SRM
INSTITUTE OF SCIENCE AND TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)
DELHI-NCR CAMPUS, GHAZIABAD (U.P.)

MULTI DISCIPLINARY DESIGN

(Subject Code: (15CS303M)

B.TECH II Year / IV Semester

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING FACULTY OF ENGINEERING & TECHNOLOGY

SRM INSTITUTE OF SCIENCE & TECHNOLOGY, Delhi NCR CAMPUS, MODINAGAR

SIKRI KALAN, DELHI MEERUT ROAD, DIST. – GHAZIABAD - 201204

www.srmimt.net

Even Semester (Jan.-2019)

Name:

1. **ANAND KUMAR SINGH (RA1711003030084)**
2. **AKUL BINDAL (RA1711003030085)**
3. **DIVYANSHU PANT (RA1711003030102)**
4. **ARYAN BHATNAGAR (RA1711003030105)**

BONAFIDE CERTIFICATE

Registration nos.

1. **RA1711003030084**
2. **RA1711003030085**
3. **RA1711003030102**
4. **RA1711003030105**

Certified to be the bonafide record of work done by ANAND KUMAR SINGH , AKUL BINDAL , DIVYANSHU PANT AND ARYAN BHATNAGAR Of 4th semester 2nd year B.TECH degree course in SRM INSTITUTE OF SCIENCE & TECHNOLOGY, DELHI-NCR Campus for the Department of ***Computer Science & Engineering,*** *in* ***Multi Disciplinary Design*** *during the academic year* ***2018-2019.***

Faculty In charge **Head of the department**

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

ANAND KUMAR SINGH (RA1711003030084)

---------- (Signature)

AKUL BINDAL (RA1711003030085)

---------- (Signature)

DIVYANSHU PANT (RA1711003030102)

---------- (Signature)

`

ARYAN BHATNAGAR (RA1711003030105)

---------- (Signature)

Date:

Acknowledgement

We would like to express our gratitude and appreciate all those who gave us the opportunity and help to complete this project successfully. A special thanks to our project mentor, Prof. MAHESH BHATT whose help, suggestions and encouragements helped us co-ordinate our project along with the reports and technical papers efficiently.
We would also like to thank all the faculty members of the Computer Science Department who guided us along with important timely suggestions for improvements and new features in the project. Their help proved pivotal for necessary implementations and improvements during the entire course of our project.
The project was a great experience and provided many opportunities to learn new concepts in computer science along with their applications. We are indebted of those who provided assistance and reviews to our task and apologize to anyone if may have failed to mention.

CONTENTS

ABSTRACT

It is well known that people suffering from visual impairments face many difficulties in travelling independently. Due to this, they rely on some form of external aids, which include a variety of tools and techniques like a stick. Such tools are called Electronic Travel Aids. Sometimes even with the use of this stick, the safety of the blind person is not guaranteed. The stick may not always detect all the obstacles in the path. The objective of this project is to build a blind man stick that can detect obstacles, potholes and thus help the blind person travel independently. The system is constructed using ultrasonic sensors, a Programmable Interrupt Controller that has an On-chip Analog-to-Digital Converter , a vibrator, buzzer and a power supply.

--- INTRODUCTION ---

INTRODUCTION

The Internet of things (IOT) is the network of appliances such as vehicles, and home appliances that contain electronics, software, actuators, and connectivity which give permission to these things to connect, interact and exchange data.

It involves extending Internet connectivity beyond standard appliances, such as desktops, laptops, smartphones, to any range of traditionally dumb or non-internet-enabled physical devices and everyday objects. Embedded with technology, these devices can communicate and interact over the Internet; they can be remotely monitored and controlled.

Imagine trying to navigate a busy town without the benefit of sight, using only a white cane to help you safely get around. We saw the problem and wanted to come up with a solution to make getting around town a little easier for the visually impaired.

We came up with a design for an IOT enabled device that straps onto a cane and is Bluetooth enabled.

This Smart stick will have an Ultrasonic sensor to sense distance from any obstacle, LDR to sense lighting conditions and a RF remote using which the blind man could remotely locate his stick. All the feedbacks will be given to the blind man through a Buzzer.

User of the Smart Stick Device:-

- Persons who are suffering from visual impairments.

Objective of the Smart stick device:

It is well known that people suffering from visual impairments face many difficulties in travelling independently. The objective of this project is to build a blind man stick that can detect obstacles, potholes and thus help the blind person travel independently.

-- SYSTEM ANALYSIS --

SYSTEM ANALYSIS

Project definition:-

This device is to help those people who is suffering from visual impairments. This device will have an Ultrasonic sensor to sense distance from any obstacle, LDR to sense lighting conditions and a RF remote using which the blind man could remotely locate his stick. All the feedbacks will be given to the blind man through a Buzzer.

Hardware-

Vibrating motor

Buzzer

IR Sensor

Ultrasonic Sensor

Software-

Arduino IDE – 1.8.8

FEASIBILITY STUDY

FEASIBILITY TEST

Scope:-

This document shall provide the requirement specification for the “SMART STICK” as per the Scope defined.

Users:-

This model can be used by 2 types of users:

Developer and Tester :-

The developer has an option to view projects and self-details.The tester has to check the bugs in the model.

Requirements:-

Hardware requirements-

1. Arduino Nano
2. Ultrasonic Sensor HC-SR04
3. Buzzer and LED
4. Resistors
5. Push button
6. Perf board
10. Soldering Kit
11. 9V batteries (OR ANY OTHER POWER SUPPLY)

Software requirements-

Arduino IDE – 1.8.8

SYSTEM DESIGN

SYSTEM DESIGN

The design phase focuses on the detail implementation of the system recommended in feasibility study. Emphasis is on translating performance specification into design specification. The design phase is a transition from user oriented document to document oriented to programmers or database personal.

DATA FLOW DIAGRAM

DATA FLOW DIAGRAMS

A Data Flow Diagram (DFD) is a graphical technique that depicts information flow and the transforms that are applied as data move from input to output.

