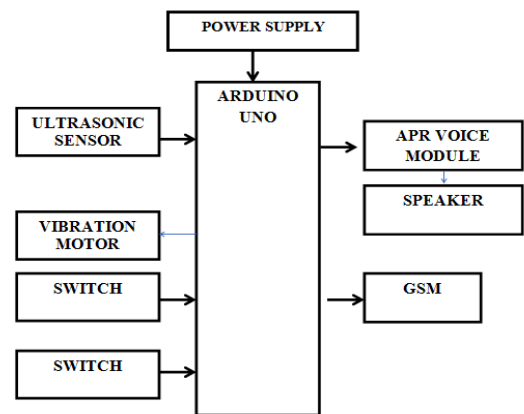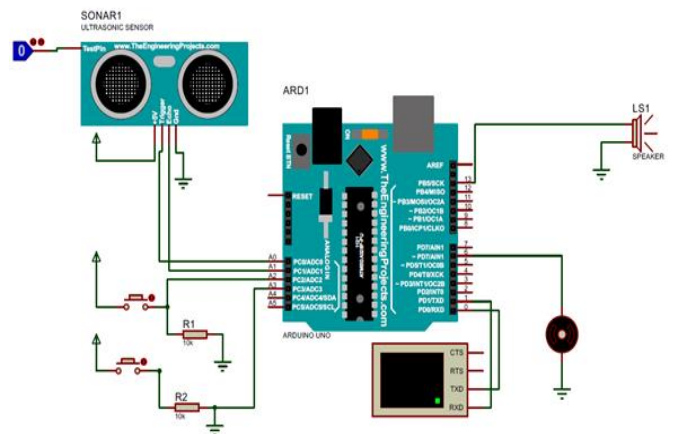

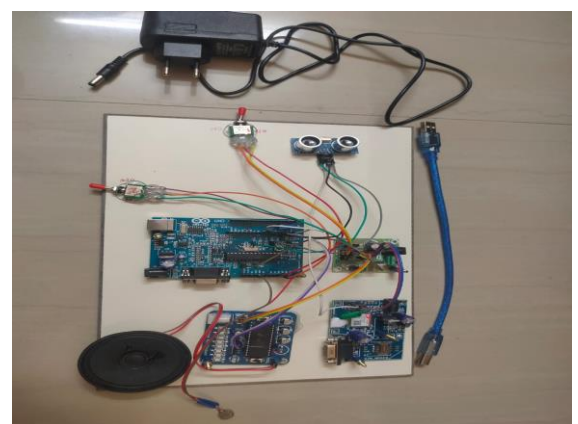**Fig -1**: Block diagram

Fig -2: Circuit Diagram

Fig -3: Working Prototype model

We have used a customized Arduino uno board which is the controlling unit of this design. The Arduino help in sensing and controlling the objects in the real-time situations and environment. The Arduino Uno is programmed using the Arduino Software (IDE), our Integrated Development Environment common to all our boards and running both online and offline. If the ultrasonic sensor detects the objects using the soundwaves the Arduino gets an input which will immediately alert the person with a vibration. For this process the vibration motor is been used. In case if the person couldn't speak, we have inserted a toggle switch with a speaker in order to ask the surrounding persons for help. The voice will be repeated till the switch is moved to off position. We have used GSM module just in case of an emergency to send an alert message to the care taker of the respective person. So that this device will be acting as an assist to the visually challenged persons.

5. RESULT

The performance of the proposed system has found to be effective. The ultrasonic sensors can detect the obstacle and alert the user with a vibration. With the press of a button, the user can perform various functionalities. The user can perceive any written information with the press of a button. The proposed model is easy to wear and use and can be used as a portable model for visually impaired people.

6. CONCLUSION

The objective of this project is Third Eye for the Blind is to design a product which is very much useful to those people who are visually impaired and those who often have to rely on others. It is an innovation which helps the blind person to move around and go from one place to another with speed and confidence by knowing the nearby obstacles using the help of the wearable band which produces the ultrasonic waves which notify them with buzz sound or vibrations. It allows the user those who are visually impaired to walk freely by detecting the obstacles. They only need to wear this device as a band or cloth on their body.

Thus, this project Arduino based obstacle detector for blind people is a new method to resolve their problems. A less complex portable, cost efficient, easy to manage an effective system with many more amazing properties and advantages are proposed to provide support for the blind. The system will be very easy to find the distance between the objects and the sensor. It can detect the objects in every directions th the blind person. Without the help of others, the blind person can move from one place to other and lead their regular lives independently.

In future we can enhance this project with few more ideas like monitoring the person's health condition like heart beat etc and with different sorts of applications.

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