CSE 316 Project Report

A Smart Stick for Blind People
with object detection and direction guidance

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1 Introduction

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2 Project Goal

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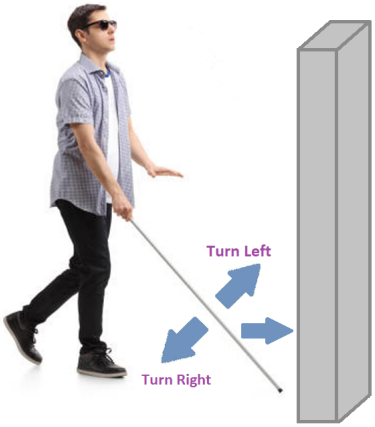

Figure 1: Scenario

3 Components Used

3.1 Hardware Components

Component Name	Quantity
AtMega32	2
HC-SR04 Ultrasonic Sensor	3
HC-05 Bluetooth Module	1
7805 Voltage Regulator IC	2
9V Battery	2
Bread Board	2
USBasp programmer	1
Male to Male Wires	Many
Male to Female Wires	Many
Multimeter	2
Battery Connectors	2
IC Extractor	1

3.2 Software Components

Software Name	Usage
Android Studio	Developing the Android App
Extreme Burner	Burn .HEX file onto AtMega32
Atmel Studio	Writing Code for AtMega32

4 Block Diagram

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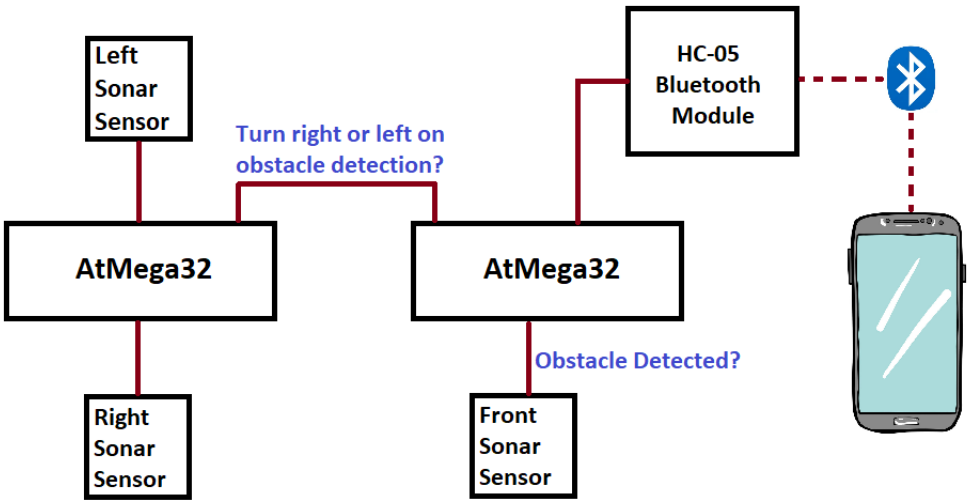

Figure 2: Block Diagram

5 Pin Diagram

The detailed pin diagram is given in Figure 3. The link for the code of the two AtMega32 is given in Section 7. In the code, the left side AtMega32 of Figure 3 is referred to as ATMEGA 1 and the right side of Figure 3 is referred to as ATMEGA 2.

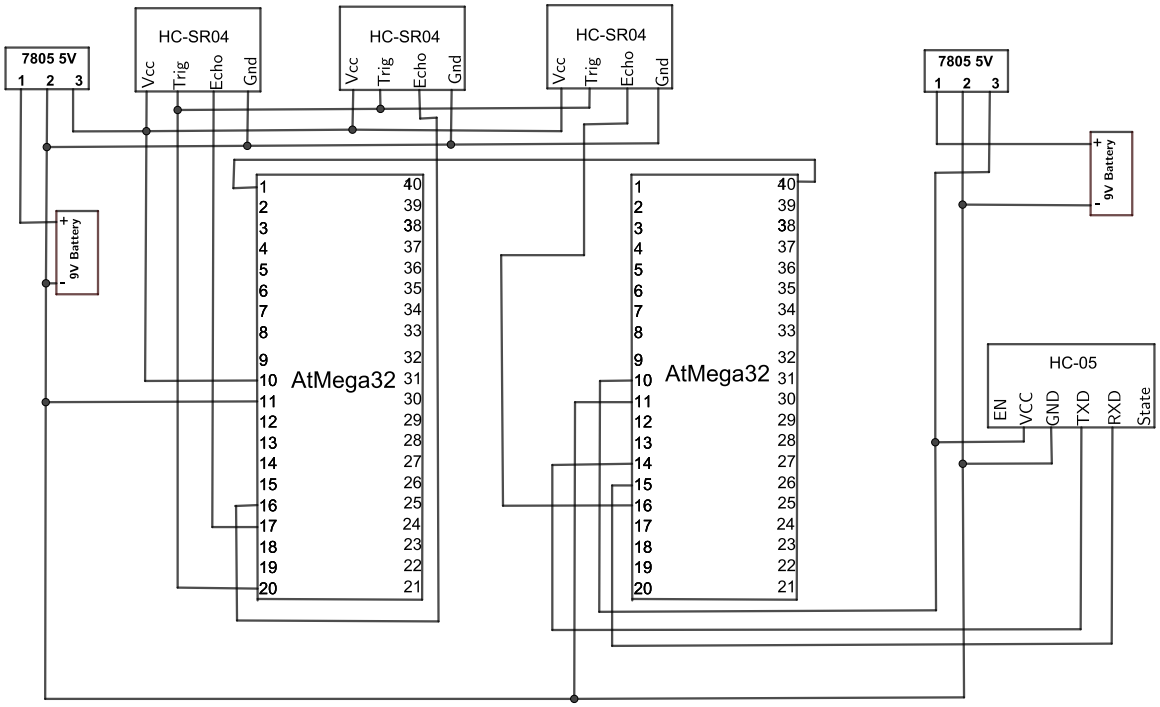

Figure 3: Pin Diagram

6 Difficulties Faced and their Solutions

- At first we tried to power the entire project using 1 battery, but the HC-05 module was not working. It was maybe due to insufficient current flow. Hence we used two 9V batteries
- The 7805 IC does not produce 5V reliably if the input voltage is less than 7V. This is a problem because the voltage output of the 9V batteries decrease overtime. So we always kept some backup batteries while working.
- Faulty equipment was a major problem for us. Our first HC-05 module did not work properly, so we had to buy another. One of the breadboards we bought did not work well. Some of the wires we bought were faulty. Proper usage of the multimeter was essential in locating the source of problems when they arised.
- All the ground nodes in the circuit should be shorted
- We had to use a Baud rate of 9600 for the USART communication through the bluetooth module. Double speed transmission mode should be used in this scenario, otherwise our module was transmitting gargabe values.
- Nested interrupt is turned off by default in AtMega32. To turn it on sei() command should be used at the beginning of the Interrupt Service Routine.

7 Resources

- Code for the two AtMega32
- Code for the Android App
- Project Presentation