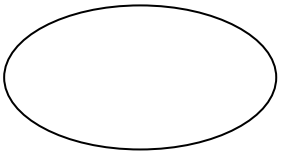
Data flow diagram is a logical model of a system. The model does not depend on hardware, software, and data structure or file organization. It only shows the data flow between modules to module of the entire system. Data flow diagrams can be completed using only four notations as follows,

Data Flow:

Data move in a specific direction from an origin to destination. The data flow is a “packet” of data.

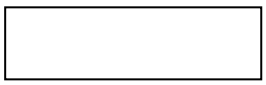
Process:

People, procedures or devices that produce data. The physical component is not identified.



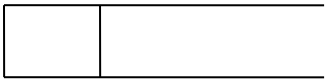
Source or Destination of Data:

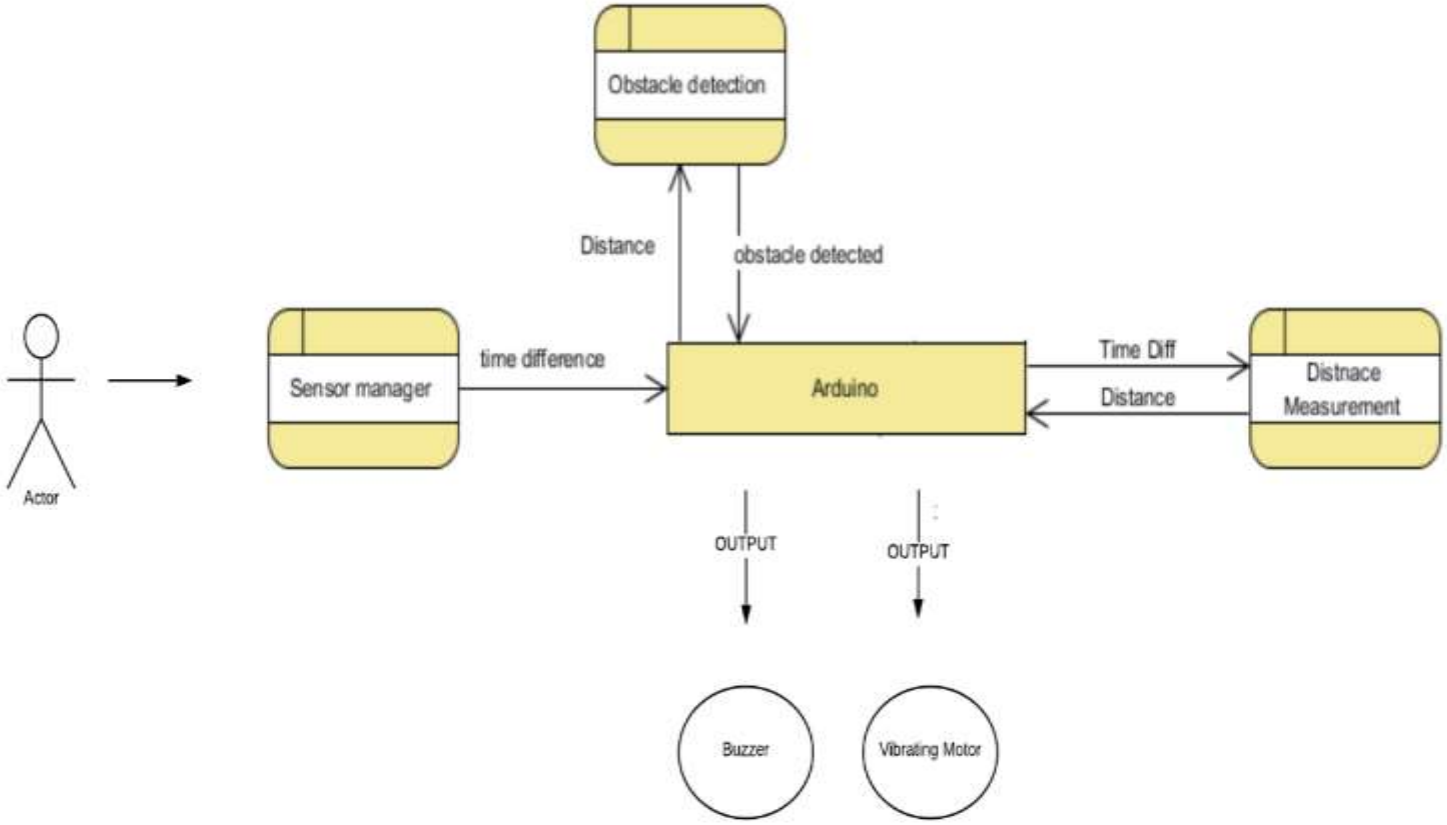
External sources or destinations of data, which may be people or organizations or other entities.

