PROJECT

THE INTELLIGENT STICK

FOR BLIND PERSON

A Thesis

Submitted for partial fulfillment for the bachelor's degree in Electronics

To the **Department of ELECTRONICS**

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ABSTRACT

In this global world according to World Health Organization (WHO) around 37 million of people are blind and the blind people always depend on external source such as trained dogs, a walking stick and a person always with them for such kind of help. But now a days the living standard is increased of this generation and how we can forgotten to physical disable people, the blind people are one them. Thus we motivated to develop a stick for blind person. We are able for this object by using program on Arduino Uno board, the ultrasonic-sensor (HC-SR04) and water detect sensor in the specific place of stick. The distance sensor used to detect an obstacle on the path and water sensor also detect the water which present on the way, then it gives message in outputs through the signals of buzzer and vibrator motor to alert the blind person. This device detects, the distance from an object within the range of 3 meters and also we can change program (code) on Arduino to increase or decrease the distance range. Finally, we named to this device "The Intelligent Stick for blind person".

Key components:

Arduino Uno with Microcontroller ATmega328, HC-SR04 Ultrasonic sensor, Water sensor, Vibrator motor, Buzzer, Veroboard, White cane stick, Arduino software for coding etc.

Table of Contents

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

With the development of the living standard of the people, we have forgotten how the physically disabled people live a tough life. So, a new technique for designing an intelligent stick to help visually impaired people that will provide them information about direction.

In the past, the walking sticks and trend dogs were used for the help of blind person, which have numerous defects. Most dangerous defects consist of critical skill and range of motion, teaching phase and very important information connected been communicated. By using some components of electronics and sensors we keep changes in the stick for solving such type of issues. When the obstacle is present in front of distance measurement sensor, buzzer, water sensor and the vibrator motor then these components record the information. Any obstacle which is present 2 to 3 meters then ultrasonic sensor detects it. So it means that ultrasonic sensor ability that any obstacle or object which came in front of it then the sensor alert the user through vibrator motor and buzzer. If any type of water present in the path then water sensor detect it, so I also use water sensor. The advancement in the current technologies, which were present in both of hardware as well as in software, now it is very easy to produce smart directional system for the blind person.

2. HYPOTHESIS

Our objective is to follow and optimize the intelligent stick for blind. This can be done by using Ultrasonic sensor and water sensor which gives feedback to Arduino mega 328. The code which is uploaded in Arduino mega 328 tells the blind person where object and water found on the path.

3. GOALS

1) To make self-controlled stick.
2) To make an intelligent stick that not only finds the obstacle on the path but also gives the feedback about the path to the user.

4. HARDWARE COMPONENTS

- Arduino (Uno) Atmega328
- Distance Sensor HC-SR04
- Buzzers Vibrator Motors
- Water sensor
- Strip board
- Breadboard
- White cane Stick
- Battery
- Switch
- Resistor
- LED
- Jumper wires
- Cables and Connectors

5. SOFTWARE

- Arduino Compiler
- Language: C

CHAPTER 2

HARDWARE COMPONENTS

1. HARDWARE COMPONENTS

The hardware refers to the physical elements, and the hardware consists of different components, there explanations are given bellows;

2. ARDUINO (UNO)

2.2.1 GENERAL IDEAS

The Arduino (Uno) is based on microcontroller board which is supported by ATmega 328. Output/Inputs digital pins are fourteen (out of which the 6 are used for pulse width modulation outputs), the 6 pins are analog pins that is start from A0 to A5, Crystal oscillator 16 MHz, the power jack, reset button and USB joint. We have to connect simply a USB cable to the computer or we can attach a battery or AC-to-DC connector to begin and to bring it into the working state**.**

The sequence of USB Arduino boards is used in modern Uno, and for contrast with preceding versions reference is suitable for the Arduino platform**.** The mention version of Arduino is 1.0.

2.2.2) SPECIFICATION

Working Voltage	5V
Digital I/O clips	14 (6 supply PWM output)
Input Voltage (range)	6-20V
Analog-Input Jacks	6 (A0-A5)
DC Current as per the I/O Pin	40 mA
Input Voltage (mentioned)	7-12V
Microcontroller	AT-mega 328
DC Current for 3.3V Pin	50 mA

Flash Memory	32 Kilo Bytes (0.5 KB works in boot-loader)
EEPROM	1 Kilo Bytes
SRAM	2 Kilo Bytes
Frequency	16 Mega Hertz

2.2.3) POWER JACKS

The Arduino Uno can be control through the USB joining or by the exterior power supply. Automatically the power is nominated.

We can give the external power to the Arduino Uno through four ways.

1) Through USB cable connector.

2) To give input of 5 volts.

3) To use AC to DC adaptor through barrel connector.

4) Use battery, must greater than 5v.

The power pins consists:

VIN: VIN is the pin through which we give voltage. It is the input voltage when external power source is used.

5V: Used for microcontroller power and other components present on the board. It controls power source.

3V3. 3.3 is the supply volts and it is produce by on board controller. In these supply volts 50 m Ampere current draw, this is minimum current.

GND: These pins only used for ground.

2.2.4) ANALOG PINS

There are six analog pins, which are available in Arduino Uno that starts from A0 to A5. These pins are supported ten (10) bits from analog to digital conversions to use analogRead purpose. In other words we can say that these pins deliver analog input range of 0 to 5V.

2.2.5) MEMORY

The AT-mega 328 memory consists;

The Atmega328 carries a maximum FLASH MEMORY of 32KB for absorbing code from them where 0.5Kb is for the boot-loader, 1K bytes of Electrically Erasable Programmable ROM and Static RAM of 2K bytes.

Flash memory; the Arduino draft is saved, there is flash memory works.

SRAM (Static RAM) is used for the sketch generates and operates irregular when it starts.

EEPROM are storage space where computer operator can use to save long-term material (data).

Flash memory and the EEPROM memory, both are stable. SRAM is volatile and reserve its data while the device is powered.

2.2.6) DIGITAL (INPUT AND OUTPUT) PINS

By using the function like as digitalWrite(), pinMode() and digitalRead() we can use each and every of 14 digital pins from 0 to 13 on Arduino (Uno). These all pins work at 5 volts. Maximum current for providing and receiving is 40 mA. All these 14 pins have particular purposes, following list showing these;

SERIAL PINS (0, 1):

0 is used to receive (RX), for transmit (TX) is used 1, These both pins are used in the transistor-transistor logic (TTL) serial data. TTL is the serial signals which are present between a microcontroller's voltage source ranges. The range from 0 to 0.8 is considered as 0 and more than that it considered 3.3V or 5V. These are connected corresponding Atmega328 USB for Transistor-Transistor Logic serial chip.

