Glove for Visually Impaired using Ultrasonic Sensor

Adharsh.S[1] Regin.R.C[2] Richard Paul.R[3] Vishnuvineeth.K[4] R.Gokulraju[5]
[1,2,3,4]UG Scholar [5]Assistant Professor
[1,2,3,4,5]Akshaya College of Engineering and Technology, Coimbatore

Abstract— This project is made for blind people for their free travel without the usage of any supporting aid like blind stick. We have seen many blind stick projects controlled by several systems used by blind people for their travel. These projects make the user to travel with a blind stick. These projects make the people to show their identity that they are blind while walking. To avoid this we have designed a system which makes the blind people to walk as a normal man. This project uses an arduino kit and several sensors like IR sensor, ultrasonic sensor, etc. The usage of sensor may vary according to their environment. This makes the blind people to walk more comfortably than the user walking with a blind stick.

Key words: Ultrasonic Sensors, Visually Impaired Person, Navigation, Visualizing, System

I. INTRODUCTION

The world has a very large population if we consider it as 100% among that around 12% are visually impaired these statistics are taken from the world health organization as per the 2011 census. And also many become visually impaired due to daily accidents. As we all know that these numbers are going to increase daily. This paper explains in detail about design and the components used in the project and how it will act as a navigation glove. They have to move in the floor sense and move The ultrasonic blind walking glove is fully automated with the help of other sensors like ultrasonic and vibrators, comfortable to use and cheap. It is quite economic over the conventional method.

II. LITERATURE REVIEWS

There are many studied done by lots of people and there are many techniques of making a smart walking stick. As the conclusion related to many studies prove that ultrasonic sensor would be very efficient to detect the obstacles with maximum range of seven meters and has an angle of 45 degree coverage. And using arduino microcontroller is cost efficient and without any problems and it has a long life for the batteries due to less power consumption. Based on the surveys conducted visually impaired people are more comfortable with this present proposed project and easy to differentiate the obstacles.

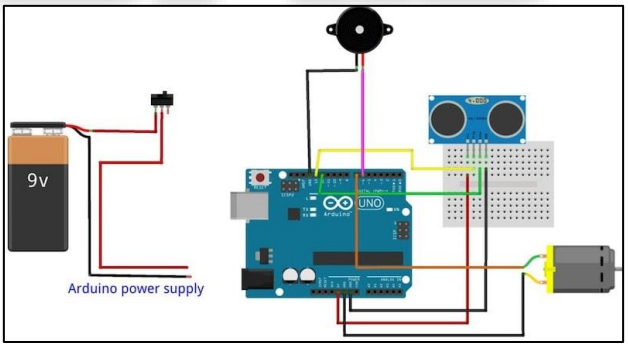
III. WORKING OF ULTRASONIC SENSOR

Ultrasonic sensor HC-SR04 is used for this project. This sensor consists of four pins, which are: V_{cc} (+5V), Trig (Trigger), Echo, GND. Trigger pin is an output pin which is used to generate the digital pulse wave form, while the Echo pin is an input pin from which the returning pulse is captured. Moreover, it requires +5V supply to start operating that is provided through the V_{cc} pin. It also consists of a GND pin for the circuit to be closed. An alternating signal of five volt is sent through the trigger pin with a time interval of ten microseconds. And they are collected in their follow path after their reflection produced on striking of any of the object. The walking stick is normally used to detect objects in front of it or to measure the distance between different objects.

IV. WORKING OF GLOVE

The working of the glove is quite simple it has a trigger and an echo pin. A signal of +5V is sent over to Trigger pin for around 10 microseconds in order to trigger the sensor. When ultrasonic sensor gets a trigger signal on its trigger pin, then it emits an ultrasonic signal from the transmitter of the ultrasonic sensor. This ultrasonic senor, then goes out and gets reflected back after hitting some object in front. This reflected ultrasonic signal is then captured by the receiver of the ultrasonic sensor. As the sensor gets this reflected signal, it automatically makes the Echo pin high. The time taken for the Echo pin will remain HIGH, depends on the reflected signal. So the sensor would have the time interval with them. With that time interval they would be able to calculate the distance travelled. And then it is divided by two in order to get the original distance. The derived distance is converted to electrical form and sent to the microcontroller in a gap of ten microseconds. The microcontroller checks the distance which is given in the program on the microcontroller and executes the result based on the given condition.

V. INTERFACING DIAGRAM



VI. METHODOLOGY

The ultrasonic blind walking stick allows the visually impaired people to move around easily using today's technology. The glove is integrated with an ultrasonic sensor. The ultrasonic sensors are used to detect the obstacles ahead with the help of the ultrasonic waves transmitted and received, which is further passed to the microcontroller.

The microcontroller further processes the data and calculates the distance if the obstacle is present in front of them. Then send the signal to the vibrator which gives out as a vibration. The glove has the two vibrators which give the instruction to the person. If the motor in index finger will get rotated the person will turn right, if the motor in middle

finger motor vibrate the person will goes left and if both the motor in off he will move straight. The ultrasonic sensor is fixed in the belt so this will get sense the obstacles in front of the person.

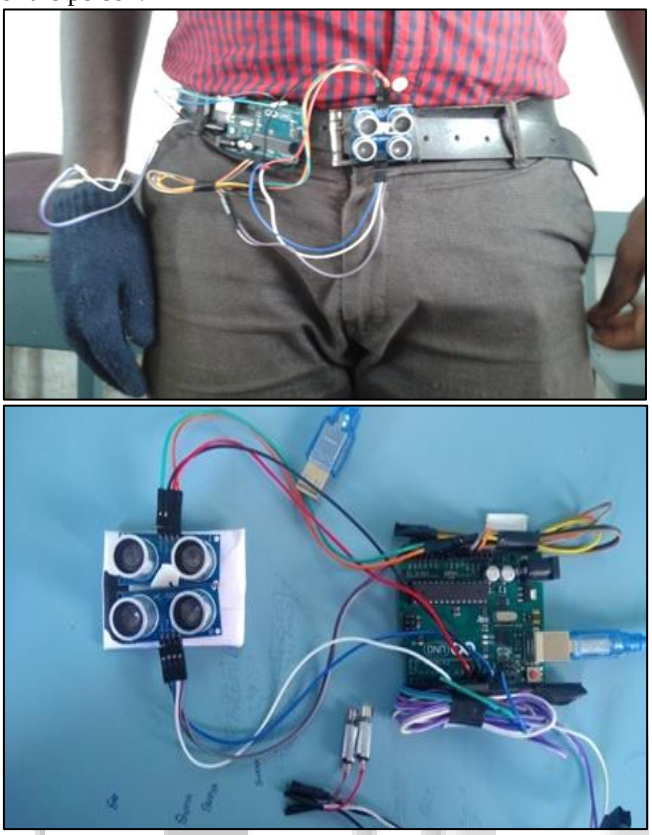


Fig. 1: Assembled Model

VII. CONCLUSIONS

The paper analyzed the existing electronic aids for visually impaired people and does not discuss any implementation results. Based on the limitations in existing aids which are noted and rectified in this project, this paper proposes an enhanced assisting electronic aid using latest technology as a contribution to the society. The glove has the following features: Entirely automated, Can be maintained & operated easily, Very comfortable to function, Authentic & Durable, Low power consumption, The Microcontroller can be code protected, Simplicity of the design makes it effective navigation tool, Wet or muddy or potentially slippery terrain can be detected by a pair of electrodes and Overall manufacturing cost is low & parts are available in both local & international market.

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