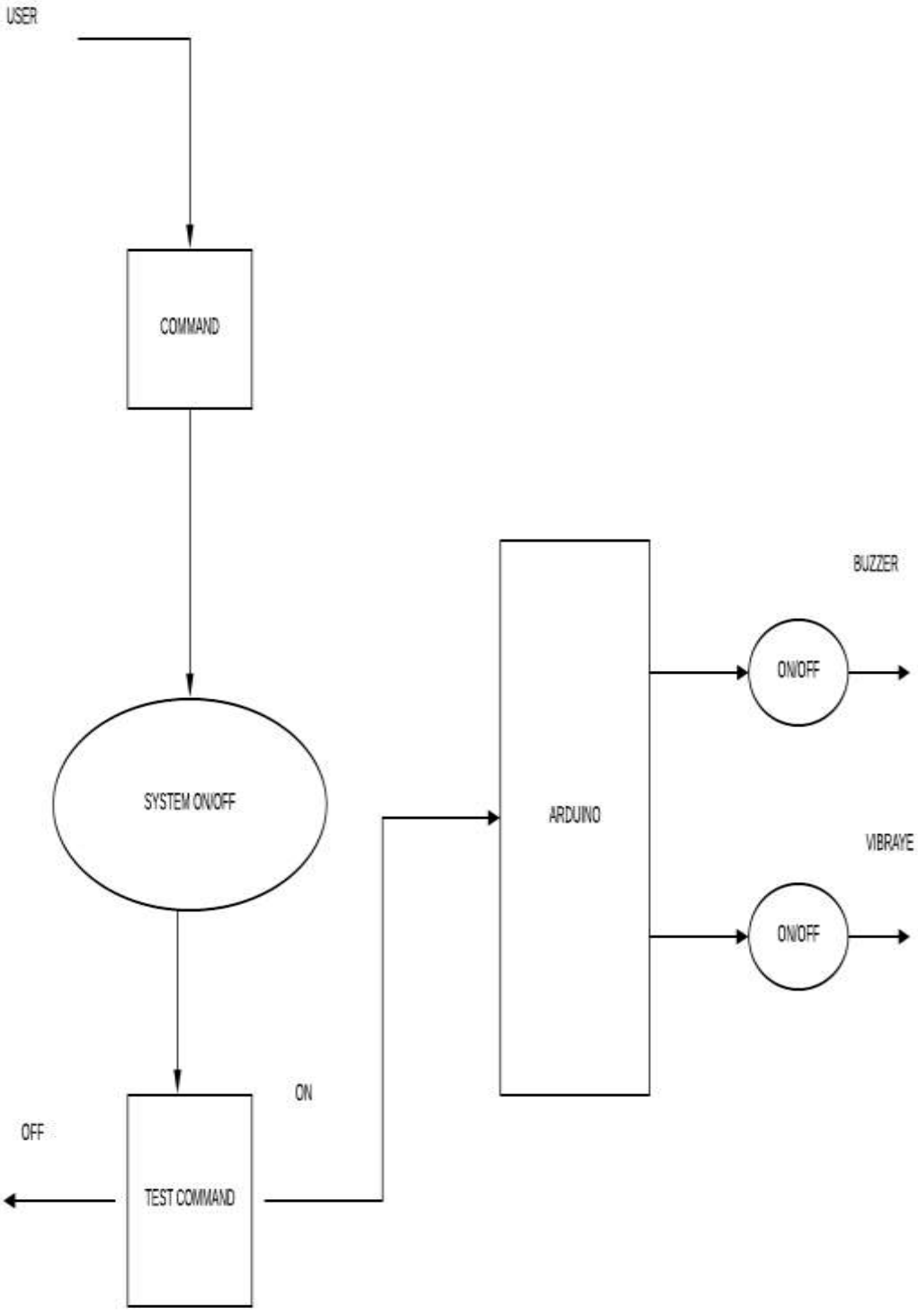


Data Source:

Here a process references the data in the system.




Obstacle detection
Distance
obstacle detected
Actor
Sensor manager
time difference
Arduino
Time Diff
Distance
Distnace
Measurement
OUTPUT
OUTPUT
Buzzer
Vibrating Motor