EXTERNAL INTRUPTS:

Pin two (2) and three (3) are the external interrupt jacks which may be arranged to trigger an interrupt on a minimum (0) range, change in value of interrupt number and also to rising or falling in the power.

PWM: The output with analog-Write () work provides by pin 3, 5, 6, 9 also11 of PWM (Pulse Width Modulation). On the Atmega328 board, The Pin 9, 10, and 11 are only the PWM outputs.

The pin 7 is connected to Bluetooth reset (Arduino BT module).

PIN 13 (LED): The LED connected through the digital jack 13 and it's built in pin. The LED shows off then value of pin will be "LOW" and when the LED shows on then the value of pin will be "HIGH".

SPI# The SPI stands for "Serial-Peripheral-Interface". It is the procedure to send data between small devices and microcontrollers and SPI communication can be held by following pins;

Pin 10 Slave Select (SS), 11 Master Out Slave In (MOSI), 12 Master In Slave Out (MISCO), 13 Serial Clock (SCK).

AREF# this pin for analog inputs the AREF provides the reference voltage with an analog-Reference purpose.

Reset (Pin) # making this pin as LOW and this pin is used to reset the microcontroller.

2.2.7) COMMUNICATION

There are many facilities in Arduino Uno that communicate with computer, the different microcontrollers and Arduino boards are used to communicate with personal computer. The UART for Transistor-Transistor Logic (TTL) 5 volts sequence is provided by the microcontroller Atmega 328. The digital pin "0" for receives (RX) and also digital pin "1" for transmission (TX) is used and communication can be done through it. Don't attach directly these pins to RS232 serial port, because if we directly join these pins then they damage our Arduino as they function at ± 12V. For use these extra serial ports with our personal computer, we must require an extra USB-to-serial Adapter, as they are not linked with Mega USB-to-serial Adapter. For use them we must communicate with exterior TTL serial device, join TXPIN to our device RX pin and with our device's ground connect the ground of our mega.

2.2.8) PROGRAMING

In programing through using the software named ARDUINO we developed the program on Arduino Uno. In this case there is a pre-burnt boot-loader in the Atmega328 that permits us for new code to upload it without any external programmer's use. For different purpose and usage we can make easily different codes and to get outputs.

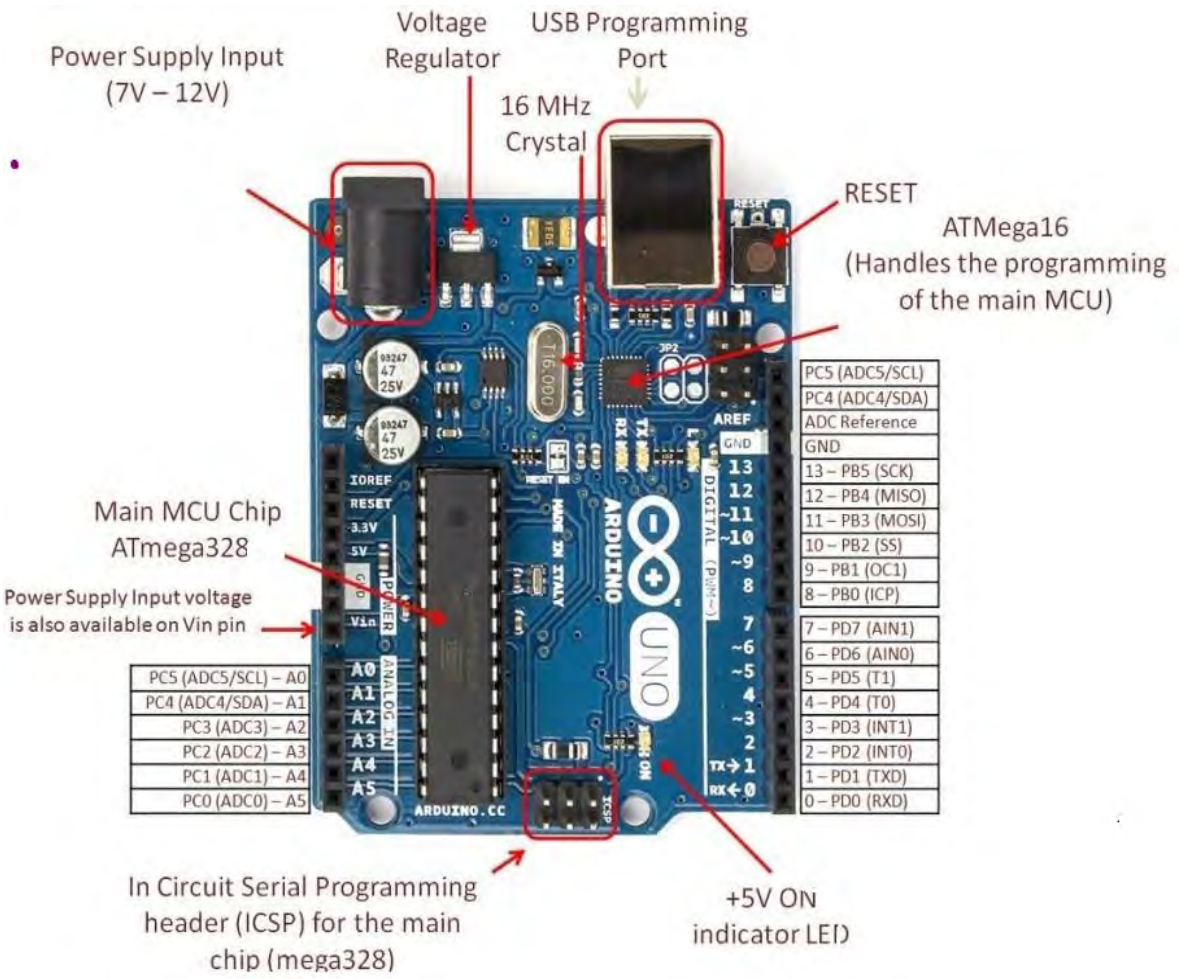


Figure 2.1

(Arduino Uno configuration)

2.3 USE OF ARDUINO UNO

2.3.1) Introduction:

In this case of project, we used Arduino Uno with microcontroller AT mega 328 to control several elements that are being used in the project. It controls the distance measurement sensor HC-SR04, water detector sensor, vibrator motor also buzzer. I programmed on Arduino in such method because in every sensor it's different code. Firstly it reads the value from Ultrasonic sensor and water sensor on the basis of which it controls the distance and water on the path after that it gives value for output response.

