

## **Blind's Talkback Stick**

Sneha Sharma, Sayantika Pal, Ankita Kulkarni

*ExTC, Mumbai University*

*Email: [2sneha97@gmail.com](mailto:2sneha97@gmail.com), [ankukulkarni.ak@gmail.com](mailto:ankukulkarni.ak@gmail.com), [sayantika96@gmail.com](mailto:sayantika96@gmail.com)*

**Abstract-** Walking without hesitation is an easy matter for us but a matter of concern for those people with low vision. Also the issue of security is very paramount in their day to day lifestyle. Therefore this project is about developing a multi purpose stick for the comfort of low vision citizens. This stick enables its users to combat obstacles ,track the user's location in case of emergency and also identifies voice message of the user and beeps its position in case of misplacement. Arduino UNO, GSM/GPS Module, Bluetooth Module and some other electronic devices are coupled together for the accomplishment of the task. This stick is a blind's guide which will enables him to have a secure lifestyle using simple technology.

### **Index Terms-**

#### **1. INTRODUCTION :**

Walking without hesitation is an easy matter for us but a matter of concern for those people with low vision. Also the issue of security is very paramount in their day to day lifestyle .Therefore this project is about developing a multipurpose stick for the comfort of low vision citizens.This stick enables its users to combat obstacles ,track the user's location in case of emergency and also identifies voice message of the user and beeps to locate it easily in case of misplacement.

Arduino UNO,GSM/GPS Module,Bluetooth Module and some other electronic devices are coupled together for the accomplishment of the task. This stick is a blind's

#### **2. LITERATURE SURVEY :**

In India as well as other countries a lot of cases have been witnessed regarding safety of blind citizens. People with low vision undergo several problems related to their day to day activities like their stick getting misplaced , being unable to judge or spot obstacles ahead of them , getting confused with routes and many more. Several cases regarding their accidents have been reported due to improper judgement of obstacles and much more. Blind's talkback stick have been designed to combat all such problems and minimize the rate of such unwanted incidents.

##### **2.1 Different Methods**

##### **2.2**

guide which enables him to have a secure lifestyle using simple technology. The project name is talkback stick because it responds to the user according to the user's convenience. Whenever an obstacle comes before the user the ultrasonic sensor senses it and the buzzer beeps to give an indication.

In case the user has misplaced his stick and is unable to find it he just need to open AMR Voice app and say the words "FIND MY STICK" ,the stick will beep its location and will enable the user to locate it and when he speaks the word "GOT" the buzzer will turn off . In case the user is missing and needs help he just need to press the button on the stick .This will send a message to one of his family member. This way it serves as a multipurpose stick.

Our project can be done using 2 methods. They are:

##### **1. 8051 Microcontroller**

**AT89S52:** The AT89S52 is a low-power, high performance CMOS 8bit micro-controller with 8k bytes of in-system programmable ash memory. The device is manufactured using Atmels high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The Atmel AT89S52 is a powerful microcontroller which provides a highly exible and coste ec-tive solution to many embedded control applications. The AT89S52 Provides the following standard features: 8K bytes of ash, 256 bytes of RAM, 32 I/O lines, Watch dog timer, two data pointers, three 16-bit timer/counters, a six-vector two level interrupt architecture, a full duplex serial port, on-chip oscillator,

and clock circuitry. The AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The power down mode saves the RAM contents but freezes the oscillator, disabling all other chip function until the next interrupt or hardware reset.

## 2. Arduino Microcontroller:

This is our project. This portion is described briefly in the upcoming sections.

### 2.2 Method Description

This project is entirely based on the implementation of Arduino Uno microcontroller, GSM/GPS Module, Ultrasonic sensor, Bluetooth Module and other electronic devices. We will interface the GSM Module, Ultrasonic sensor, Bluetooth Module and other electronic devices with arduino micro- controller. We are using a 12V,2A adapter as power supply for GSM/GPS module. The arduino has been programmed such that each feature of the stick will work independent of the other. i.e the working of one module will not affect the working of the other. The output is obtained in terms of buzzer beeps because its easy for a blind person to judge a tone.

## 3. SYSTEM DESIGN AND DESCRIPTION :

### 3.1 Interfacing Of Arduino With Ultrasonic

The Ultrasonic Sensor sends out a high-frequency sound pulse and then times how long it takes for the echo of the sound to re ect back. The sensor has 2 openings on its front. One opening transmits ultrasonic waves, (like a tiny speaker), the other receives them, (like a tiny microphone).