USER
COMMAND
SYSTEM ON/OFF
TEST COMMAND
OFF
ON
ARDUINO
BUZZER
ON/OFF
VIBRAYE
ON/OFF

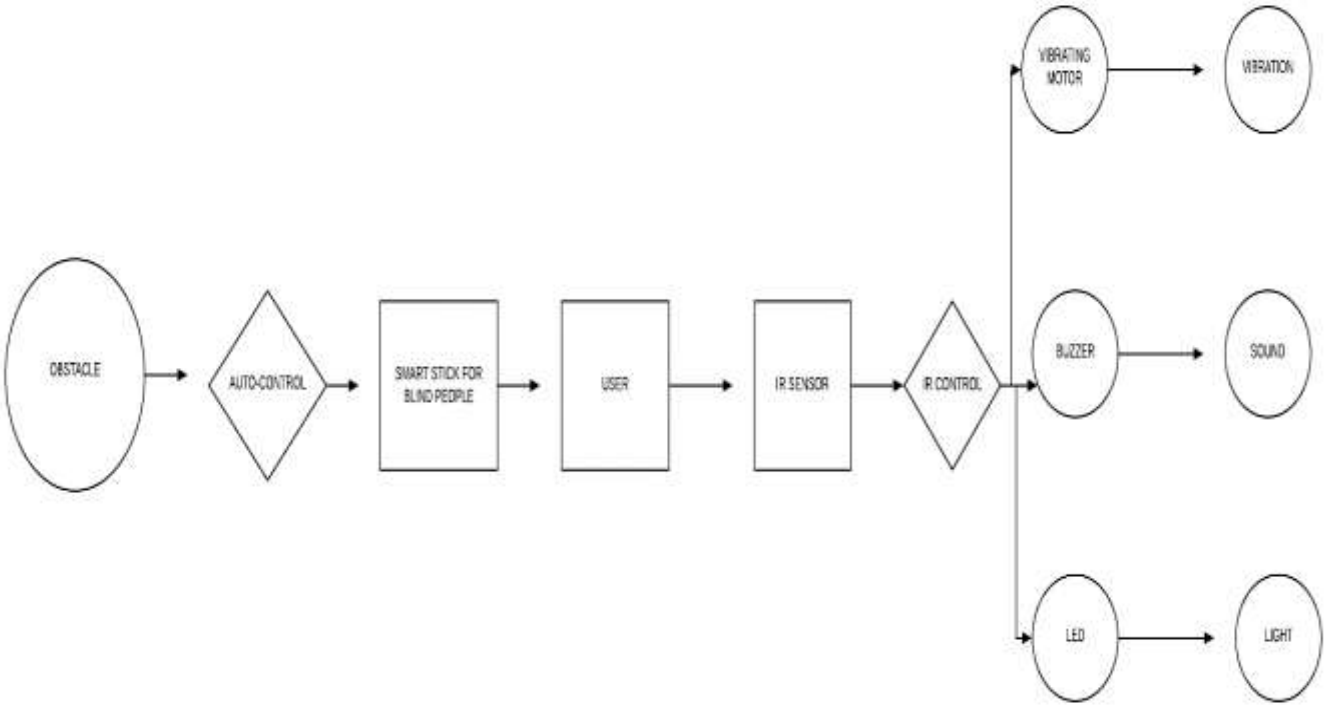
ER DIAGRAM

ER DIAGRAMS

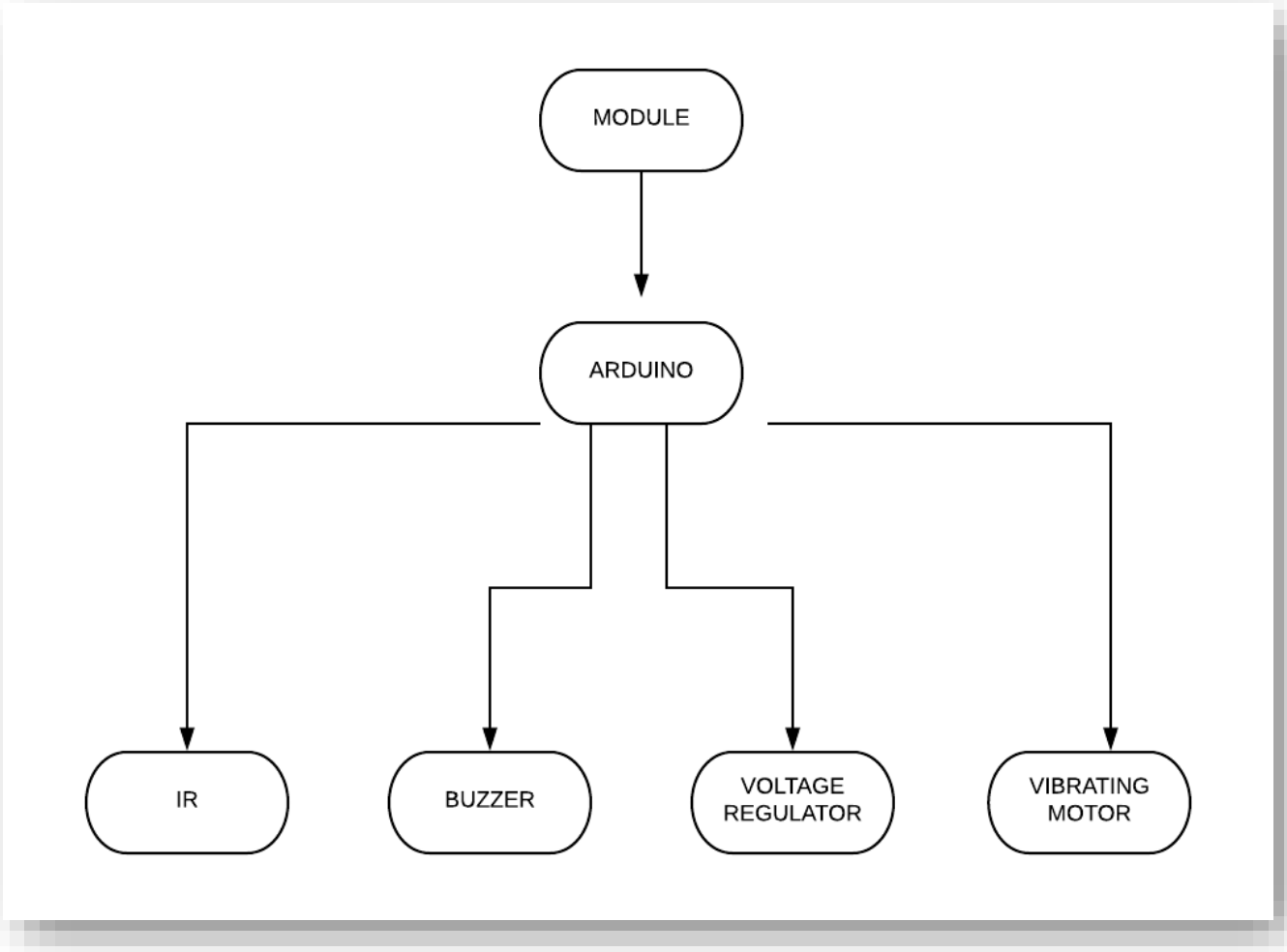
An E-R Diagram stand for Entity Relationship model is a tool that is commonly used to translate different views of data among managers, users and programmers to fit into a common framework, define data processing and constraint requirements to help us meet the different views and helps to implement the database.

The E-R model forms the basis of E-R diagram that represent the conceptual database as viewed by the end user. These diagrams depict the E-R model three main components:-

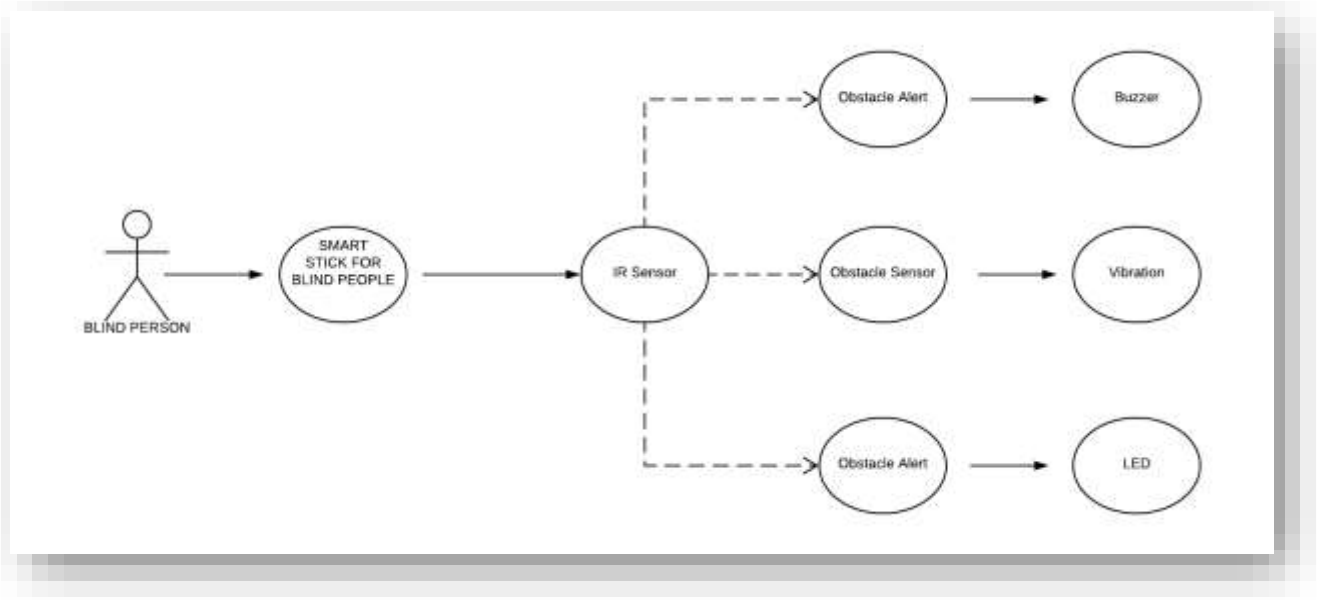
a. Entities
b. Attributes
c. Relationships