Here we selected the Arduino Uno because, it has low cost, easily available in market, it contains less pins than other arduino and also we have been used it in previous semester in lab work.

Atmega 328 Arduino (Uno) is shown in following figure 2.2.

Figure (2.2)

Arduino Uno diagram

2.4) SENSORS

The device which can change the physical quantity in the form of signals that can be detect, read and observe to an object is known as sensor. For different purpose we can use different type of sensor. Here we used the Ultrasonic sensor HC-SR04 for measuring distance from an object and the water sensor for detecting water.

2.5) ULTRASONIC SENSOR

It is a device that uses the sonar to measure the distance from an obstacle which come in-front of it, that's called the distance measurement sensor or ultrasonic-sensor. This type of sensor gives good range for detection with more stable readings and accuracy. It comes whole with the help of ultrasonic transmitter and receiver modules. In following figure 2.3, The HC-SR04 (ultrasonic) sensor is shown.

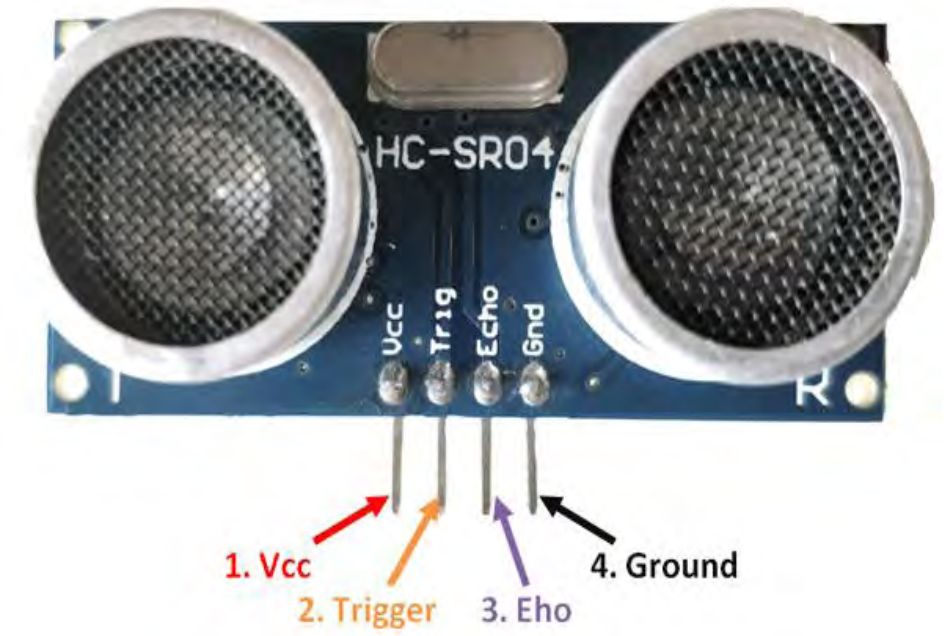


Figure (2.3)

Ultrasonic Sensor diagram

2.5.1) OPERATION OF ULTRASONIC-SENSOR

Once the obstacle is fined through the ultrasonic sensor in left, right and front side of the stick on the path, and then Arduino Uno sends the message to the visually impaired person by buzzer and vibrator motor. The distance or range from an obstacle is defined and controlled by ultrasonic-sensor, it uses sonar for working and detect object. It occurs as follow;

The trigger jot is used for the transmitter that sends a signal. It can be an extreme voice rate. Once that signal find to a body and obstacle then it return back the signal. After that the echo pin receives it.

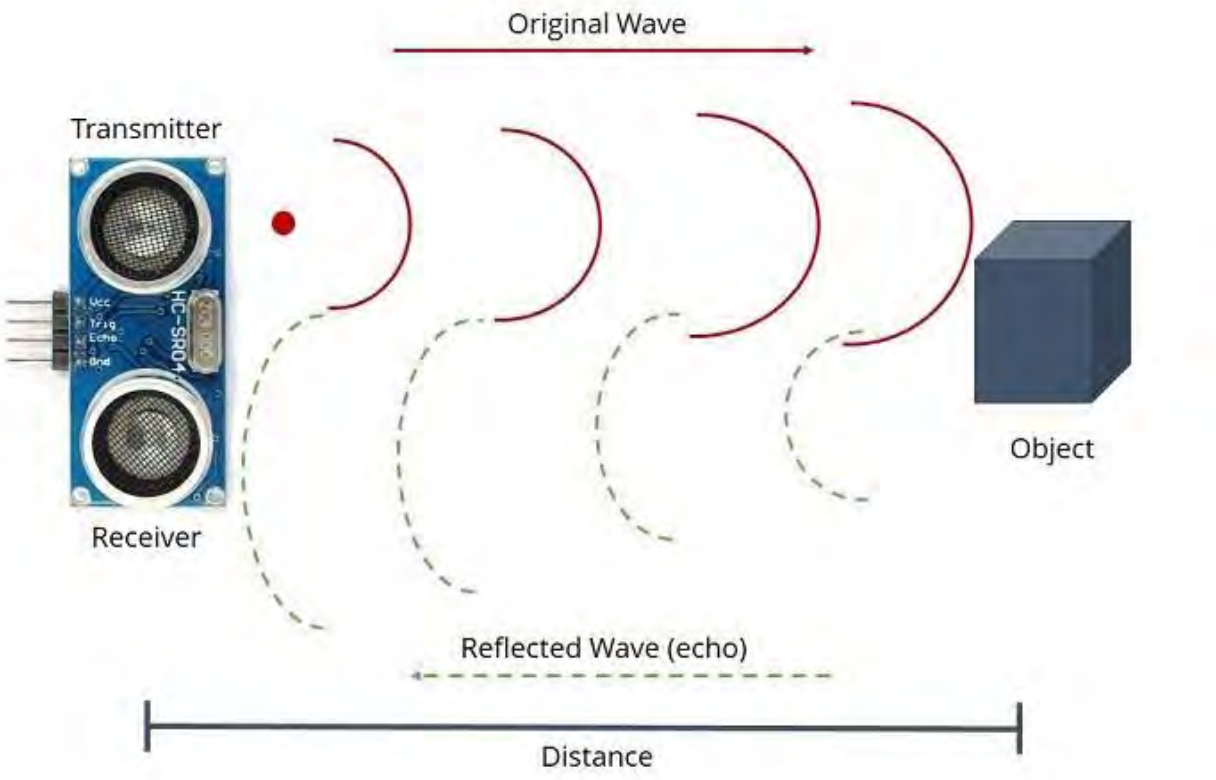


Figure 2.4

The distance from an obstacle can be determined through the help of reception and transmission time signals. It's workable as we already know that in air the velocity of sound. The speed of sound is 343 meter per second (1125 foot/sec).

