Bangladesh University of Engineering and Technology

Department of Computer Science and Engineering

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CSE 316
Microprocessors, Microcontrollers, and Embedded Systems Sessional

Project Report

Project Title:
Physical Feedback based Smart Stick for Blind People

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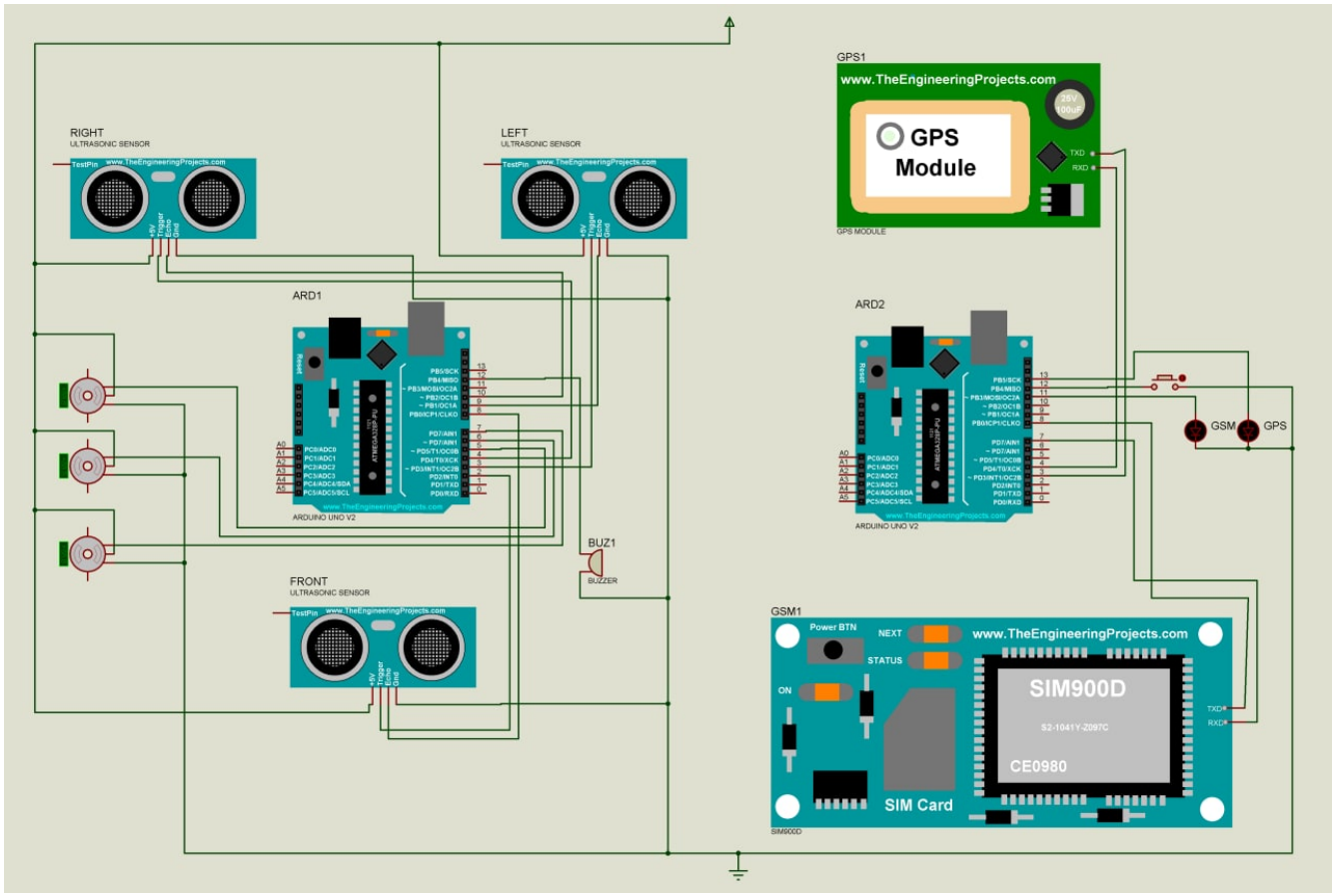
1 Circuit Diagram



2 Instruments

Module/sensor	Count
Arduino Uno	2
HC-SR04 Ultrasonic sensor	3
SG90 Micro Servo Motor	3
NEO-6M GPS	1
GSM SIM 900A	1
Buzzer	1
LED	2
Bread board	4

Table 1: Instruments used

3 Problems We faced

3.1 Power issue

3.1.1 Problem

We first naively tried to power up all our components using Arduino's VCC and GND pin. This obviously did not work since the VCC pin of Arduino may supply around .4A when powered up using USB. We did not face any issues with this approach at first. The servo motors, sonar sensors, GPS sensors all seem to work fine. However, the GSM module did not work reliably. It did power up, but most of the time it could not connect to the network. Or even if connected to the network, the network dropped immediately we tried to make a call or send an SMS.

3.1.2 Solution

We cut a USB charging cable, plugged it into a 10W power bank, and used it to power up all the components including the Arduino (Using Vin and GND pins). We found that the modules and sensors may not work correctly if Arduino is powered from different sources if they do not share a common ground.

3.2 GPS

3.2.1 Problem

The GPS module was not getting any signal.

3.2.2 Solution

The GPS module did not work indoors. We had to go to an open space and waited around 5 to 10 minutes for it to get the proper signal and provide the location.

3.3 GPS and SONAR in same Arduino

3.3.1 Problem

We needed to continuously read both the SONAR sensor and GPS sensor. But it seems like that is not possible. This question's answer dives deeper on this issue

3.3.2 Solution

We ended up using 2 Arduino

3.4 SONAR Trig and Echo on Same Pin

3.4.1 Problem

We found in an article that SONAR can work even if the Trig and Echo pin is connected to the same pin of Arduino. We found it to be true while powering up the SONARS from Arduino. However, when we powered up the sensors and Arduino from an external source, the SONARs stopped working properly

3.4.2 Solution

Used 2 different pins for Echo and Trig.

3.5 GSM 900A

3.5.1 Problem

The most problematic module. Sometimes it could not get any signal. Sometimes, just when it was about to connect to a signal, the module restarted. Sending SMS did not seem to work reliably as well.

3.5.2 Solution

The network issue was resolved by supplying it with enough power and working in a place where there is strong signal. SMS not sent every time was mainly the SIM network providers' fault. So nothing could be done for that.