

# **Ahsanullah University of Science & Technology**

Department of Computer Science & Engineering

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**CSE 3216**

**Microcontroller Based System Design Lab**

## **Project Proposal**

**Project Name: Blind Stick**

Submitted To

**Farzad Ahmed**

Lecturer, CSE , AUST

**Ashna Nawar Ahmed**

Lecturer, CSE, AUST

Submitted By

<b>Mustavi Ibne Masum</b>	<b>18.02.04.040</b>
<b>Abdullah Al Noman</b>	<b>18.02.04.042</b>
<b>Yumna Islam</b>	<b>18.02.04.046</b>
<b>Farhana Azad</b>	<b>18.02.04.068</b>

## **Objectives**

The blind stick for the blind as the name suggests is a device for the visually impaired to guide the user to respective destination and avoiding to collide with the obstacle. Currently there are thousands of blind people around the globe. These include people from low side seeing to complete loss of vision. The traditional stick cannot help to detect the obstacle in front or the potholes in the way. It is outdated. Hence, there is a need to update it using today's technology. The main objective of our project is to provide a sound based assistance to blind people. Here we are trying to develop a system that helps blind people to travel independently and works efficiently. Current navigation device for the visually impair focus on traveling from one location to another. Our project focuses on designing a device for blind people that helps them to travel independently and also it must be comfortable to use. The proposed device is used for guiding individuals who are blind or partially sighted. The device used to help blind people to move with the same ease and confidence as sighted people.

## **Social Values**

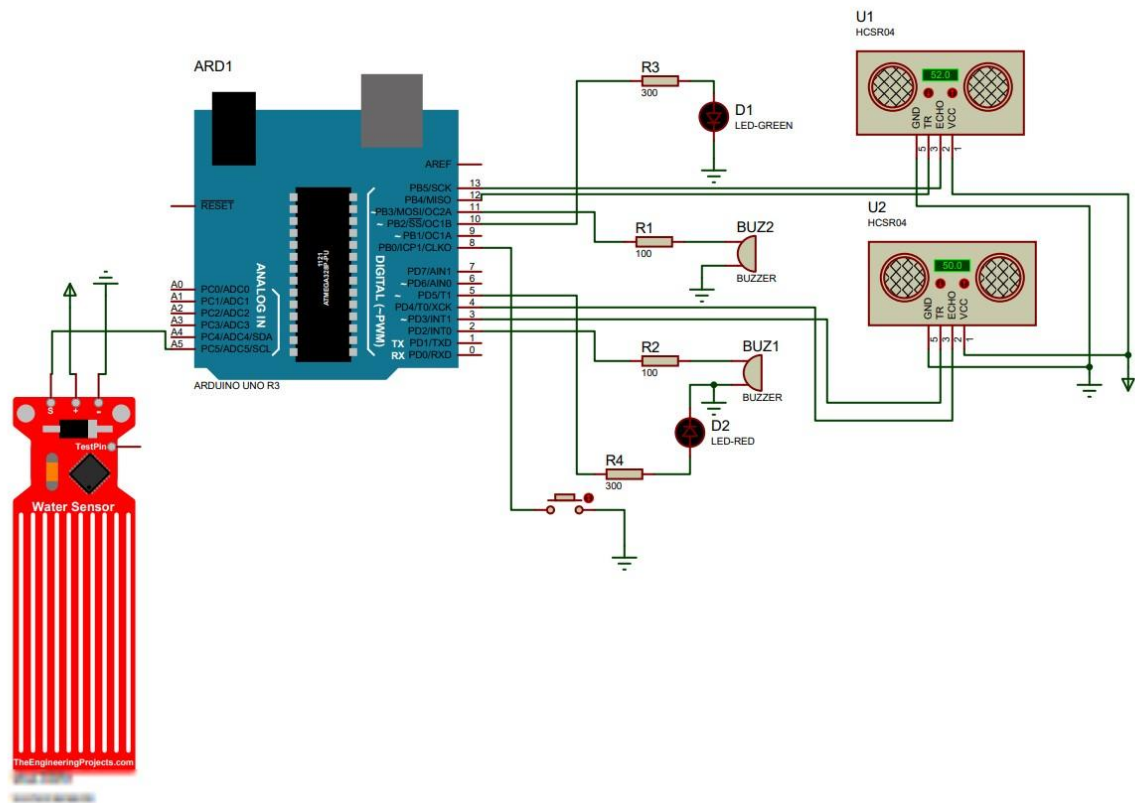
Nowadays, blind or impaired people are facing a lot of problems in their daily life since it is not easy for them to move, which is very dangerous. There are about 37 million visually impaired people across the globe according to the World Health Organization. People with these problems mostly depend on others, for example, a friend, or their trained dog while moving outside. Thus, we were motivated to develop a smart blind stick to solve this problem. The blind stick, integrated with a sonar, buzzer and LED, can detect obstacles in the path of the blind people. The buzzer activates when any obstacle is detected to alert the blind person. This work proposes a low-cost smart blind stick which will be economical for many blind people. It is so that they can move from one place to another in an easy, safe and independent manner.

