**SMART BLIND STICK FOR VISUALLY IMPAIRED PEOPLE**

**Hardware Connections:**

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| **Hardware Module** | **Description** | **Connections** |
| Arduino | Microcontroller with digital and analog I/O pins | Connect to a 9V lithium ion battery,all the sensors and modules will be interfaced with the help of arduino I/O pins |
| GSM (SIM 900A) - Global System for Mobile Communication | GSM is used for sending message alerts to provided contacts | Connect GSM RX to Analog pin A0 (14),TX to Analog pin A1 (15) of arduino |
| GPS (NEO-6m) - Global Positioning System | GPS is used for attaining the location coordinates from the satellite | Connect GPS RX to Analog pin A2 (16),TX to Analog pin A3 (17) of arduino |
| Ultrasonic Sensor (HC-SR04) | Attains the readings of the proximity of the obstacles. 2 Ultrasonic sensors are used | **Ultrasonic Sensor 1:**  Connect ECHO to Digital pin 2 and TRIGGER to Digital pin 3 of the arduino  **Ultrasonic Sensor 2:**  Connect ECHO to Digital pin 6 and TRIGGER to Digital pin 7 of the arduino |
| Moisture Sensor | Attains the readings of moisture level on the terrain | Connect to Digital pin 5 of the arduino |
| Infrared Sensor | Attains the readings of the proximity of the objects | Connect to Digital pin 4 of the arduino |
| RF Transmitter | Transmits serial data to the RF receiver | Connect to the RF remote controller |
| RF Receiver | Receives serial data from the RF Transmitter | Connect to Analog pin A5 (19) of the arduino |
| Buzzer | Triggers a buzzer sound when RF receiver receives data transmitted by RF transmitter | Connect to Digital pin 13 of the arduino |
| Vibration motor | Triggers vibration on the stick when moisture sensor detects moisture. | Connect to Analog pin A4 (18) of the arduino |
| Voice Recorder & Playback Module | Obstacle alerts are voiced out, when triggered by US and IR sensors. | The Voice Module is connected to Arduino using 4 pins:  OBSTACLE\_AUDIO : Digital pin 8  WATER\_AUDIO : Digital pin 9  STAIRCASE\_AUDIO : Digital pin 10  OBJECT\_AUDIO (small obstacles) : Digital pin 11 |
| Button | Toggle on/off button | Connect to Digital pin 12 of the arduino |

**Arduino Software Usage:**

1) Use your Arduino Uno on the Arduino Web IDE:

* All Arduino boards work out-of-the-box on the Arduino Web Editor, no need to install anything. Directly upload the code and you can run that.

2) Use your Arduino Uno on the Arduino Desktop IDE:

* If you want to program your Arduino Uno while offline you need to install the Arduino Desktop IDE The Uno is programmed using the Arduino Software (IDE), Integrated Development Environment common to all arduino boards. Before you can move on, you must have installed the Arduino Software (IDE) on your PC, as explained in the home page of our Getting [started](https://www.arduino.cc/en/Guide/HomePage).
* For step wise setup of your arduino software follow the steps [mentioned here](https://www.arduino.cc/en/Guide/ArduinoUno). To know the Analog and Digital pins of Arduino, check [here](https://www.arduino.cc/en/reference/board).