The speed of sound is approximately 341 meters (1100 feet) per second in air. The ultrasonic sensor uses this information along with the time di erence between sending and receiving the sound pulse to determine the distance to an object. It uses the following mathematical equation:

$$\text{Distance} = \text{Time} \times \text{Speed of Sound divided by 2} \dots\dots\dots \{ \text{"Eq.(1)"} \}$$

Time = the time between when an ultrasonic wave is transmitted and when it is received You divide this number by 2 because the sound wave has to travel to the object and back. PIN CONFIGURATION : The VCC of ultrasonic sensor is connected to the 5V pin of arduino. GND is connected to the gnd pin of arduino TRIG pin is connected to digital pin no.6 ECHO pin is connected to digital pin no.5

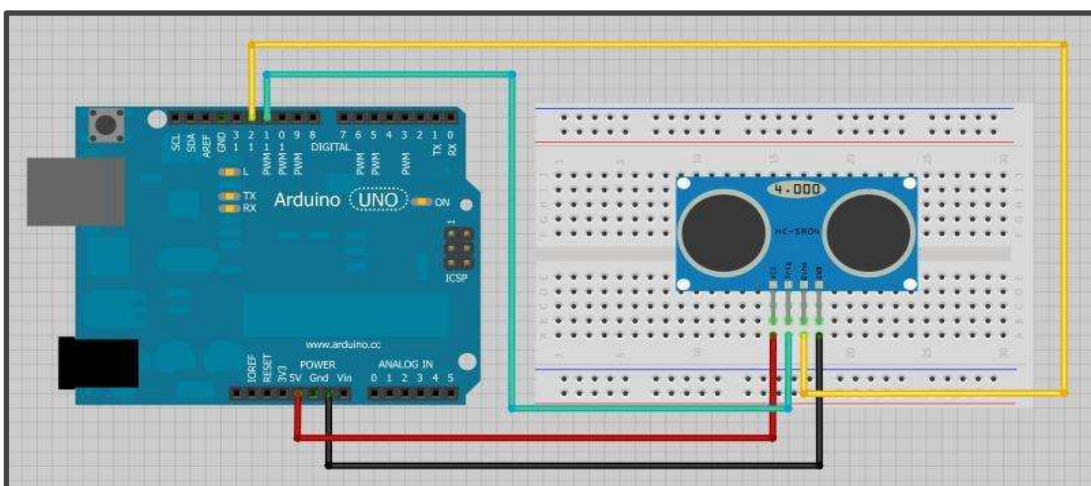


Fig. 3.1. Ultrasonic with Arduino interfacing

### 3.2 Bluetooth And Its Interfacing With Arduino

HC-05 is a more capable module that can be set to be either Master or Slave HC-06 is a Slave only device. (It looks physically just like the HC-05).(Note: Now HC-06 not cheaper)These small ( 3 cm long) modules run on 3.3V power with 3.3V signal levels, They have no pins and usually solder to a larger board. (See example below) The module has two modes of operation, Command Mode where we can send AT commands to it and Data Mode where it transmits and receives data to another bluetooth module. "Breakout" Boards that make these easy to use are available and recommended. These mount the

sub-module like that shown on the right on a slightly larger board. NOTE: Sellers often label them "HC-05" or "HC-06", but they have some other model number on the reverse side. Most of these boards support operation at 5V power and interface to 5V Arduino signal levels with some technique of level shifting.

A voltage divider circuit is used in this interfacing. In this circuit two resistors in the ratio 2:1 are needed in order to convert the 5V into 3.3V. This is necessary because the Bluetooth module works on 3.3 V but arduino provides 5V so the Bluetooth module can get damaged due to the high voltage.