The specific distance from sensor can be calculated by the formula:

Distance = ½ T x C (T = Time and C = the speed of sound).

2.5.2) PINS OF ULTRASONIC SENSOR

There are four pins of this Ultrasonic sensor. The pin description is given bellows;

VCC: The given voltage source is +5VDC.

Trig: The trigger pin is used for inputs.

Echo: The echo pin is used for output.

GND: This is used for ground.

This table shows the connections:

Ultrasonic-Sensor (HC-SR04)	**Arduino (Uno)**
Input source (VCC)	5 Volts
Ground (GND)	Ground (GND)
Echo	Pin no:12
Trigger (trig)	Pin no:11

2.6) WATER SENSOR

The water sensor is an electronics device. It is designed for water detection, which can be commonly used in detecting the rainwater, water level and even water on the path. It measures the electrical conductivity of the water present and completing a circuit to send a signal. This sensor operates on the 5 volts and working current is less than 20ma.

2.6.1) PINS DETAILS

The water sensor contains three pins for connections, "**S**", "**+**" and "**-**". This configuration is showing in figure 2.8.

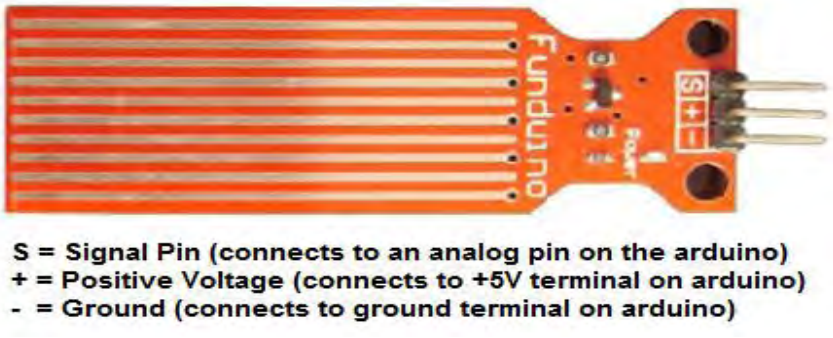


Figure 2.5

Water Sensor diagram

In this project the water detector sensor is used to detect the presence any type of water on the path and also convey the message toward blind person through buzzer and vibrator motor.

Basically water sensor works as, It measures the electrical conductivity of the water present and completing a circuit to send a signal.

2.7) VIBRATOR MOTOR

The vibrator motor uses a small unequal mass on a DC motor, when it rotates then it produce a force that converts into vibrations. This type of DC vibration motor is also used in cellphones and it needs a voltage supply of 3- 5V with current about 125 mA. Here in this project it is used for a kind of message to alert the blind person, so the visually impaired person can attentive through it. The diagram is shown as in figure 2.6.

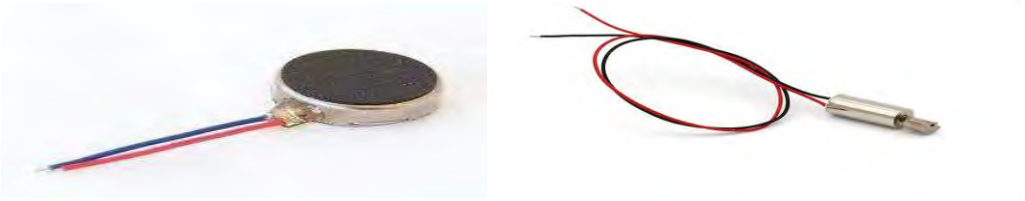


Figure 2.6

Vibrator Motor diagram

The vibration motor has two pins, one is used for positive voltage (3V) and 2nd is used for ground (GND).

2.8) BUZZER

The buzzer is an audio type signaling hardware component. And it is an electrical device which changes electrical energy in the form of mechanical energy that usually functions. A buzzer is in the lower portion of the detectable frequency limit of 20 Hz to 20 kHz. It is capable through change an electric, oscillating signal in the form of mechanical energy, easy to hear waves. Buzzer is used in this research to inform the visually impaired against objects by producing sound proportional to distance from object. It has two pins, one is used for positive voltage and 2nd is used for ground (GND). The diagram is shown as in figure 2.7.

Figure 2.7

Buzzer diagram

2.9 CIRCUIT BOARDS

There are different types of circuit boards in electronics field which are using to design a new circuit. The circuit board is an independent board that mechanically encouragement and electrically joins electronic elements using such conductive paths. This circuit configuration depends on each of electronics hardware. Some circuits are already fix designed and also a few other circuit designed special for a different and new purpose. Now a day, projects are designed on three main circuit boards which are given below;

1. Breadboard.
2. Veroboard.
3. Printed circuit board (PCB).

2.9.1) Breadboard

The breadboard is a temporary use and no soldering required board. In this board we design temporary circuit for testing purpose and taking some ideas from it. The components can be reused after testing because they are not fixed. It is uncomplicated to change and replace the elements of circuit. The project manager is always used for checking electronics element before to put in soldering type board. The breadboard is shown in following figure 2.8.