## Required Components

- Arduino Uno R3
- HC-SR04 Ultrasonic Sensor
- HC-SR04 Ultrasonic Sensor Mount
- Water Sensor
- Buzzer
- Breadboard
- Mini Breadboard
- Resistors (100ohm,330ohm,1kohm)
- Jumper Wires(M-M, M-F)
- LED
- 9V Battery
- 9V Battery Cap
- Slide Switch
- Push Switch

## Working Procedure

- **Slide switch** : We will use the slide switch to turn On and Off the whole system.
- **Push switch** : The push switch will be used to turn off the buzzer. In special situations where the user is in a group and aware of people surrounding him/her ,the user can turn off the buzzer for some time.
- **LED** : The LED will send signals to the person in front of the user who is not aware of his/her surroundings.The LED will blink as a signal.
- **Buzzer** : The Buzzer will sound when there is an obstacle or person in front of the user.
- **Resistor** : We will use resistors to make a proper electrical flow through the entire system.
- **Sensors** : Ultrasonic sensors will detect the obstacles and high places in front of users. Water sensor will detect water and its depth ahead of the user.
- **Arduino Uno**: We will use Arduino Uno as the main driver device because it has low power consumption with fast start up, easier to use. It has a clock speed of 16 MHz and a flash memory of 32 kB.



## Estimated Budget

Equipment	Quantity	Budget (Tk)
Arduino Mega 2560	1	1150
HC-SR04 Ultrasonic Sensor	2	210
Water Sensor	1	150
Buzzer	3	60
Breadboard	2	230
Resistors(100ohm,300ohm,1kohm)	As required	35
Jumper Wires(M-M,M-F)	As required	75
LED	5	15
9V Battery	1	95
9V Battery Cap	1	9
Slide Switch	1	8
Push Switch	1	7
Cane	1	600
<b>Total-</b>		2644

## Final Expenditure

Equipment	Quantity	Budget (Tk)
Arduino Uno R3	1	795
HC-SR04 Ultrasonic Sensor	2	210
HC-SR04 Ultrasonic Sensor Mount	2	138
Water Sensor	1	150
Buzzer	2	48
Breadboard	2	230
Mini Breadboard	1	47
Resistors(100ohm,300ohm)	As required	20
Jumper Wires(M-M,M-F)	As required	150
LED	5	15
9V Battery	2	190
9V Battery Cap	2	20
Slide Switch	2	16
Large Push Switch	1	15
Cane	1	200
<b>Total-</b>		<b>2244</b>

## **Budget Comparison**

In the project proposal our estimated budget was 2644 Tk. But the final expenditure of our project is 2244 Tk. If we compare the previous estimation and the final expenditure, we can see that the cost is decreased and 400 Tk is saved. The reason for the reduced expenditure is that we have used Arduino Uno R3 instead of Arduino Mega 2560 because while building the project we came to realize that we don't need much pins or wire connections which are provided by Arduino Mega. Instead we have used Arduino Uno which is more efficient for our project in addition to that Arduino Uno R3 consumes less power and the final price of it is reduced as well. Lastly, we have used HC-SR04 Ultrasonic Sensor Mount and mini breadboard which was not calculated in our previous estimation but added cost of these do not make a significant difference.

## **Contribution of Team**

- 18.02.04.040 : 25%
- 18.02.04.042 : 25%
- 18.02.04.046 : 25%
- 18.02.04.068 : 25%

## **Challenges of the Project**

As here we are working with sensors to automatically sense and run the system, we may face some difficulties. In the case of the ultrasonic sensor, due to sensors' read latency, response time of the system may be slow. So to solve this problem, based on distance we have three different noise levels. The noise levels can be distinguished by frequency and delay. We faced another problem. As we have two buzzers in our project, each of them has their own functionalities. So there were some conflicts between them. While the top buzzer was generating noise at that moment, if the bottom buzzer detected any small obstacles, it would also generate its own noise simultaneously which was quite inconvenient. To solve this problem, we have used a flag value so that at any moment if the top buzzer was generating noise, the flag value would be set and which is an indication for the bottom buzzer not to generate any noise at that moment. The last problem we encountered is with the water sensor, it detects the presence of water on the sensor. Hence, here the challenge is that it continuously keeps us alerting till the slightest amount of water present on the sensor. So to solve this problem we have conducted an experiment. After conducting the experiment we found a minimum value detected by the water sensor which can be ignored.



## **Conclusion**

Blind Stick is an easily implementable project. The developed smart blind stick that is incorporated with multiple sensors will help in navigating the way while walking and keep alarming the person if any sign of danger or obstacle is detected.