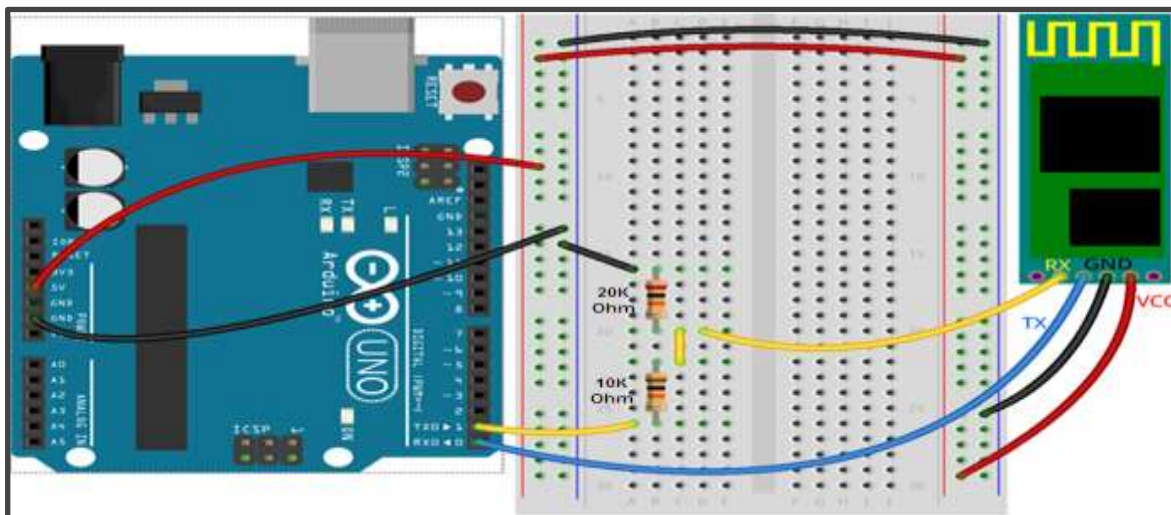


Fig. 3.2. Bluetooth with Arduino interfacing( With voltage divider circuit)

### 3.3 GSM/GPS Module And Its Interfacing With Arduino

A GSM Module is basically a GSM Modem (like SIM 900) connected to a PCB with different types of output taken from the board say TTL Output (for Arduino, 8051 and other microcontrollers) and RS232 Output to interface directly with a PC (personal computer). The board will also have pins or provisions to attach mic and speaker, to take out +5V or other values of power and ground connections. These type of provisions vary with different modules.

Lots of varieties of GSM modem and GSM Modules are available in the market to choose from. For our project of connecting a gsm modem or module to arduino and hence send and receive sms using arduino its always good to choose an arduino compatible GSM Module that is a GSM module with TTL Output provisions. There are two ways of connecting GSM module to arduino. In any case, the communication between Arduino and GSM module is serial. So we are supposed to use serial pins of Arduino (Rx and Tx). So if you are going with this method, you may connect the Tx pin of GSM module to Rx pin of Arduino and Rx pin of GSM module to Tx pin of Arduino. You read it right ? GSM Tx > Arduino Rx and GSM Rx >

Arduino Tx. Now connect the ground pin of arduino to ground pin of gsm module! So thats all! You made 3 connections and the wiring is over! Now you can load different programs to communicate with gsm module and make it work.

Note:- The problem with this connection is that, while programming Arduino uses serial ports to load program from the Arduino IDE. If these pins are used in wiring, the program will not be loaded successfully to Arduino. So you have to disconnect wiring in Rx and Tx each time you burn the program to arduino. Once the program is loaded successfully, you can re-connect these pins and have the system working.

To avoid this difficulty, I am using an alternate method in which two digital pins of arduino are used for serial communication. We need to select two PWM enabled pins of arduino for this method. So I choose pins 9 and 10 (which are PWM enabled pins). This method is made possible with the SoftwareSerial Library of Arduino. SoftwareSerial is a library of Arduino which enables serial data communication through other digital pins of Arduino. The library replicates hardware functions and handles the task of serial communication.