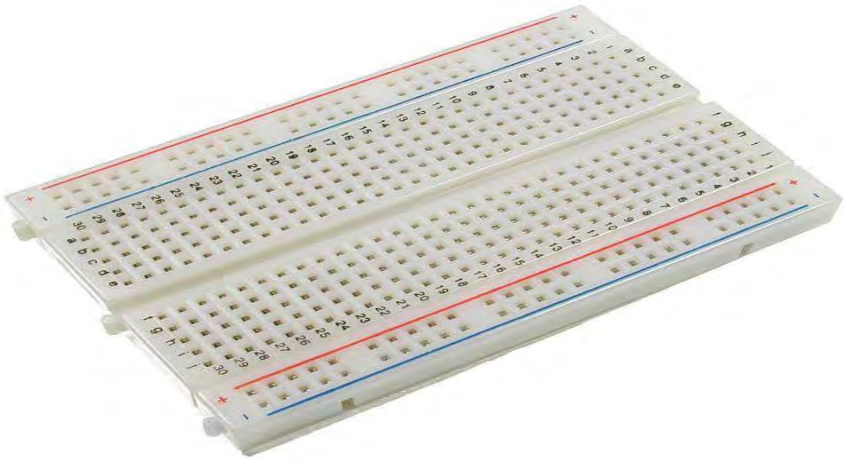


Figure 2.8

Bread board diagram

2.9.2) VERO BOARD

The Veroboard is also known as stripboard. It is for permanent use and soldering is also required to connect the components. In this board we designed a permanent circuit. The components can't be reused after testing because they are fixed with soldering. The stripboard contains parallel wholes of copper path on one side of the board and the distance of every whole is 2.54 mm. The Veroboard has no needs of preparation for cut and making a path. It is already make for designing and only to put the electronics components on it. The Veroboard is given below in figure 2.9 (a) and 2.9 (b).

Simple Veroboard

Figure 2.9 (a)

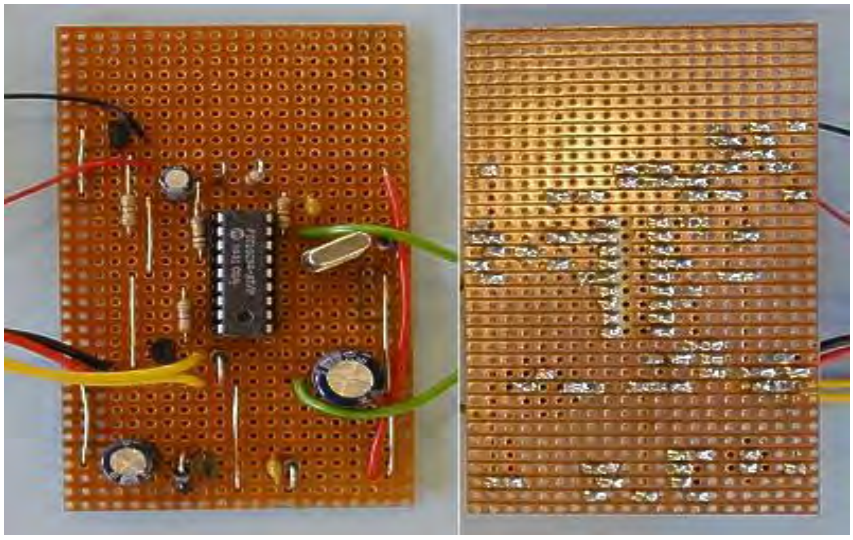


Figure 2.9 (b)

Soldering Veroboard

2.9.3) PRINTED CIRCUIT BOARD (PCB)

The PCB (printed circuit board) has copper paths attaching the holes a position where the electronic components are put according to the simplified sketch. These holes are sketch especially for every circuit on PCB and make the creation easy. The PCBs are applied in many electronic elements due to its potential to combine both complicated and uncomplicated designs. So there are different kind or variety of PCBs and every kind is good our needs. The following types given;

