Flood monitoring and early warning system

Name : Bhanusri G

Reg no : 952021106001

Team : Sri Jaya Jothi M

Brindha R A

Divya R

Objective:

The main objectives of the project are:

- To read the temperature and humidity of the environment continuously
- To warn the people through SMS system using web API
- To detect the level of water in real time.

Scope:

The main purpose of application is to know the nearest flood situation.

Flood monitoring:

The purpose of this project is to sense the water level in river beds and check if they are in normal condition. If they reach beyond the limit, then it alerts people through LED signals and buzzer sound. Also it alerts people through SMS and Emails alerts when the water level reaches beyond the limit.

Hardware components :

1. Bolt-IoT Wifi module
2. Arduino uno
3. Breadboard- 400 tie points
4. 5mm LED:(Green, Red, Orange) and Buzzer
5. 16×2 LCD Display
6. LM35 Temperature Sensor
7. HC-SR04 Ultrasonic Sensor
8. Some Jumper Wires
    1. Male to Female Jumper Wires- 15 pcs
    2. Male to Male Jumper Wires- 10 pcs
    3. Female to Female Jumper Wires- 5 pcs

9. 9v Battery and Snap Connector and USB cable type B

Hand tools and fabrication machines:

1. Electrical Tape
2. Green Cello Tape

Steps to connect the components:

Step 1: Connecting 5v and GND of Arduino to the Breadboard for power connection to other components.