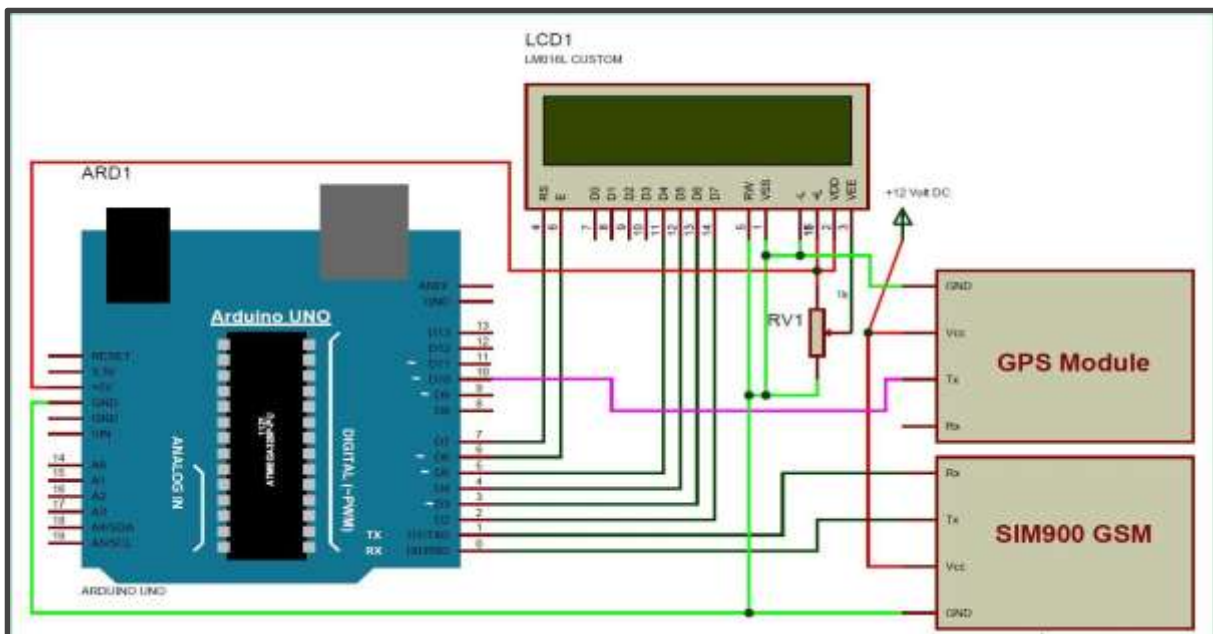


Fig. 3.3. GSM/GPS with Arduino interfacing

#### **4. APPLICATIONS:**

It can be very useful for the people having low vision. It is also helpful for the aged people with reduced vision, memory loss or during any kind of emergency.

The salient features that make this stick special are :

1. Detection of obstacles in the path.
2. Easily locate the stick when misplaced.
3. To send message to family members in case of emergency.
4. To track the person's location

#### **5. RESULT:**

After the completion of our project we had a very successful result. The project is working well. At the start we faced certain challenges in programming the G.S.M/G.P.S. module. But then it was resolved very soon because of our dedicated efforts. There are certain issues with the G.S.M module like low range network, so we need an area where there is full network range of the SIM card inserted in G.S.M. Once, the button is pressed the Arduino quickly sends a message stating "I NEED HELP" to a family member in case of emergency. It also sends details about the location where the person is. The end result is a success and project is working perfectly.

#### **6. CONCLUSION:**

This Project is made for the unfortunate people having low vision to make a difference in their lives. Walking without hesitation is an easy matter for us but a matter of concern for those people with low vision. Therefore this project is about developing a multi purpose stick for the comfort of low vision citizens. This stick enables its users to combat obstacles, track the user's location in case of emergency and also identifies voice message of the user and beeps its position in case of misplacement. Arduino UNO, GSM/GPS Module, Bluetooth Module and some other electronic devices are coupled together for the accomplishment of the task. This stick is a blind's guide which enables him to have a secure lifestyle using simple technology. The project name is talkback stick because it responds to the user according to the user's convenience. Whenever an obstacle comes before the user the ultrasonic sensor sense it and the buzzer beeps to give an indication. In case the user have misplaced his stick and is unable to find it he just need to open AMR Voice app

and speak the word "STICK". The stick will beep its location and will enable the user to locate it and when he speaks the word "GOT" the buzzer will turn on. In case the user is missing and needs help he just need to press the button on the stick. This will send a message to one of his family member. This way it serves as a multipurpose stick.

#### **7. FUTURE SCOPE:**

It depends upon how original one could be to enhance the use of this project. The solution provided can be further enhanced by sending user's location to the family member as a google maps link.

We can monitor and store more parameters like Terrain detection, pothole detection, speed of the obstacle etc. It can be very useful in following areas:

1. Easy tracking of the location of the person.
2. In case of emergency the person can call for help.
3. The lives of these people can become a lot more easier as they don't have to depend on others anymore.

#### **8. ACKNOWLEDGEMENT:**

We are very glad to thank to our project guide Dr. Ayush Saxena and our H.O.D. Dr. M.D. Patil for their encouragement and tremendous guidance. Here it is very special thank feelings for our colleagues for their support and help. We have been fortunate to have received many useful suggestions from our colleagues which have greatly improved the clarity of our report. At the end special thanks to our Principal Dr. Ramesh Vasappanavara. I would like to appreciate suggestions and criticisms about the report from the readers.

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