1. Single sided PCBs
2. Double sided PCBs
3. Rigid PCBs
4. Flex PCBs
5. Rigid Flex PCBs

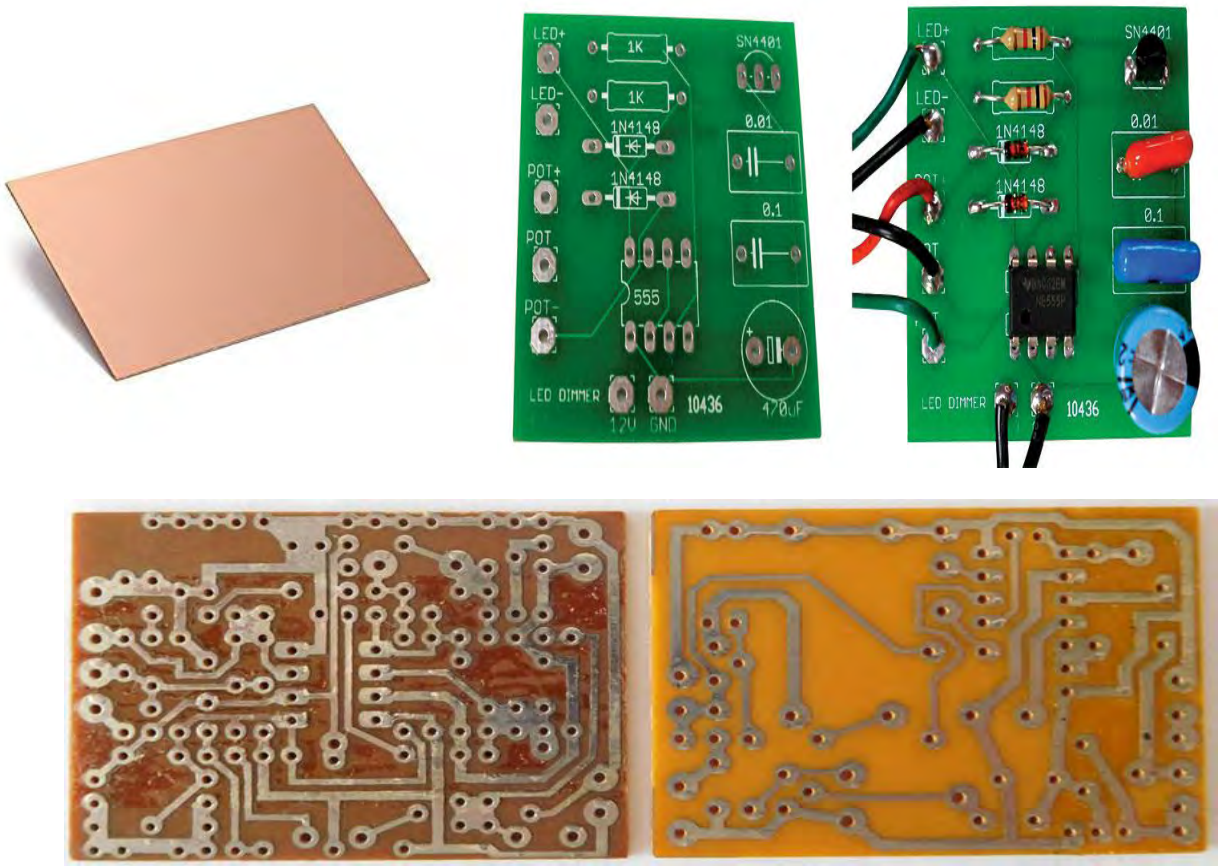


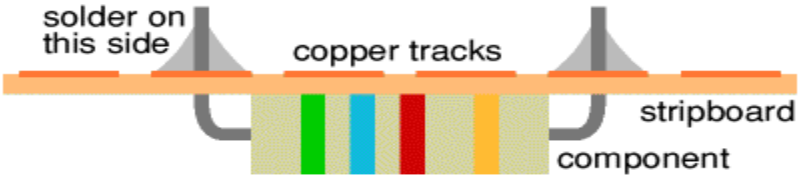
Figure 2.10

Different types and designs of PCBs

2.10) WHY WE USE VEROBOARD IN PROJECT?

The Veroboard is easy and already designed board like a breadboard. As Veroboard components are fixed and cannot replace so I made my project circuit on it. A chance for circuit damage is very less so the error probability is very less. Soldering in Veroboard is easier as compare to printed circuit board (PCB). The distance of holes in this board on every side is same 2.54 mm. The Veroboard contains parallel wholes of copper path on each layer of the panel (board) and the

electronic elements are put on the non-copper lateral layer then the veroboard is set over to solder the element conducts to the copper paths. Shows in given figure 2.11.



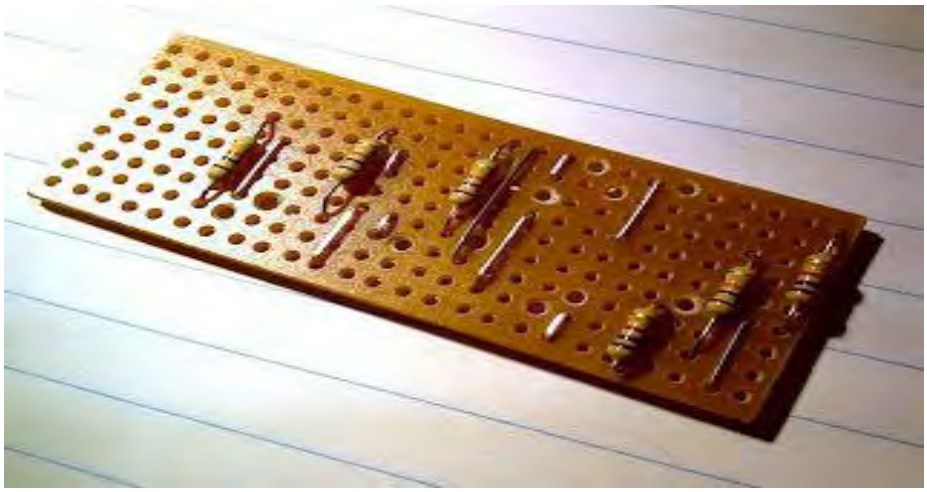


Figure (2.11)

Veroboard diagram

CHAPTER 3

IMPLIMENTATION ON SOFTWARE

1. IMPLEMENTATIONS

In this project both parts are included hardware and software. I am working on both parts simultaneously. First of all I made a body of intelligent stick. There are various designs for the making project hardware such as glove, stick and shoes but the stick is a more suitable design then gloves and shoes as it cover larger distance. Firstly I take bread board and place the distance measurement sensor (HC-SR04) onto it. This sensor consists of four jots (VCC, GND, Trigger and Echo). Then I take Arduino Uno ATmega328 and join pin VCC of ultrasonic sensor to Arduino pin that contain 5V. Now 2nd GND (ground) pin connects to Arduino's ground, after that the trigger pin join with digital jot number 10 of Arduino and the last Echo jot connects to digital pin number 11 of Arduino. For output of this circuit I use three elements the buzzer, LED and vibrator motor. The purpose of using buzzer is produce sound when any obstacle comes in the front of ultrasonic sensor, LED glows to give signal and vibrator motor purpose is to warn the blind person and inform him that the any object is came in front of him. The buzzer, LED and the vibrator motor are parallel connected so any obstacle or object came in front of ultrasonic sensor then these all three give the output. Buzzer, LED and vibrator motor has two pins each and positive pin of all of these components are linked to the digital pin number 12 of Arduino and negative pins of all these components are grounded.

ULTRASONIC SENSOR PROGRAM ON ARDUINO

sensor_with_buzzer

```
const int trigPin = 9;
const int echoPin = 10;
const int buzzer = 11;
const int ledPin = 13;

// defines variables
long duration;
int distance;
int safetyDistance;


void setup() {
pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
pinMode(echoPin, INPUT); // Sets the echoPin as an Input
pinMode(buzzer, OUTPUT);
pinMode(ledPin, OUTPUT);
Serial.begin(9600); // Starts the serial communication
}


void loop() {
// Clears the trigPin
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
```

```
// Sets the trigPin on HIGH state for 10 micro seconds
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);

// Reads the echoPin, returns the sound wave travel time in microseconds
duration = pulseIn(echoPin, HIGH);

// Calculating the distance
distance= duration*0.012/2;

safetyDistance = distance;
if (safetyDistance <= 15){
  digitalWrite(buzzer, HIGH);
  digitalWrite(ledPin, HIGH);
}
else{
  digitalWrite(buzzer, LOW);
  digitalWrite(ledPin, LOW);
}

// Prints the distance on the Serial Monitor
Serial.print("Distance: ");
Serial.println(distance);
}
}
```