Step 2: Connecting LED's

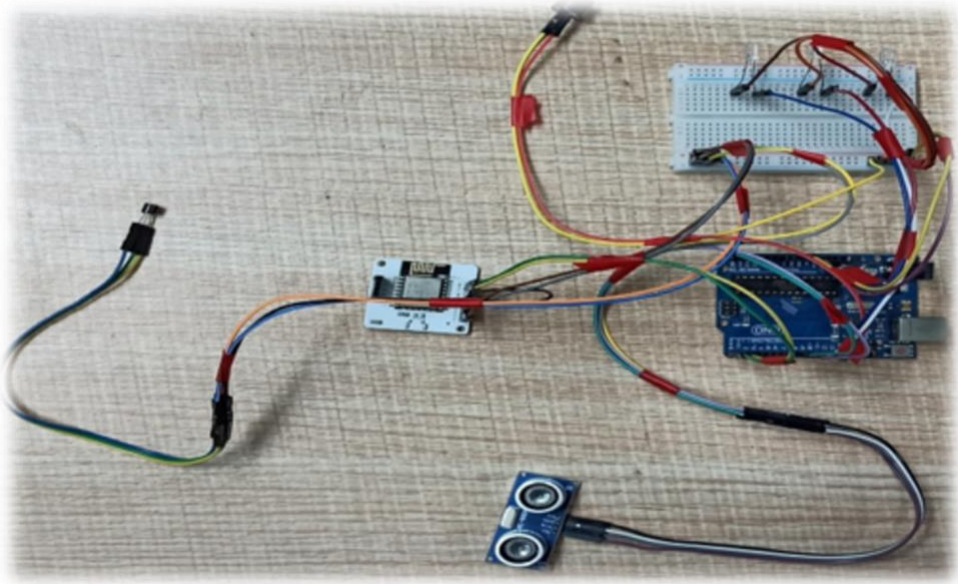
Step 3: Connecting Buzzer

Step 4: Connecting HC-SR04 Ultrasonic Sensor

Step 5: Connecting Bolt WiFi Module

Step 6: Connecting LM35 Temperature Sensor

Step 7:Connecting 16×2 LCD Display



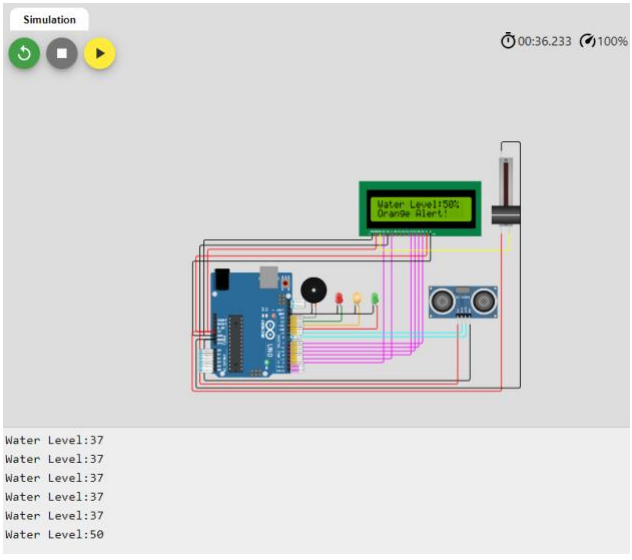
Programming for flood monitoring

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(2, 3, 4, 5, 6, 7);  // Create an instance of the LiquidCrystal
library
const int in = 8;                          // This is the ECHO pin of The
Ultrasonic sensor HC-SR04
const int out = 9;                         // This is the TRIG pin of the
ultrasonic Sensor HC-SR04
// Define pin numbers for various components
const int green = 10;
const int orange = 11;
const int red = 12;
const int buzz = 13;

void setup()
{
  // Start serial communication with a baud rate of 9600
  Serial.begin(9600);
  // Initialize the LCD with 16 columns and 2 rows
  lcd.begin(16, 2);
  // Set pin modes for various components
  pinMode(in, INPUT);
  pinMode(out, OUTPUT);
  pinMode(green, OUTPUT);
  pinMode(orange, OUTPUT);
  pinMode(red, OUTPUT);
  pinMode(buzz, OUTPUT);
  // Display a startup message on the LCD
  lcd.setCursor(0, 0);
  lcd.print("Flood Monitoring");
  lcd.setCursor(0, 1);
  lcd.print("Alerting System");
  // Wait for 5 seconds and then clear the LCD
  delay(5000);
```

```
  lcd.clear();
}

void loop()
{
  // Read distance from the ultrasonic sensor (HC-SR04)
  long dur;
  long dist;
  long per;
  digitalWrite(out, LOW);
  delayMicroseconds(2);
  digitalWrite(out, HIGH);
  delayMicroseconds(10);
  digitalWrite(out, LOW);
  dur = pulseIn(in, HIGH);
  dist = (dur * 0.034) / 2;
  // Map the distance value to a percentage value
  per = map(dist, 10.5, 2, 0, 100);
  // Ensure that the percentage value is within bounds
  if (per < 0)
  {
    per = 0;
  }
  if (per > 100)
  {
    per = 100;
  }
  // Print water level data to serial
  Serial.print("Water Level:");
  Serial.println(String(per));
  lcd.setCursor(0, 0);
  lcd.print("Water Level:");
  lcd.print(String(per));
  lcd.print("%  ");
  // Check water level and set alert levels
  if (dist <= 3)
  {
    lcd.setCursor(0, 1);
    lcd.print("Red Alert!   ");
    digitalWrite(red, HIGH);
    digitalWrite(green, LOW);
    digitalWrite(orange, LOW);
    digitalWrite(buzz, HIGH);
    delay(2000);
    digitalWrite(buzz, LOW);
```

```
    delay(2000);
    digitalWrite(buzz, HIGH);
    delay(2000);
    digitalWrite(buzz, LOW);
    delay(2000);
  }
  else if (dist <= 10)
  {
    lcd.setCursor(0, 1);
    lcd.print("Orange Alert!  ");
    digitalWrite(orange, HIGH);
    digitalWrite(red, LOW);
    digitalWrite(green, LOW);
    digitalWrite(buzz, HIGH);
    delay(3000);
    digitalWrite(buzz, LOW);
    delay(3000);
  }
  else
  {
    lcd.setCursor(0, 1);
    lcd.print("Green Alert!  ");
    digitalWrite(green, HIGH);
    digitalWrite(orange, LOW);
    digitalWrite(red, LOW);
    digitalWrite(buzz, LOW);
  }
}
```

Simulation output:



Conclusion:

Nowadays the Internet Of things (IoT) is broadly used in worldwide, this system will display the data of the water level measured on lcd display. This project can be very helpful to the Meteorological Department to continuously monitor the dams and river beds water level. With this project it can save many people lives by giving alerts when the water level crosses beyond the limit. This project is very cost-effective, flexible and productive in areas where flood conditions happens everytime.