OBSTACLE
AUTO-CONTROL
SMART STICK FOR BLIND PEOPLE
USER
IR SENSOR
IR CONTROL
VIBRATING MOTOR
VIBRATION
BUZZER
SOUND
LED
LIGHT

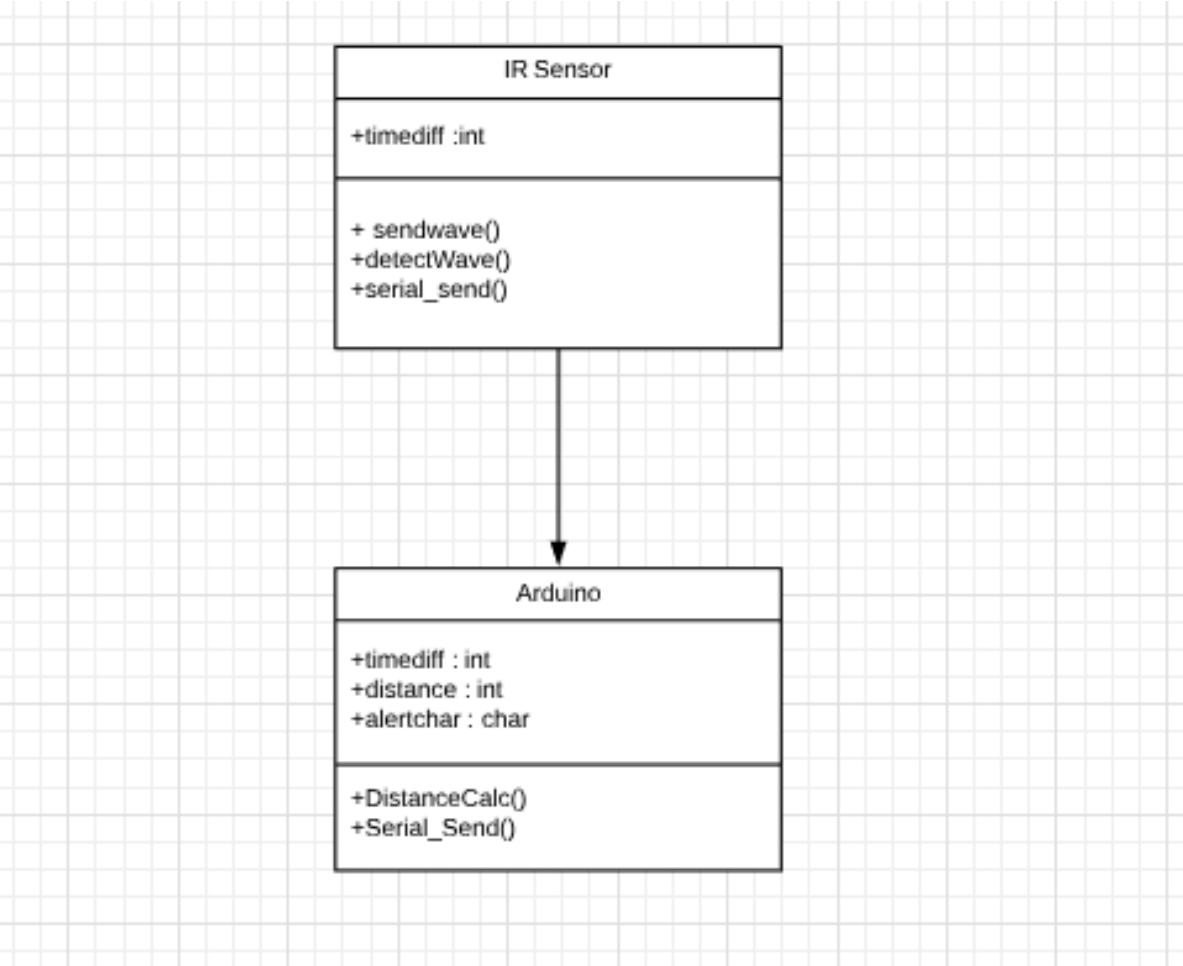
MODULES


MODULE
ARDUINO
IR
BUZZER
VOLTAGE REGULATOR
VIBRATING MOTOR

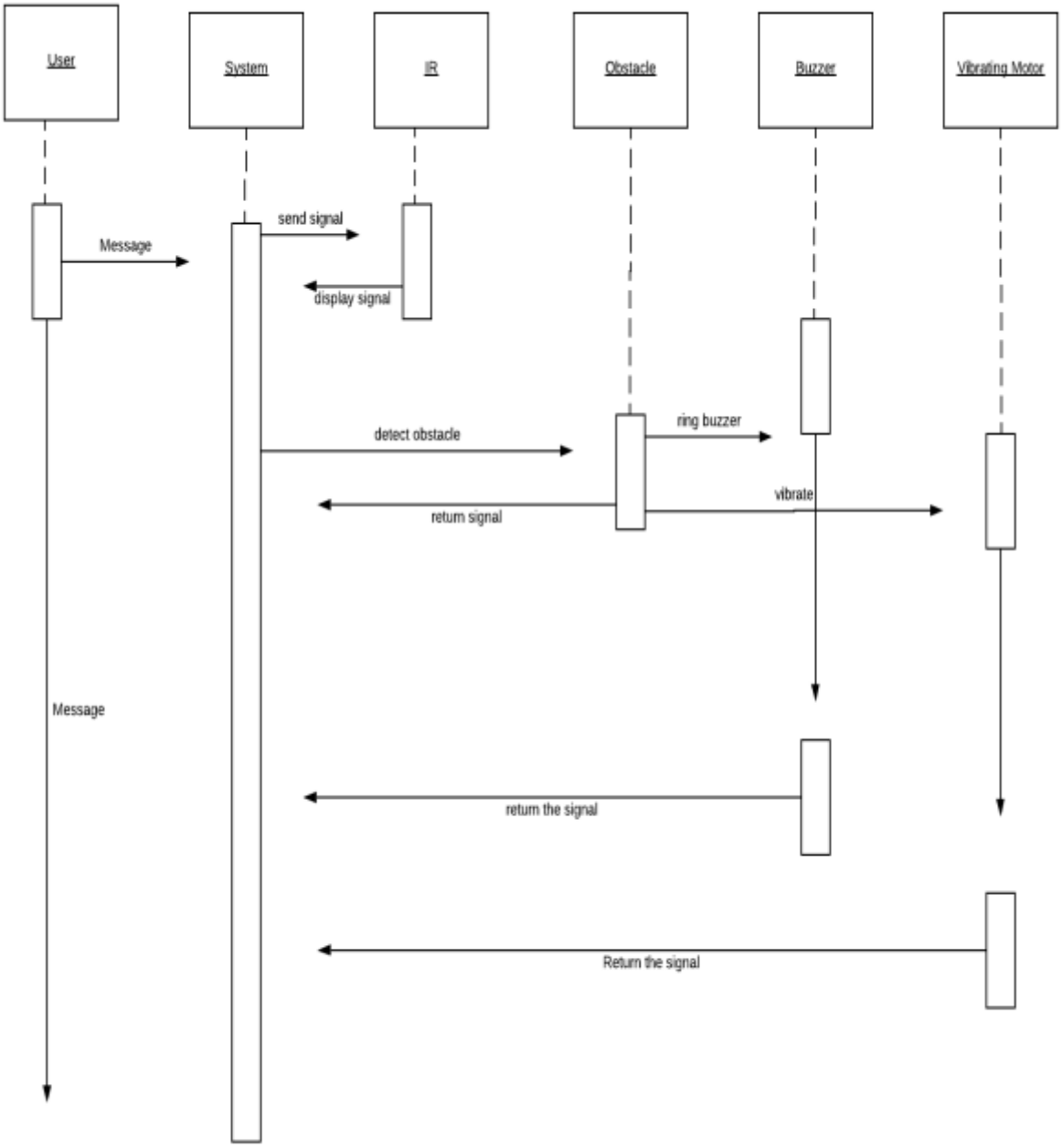
USE CASE DIAGRAM



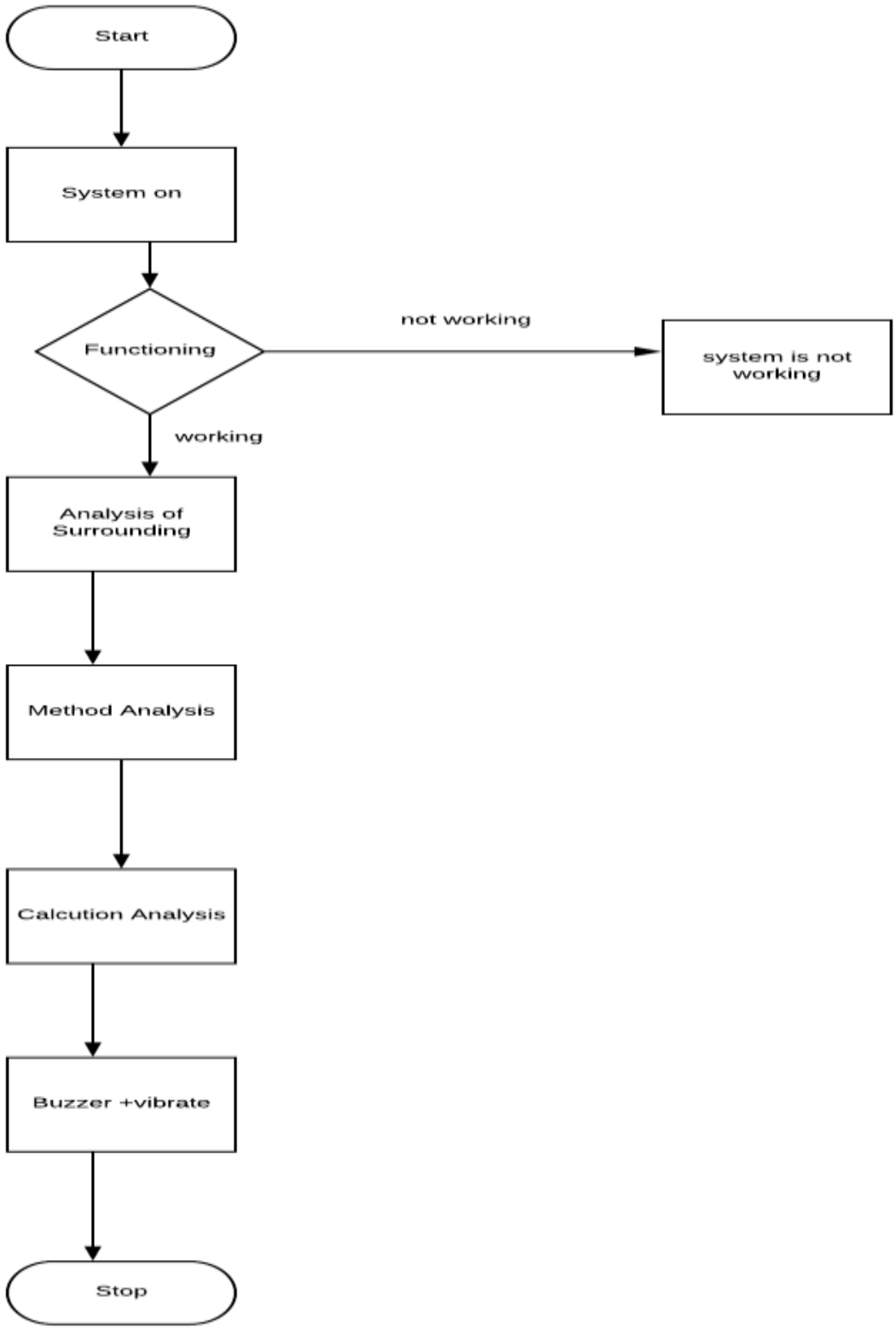
CLASS DIAGRAM



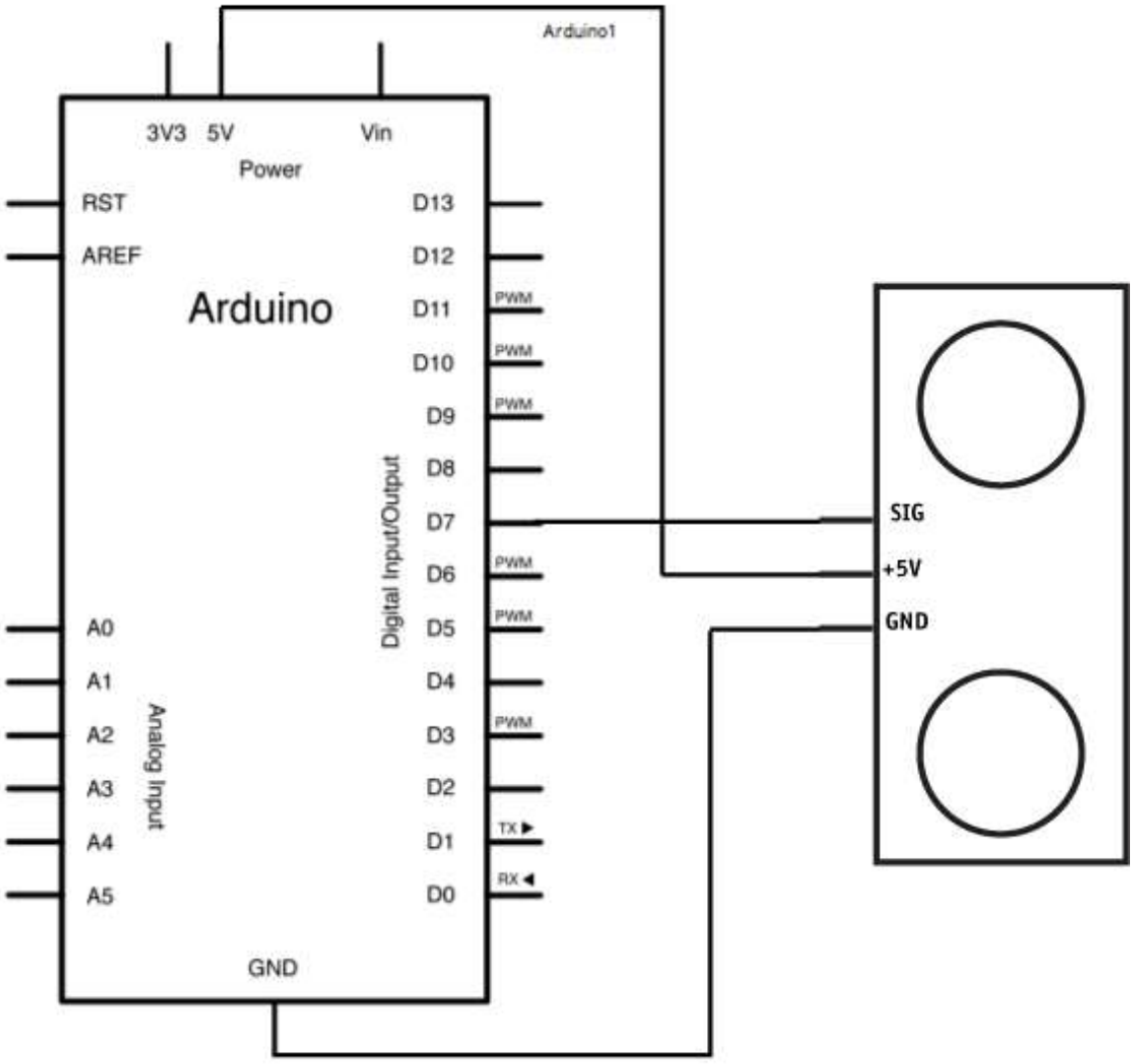
SEQUENCE DIAGRAM

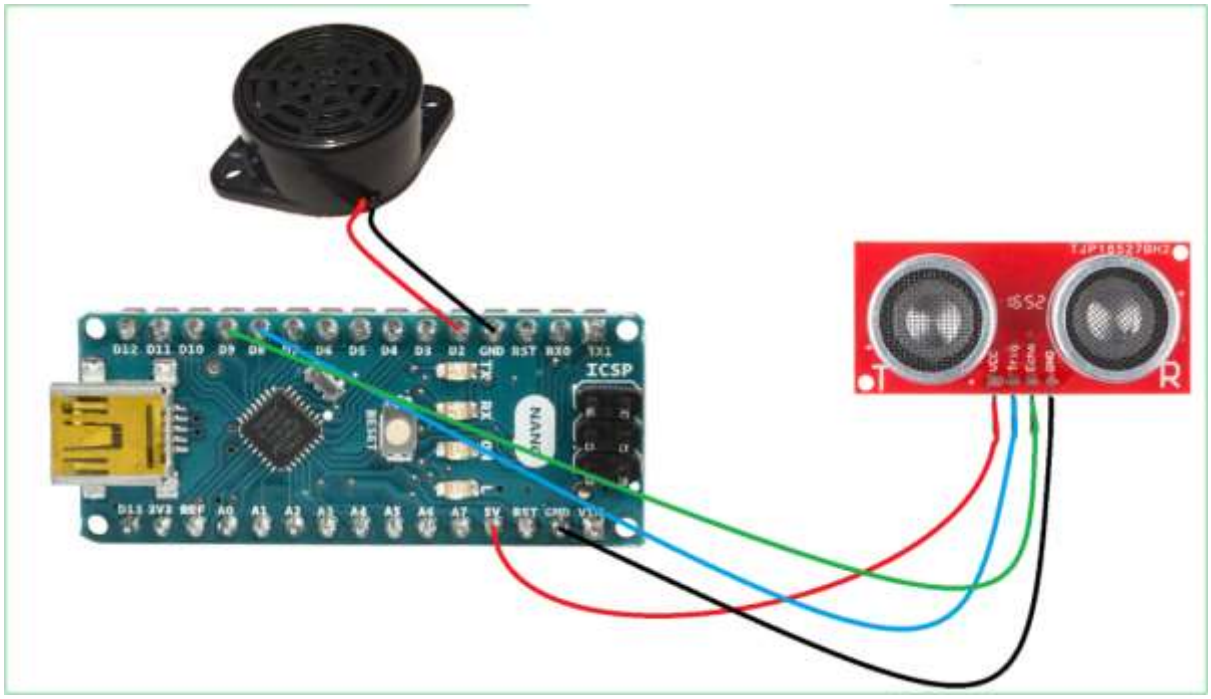


FLOW CHART


Start
System on
Functioning
not working
system is not working
working
Analysis of Surrounding