CIRCUIT DIAGRAM OF HC-SR04 SENSOR

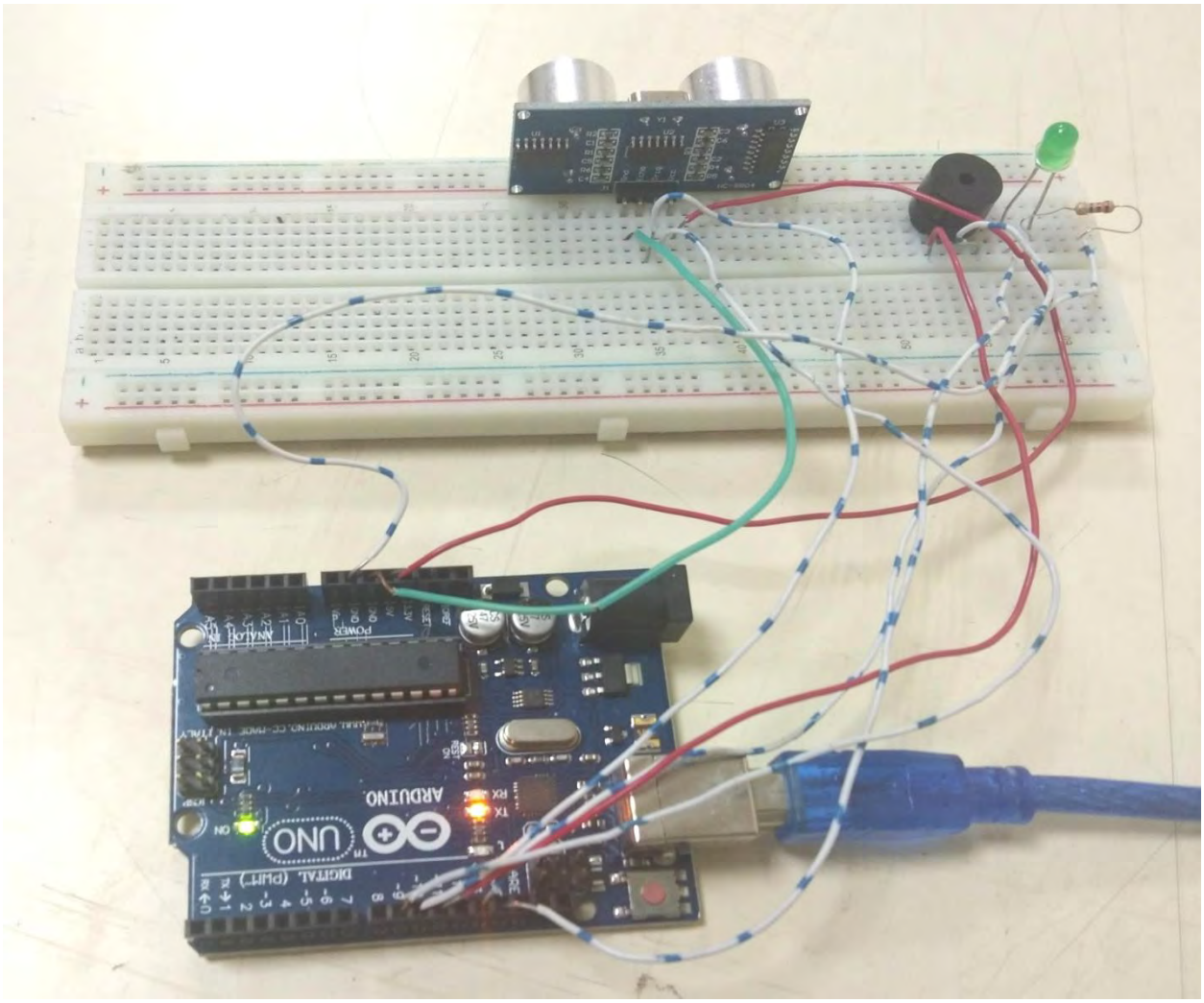


Figure: (3.1)

Now for safety of visually impaired person from the loam and water, we use water sensor. Water sensor detects the water on the path. Water sensor has 3 pins (S, +, -). S pin is a signal pin which is linked to Arduino's analog jot A0. Positive (+) jot is joint to pin 5 volts of Arduino and negative (-) jot is linked with Arduino's ground (GND). For its output I use buzzer and vibrator motor, both are parallel connected. Both of these have two pins each. 1st is positive and 2nd in negative. Positive pin of both these elements is connected with digital jot number 6 of Arduino and negative is joint to Arduino ground (GND) pin.

WATER SENSOR PROGRAM ON ARDUINO

water_se

```
const int waterSens = A0; //define water sensor
const int buzzer = 9;//define buzzer to pin 9
int waterVal; //define the water sensor value


void setup() {
pinMode(buzzer, OUTPUT); //set buzzer as an output
pinMode(waterSens, INPUT);//set water sensor as an input
Serial.begin(9600);  //start the serial port at 9600 bauds

}

void loop() {
  waterVal = analogRead(waterSens); //read the water sensor

  Serial.println(waterVal); //print the value of the water sensor to the serial monitor

if (waterVal <= 50){
  digitalWrite(buzzer, HIGH);//if the water sensor senses water turn the buzzer on
}
else{
  digitalWrite(buzzer, LOW);//if it doesn't sense anything turn the buzzer off
}
}
```

CIRCUIT DIAGRAM OF WATER SENSOR

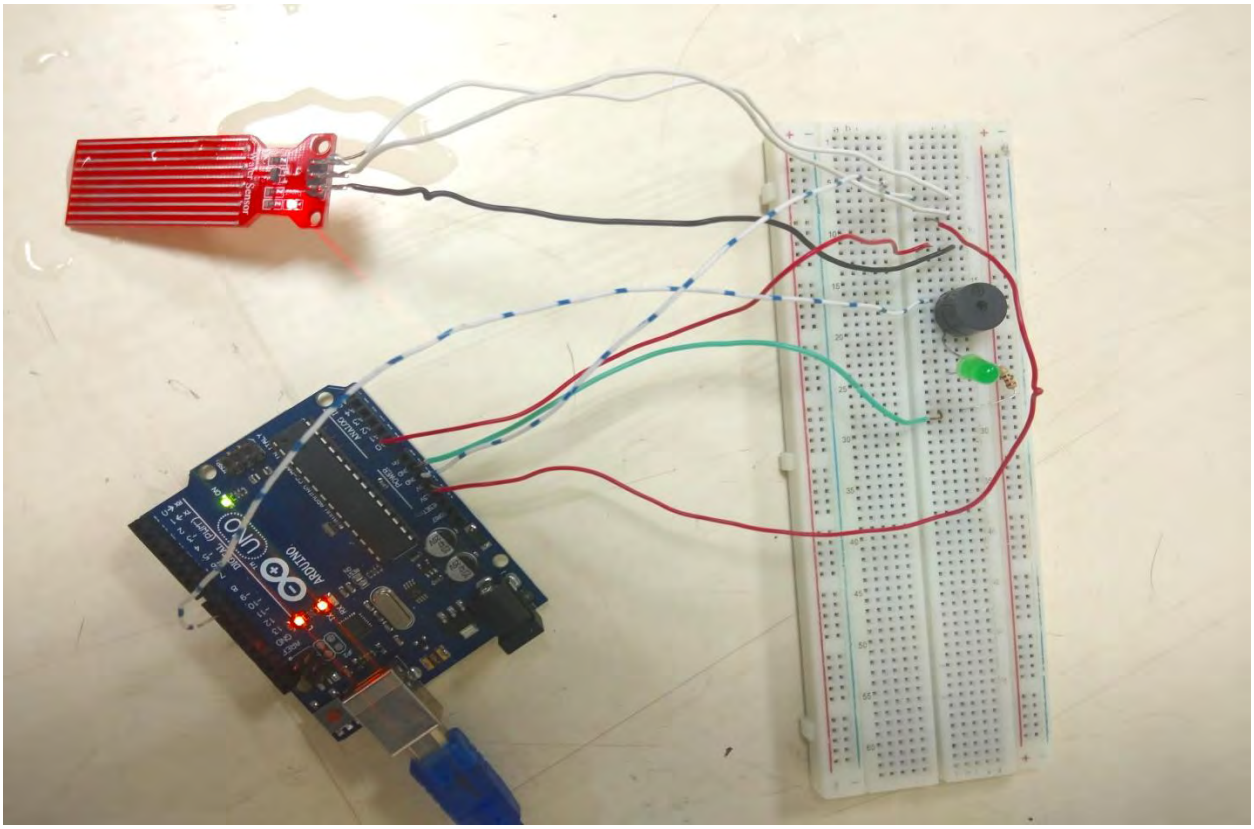


Figure 3.2

Now I combine these two circuits and made a single circuit on strip board that did both these jobs. Now a blind person can sense either the obstacle is in front of him or water on the way. This insures that he feel more safe.

The implemented circuit is attached on the stick. The stick covers larger area so the visually impaired person feels more confidence.

CHAPTER 4

CONCLUSION & RESULTS

4.1) CONCLUSION

Finally, the project has been success and also all of our purpose has been completed. According the result, the hypothesis is confirmed. Our sensors detect obstacle on the path. The ultrasonic sensor and water Sensor senses to an object and then program that was uploaded in the brain of Arduino Uno tells it where and how much distance the object is present. Once an obstacle is find through the distance measurement sensor in the left, right and front side of the stick on the path, then Arduino Uno send the message to the blind person through buzzer and vibrator motor and also the water detector is used for sense the presence of water on the path and it also convey the message to the blind person through buzzer and vibrator motor.

4.2) ADVANTAGES OF PROJECT

1) It allows to the user those people who are visually challenged to walk directly by identifying the objects.

2) The goal of this project the intelligent stick for blind person is to invent a cheap, fair and well organized way to support the visually impaired people to give direction with more comfort.

3) To develop the speed and confidence of a visually impaired person

4) Another way of helping to blind person is, having a trained animal such like a dog, but it is actually expensive.

4.3) FUTURE SCOPE

GPS (Global Positioning System) can help to visually impaired people to source and object route information.

GPS can support to determine the minimum and best path as hence Google map based on real time directs.

From the shoes connected GPS we can easily determine the exact place of blind person.

4.4) SUMMARY

The blind people find problems and identifying the objects in front of them, when they walking in the path, which makes it unsafe. The intelligent stick approaches as a coming result to allow blind person to determine the obstacle around them. In my project here is a solution, which is represented in an intelligent stick with ultrasonic sensor to detect the distance from them to object in opposite of the blind, in the limit of 3m (meters). Furthermore, one other sensor is put on the bottom of stick which used to avoid the water present on path. If the water sensor detects the water it gives message through buzzer and vibrator motor. A warning with buzzer's sound and the vibration motor are started while any object is identified. This suggested system uses the Arduino Uno Atmega328 set in system, vibration motor and buzzer. The stick is intelligent of detecting all objects in the limit of 2-3m (meters) and provides a suitable respect communication allowing unsighted person to walk easily more than common speed as blind person observe harmless. This blind intelligent stick is more reliable, affordable cast, less weight, having minimum power use, gives fast response and ability to make easily.

CHAPTER 5

PROGRRAMMING

PROGRAMMING


```
// Arduino pin assigning
const int trigPin = 9;
const int echoPin = 10;
const int buzzer = 11;
const int waterbuzzer = 6; //define buzzer to pin 6
const int ledPin = 13;
const int waterSens = A0; //define water sensor
int waterVal; //define the water sensor value// defines variables
long duration;
int distance;
int safetyDistance;


void setup() {
pinMode(waterSens, INPUT); //set water sensor as an input
pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
pinMode(echoPin, INPUT); // Sets the echoPin as an Input
pinMode(buzzer, OUTPUT);
pinMode(ledPin, OUTPUT);
pinMode(waterbuzzer, OUTPUT); //set buzzer as an output
Serial.begin(9600); // Starts the serial communication

}
```

```
void loop() {
// Clears the trigPin
digitalWrite(trigPin, LOW);
delayMicroseconds(2);

// Sets the trigPin on HIGH state for 10 micro seconds
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);

// Reads the echoPin, returns the sound wave travel time in microseconds
duration = pulseIn(echoPin, HIGH);

// Calculating the distance
distance= duration*0.012/2;

safetyDistance = distance;
if (safetyDistance <= 10){
  digitalWrite(buzzer, HIGH);
  digitalWrite(ledPin, HIGH);
}
else{
  digitalWrite(buzzer, LOW);
  digitalWrite(ledPin, LOW);
}
```

```
// Prints the distance on the Serial Monitor

Serial.print("Distance: ");

Serial.println(distance);


  waterVal = analogRead(waterSens); //read the water sensor

  Serial.println(waterVal); //print the value of the water sensor to the serial monitor

if (waterVal >= 100)
{
  digitalWrite(waterbuzzer, HIGH);//if the water sensor senses water turn the buzzer on
}

else
{
  digitalWrite(waterbuzzer, LOW);//if it doesn't sense anything turn the buzzer off
}

}
```

Done compiling.

REFRENCES

1) **http://www.arduino.cc.com//**

2) C.S. Kher, Y.A. Dabhade, S.K Kadam., S.D. Dhamdhere and A.V. Deshpande//

3) **http://www.components101.com//**

4) **http://www.electronics-lab.com/project/ds1307-rtc-module/**