Method Analysis
Calcution Analysis
Buzzer +vibrate
Stop

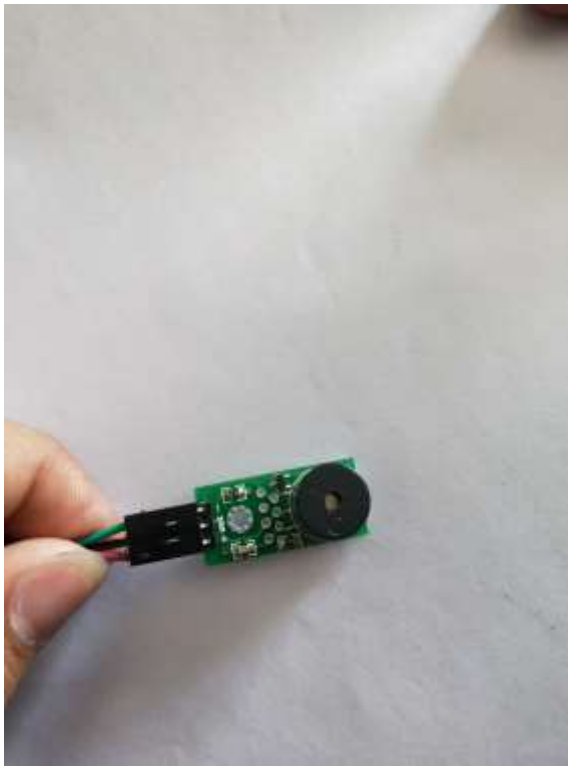
IMPLEMENTATION



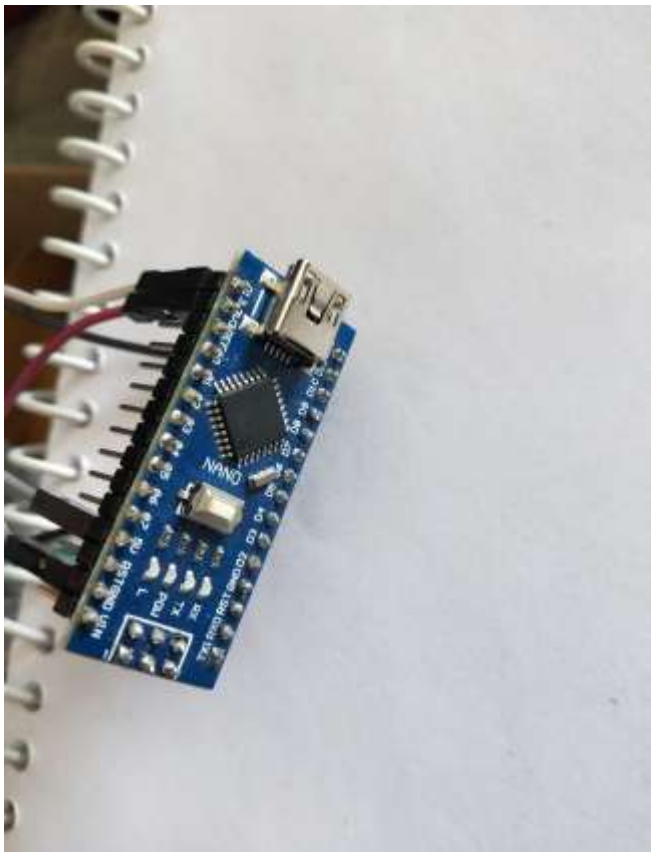

ICSP
T
R

IF ANY OBSTACLE COME IN FRONT OF THE SENSOR THE BUZZER WILL CREATE SOUND

SNAPSHOTS



BUZZER



ARDUINO NANO

CIRCUIT

ULTRASONIC SENSOR

A PICTURE OF SMART STICK FOR BLIND PEOPLE

Future Work

Although this project covers almost every aspect of various possibilities but still there are scopes of improvement. Better expensive sensors can be used instead of ultrasonic sensors. Ultrasonic sensors were used because of inexpensiveness and reliability. Cameras can be used to detect obstacle and pothole along with edge detection algorithms. APIs of other applications can be used for better collaboration. Some of the above features however might have been implemented before but it either makes system too expensive or it is inefficient. Hence, cost and efficiency along with above features could be implemented in future.

Conclusion

In this project, solution is provided to help blind people so that they can walk with confidence by detecting obstacles and potholes in their path. Solution consisted of arrangement of sensors. The horizontal sensors were able to detect obstacle whereas bottom most inclined sensor was able to detect pothole and output was provided in form of voice. Thereby increasing the accessibility for the blind and increasing their confidence to walk in non-familiar environment.

Bibliography

LINKS-

https://www.itead.cc/wiki/Ultrasonic_Ranging_Module_HC-SR04

http://www.geeetech.com/wiki/index.php/Arduino_Nano

https://wiki.eprolabs.com/index.php?title=Passive_Buzzer_Module