GOVERNMENT COLLEGE OF ENGINEERING

ERODE

B.E

Electronics and Communication Engineering

FLOOD

MONITORING AND EARLY WARNING SYSTEM BLOT IOT

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INTRODUCTION:

A flood monitoring and early warning project aims to mitigate the impact of floods by implementing a comprehensive system. It focuses only on the water level detection and early warning system (via website and/or SMS) that alerts concern agencies and individuals for a potential flood event. The study aims in helping citizens to be prepared and knowledgeable whenever there is a flood.

PROGRAM:

```
//Early Flood Detection Using IOT ~ A project by Sabyasachi Ghosh

//<LiquidCrystal.h> is the library for using the LCD 16x2

#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);
 }
}
```

CIRCUIT CODING:

```
"version": 1,
 "author": "Warship Battle",
 "editor": "wokwi",
 "parts": [
   {
     "type": "wokwi-arduino-uno",
     "id": "uno",
     "top": -64.64,
     "left": 105.33,
     "rotate": 90,
     "attrs": {}
   },
   { "type": "wokwi-lcd1602", "id": "lcd1", "top": -312.02, "left": 508, "attrs":
{} },
   {
     "type": "wokwi-led",
     "id": "led1",
```

```
  "top": -45.08,
  "left": 439.42,
  "attrs": { "color": "red" }
},
{
  "type": "wokwi-hc-sr04",
  "id": "ultrasonic1",
  "top": -52.66,
  "left": 680.31,
  "attrs": { "distance": "7" }
},
{
  "type": "wokwi-slide-potentiometer",
  "id": "pot1",
  "top": -339.66,
  "left": 767.48,
  "rotate": 270,
  "attrs": { "travelLength": "30" }
},
{
  "type": "wokwi-buzzer",
  "id": "bz1",
  "top": -83.14,
  "left": 364.46,
  "attrs": { "volume": "0.1" }
},
{
  "type": "wokwi-led",
```

```
    "id": "led2",
    "top": -44.56,
    "left": 483.32,
    "attrs": { "color": "orange" }
   },
   {
    "type": "wokwi-led",
    "id": "led3",
    "top": -45.47,
    "left": 527.48,
    "attrs": { "color": "limegreen" }
   }
 ],
 "connections": [
   [ "lcd1:D4", "uno:4", "magenta", [ "v0" ] ],
   [ "lcd1:D5", "uno:5", "magenta", [ "v0" ] ],
   [ "lcd1:D6", "uno:6", "magenta", [ "v0" ] ],
   [ "lcd1:D7", "uno:7", "magenta", [ "v0" ] ],
   [ "led3:A", "uno:10", "red", [ "v0" ] ],
   [ "led2:A", "uno:11", "orange", [ "v0" ] ],
   [ "led1:A", "uno:12", "green", [ "v0" ] ],
   [ "bz1:2", "uno:13", "gray", [ "v0" ] ],
   [ "uno:GND.1", "led1:C", "black", [ "h0" ] ],
   [ "uno:GND.1", "led2:C", "black", [ "h0" ] ],
   [ "uno:GND.1", "led3:C", "black", [ "h0" ] ],
   [ "uno:GND.1", "bz1:1", "black", [ "h0" ] ],
   [ "uno:GND.2", "lcd1:VSS", "black", [ "h-27.73", "v-236.01", "h405.87" ] ],
   [ "uno:GND.2", "lcd1:RW", "black", [ "h-37.21", "v-223.22", "h460.88" ] ],
```

["uno:5V", "lcd1:VDD", "red", ["h-18.3", "v-203.63", "h13.46"]],

["lcd1:RS", "uno:2", "magenta", ["v0"]],

["lcd1:E", "uno:3", "magenta", ["v0"]],

["uno:5V", "lcd1:A", "red", ["h-46.76", "v-186.9", "h566.43"]],

["uno:GND.2", "lcd1:K", "black", ["h-55.24", "v-183", "h584.41"]],

["uno:GND.3", "ultrasonic1:GND", "black", ["h-26.54", "v101.57", "h653.32"]],

["uno:5V", "ultrasonic1:VCC", "red", ["h-37.14", "v129.59", "h633.92"]],

["ultrasonic1:TRIG", "uno:9", "cyan", ["v0"]],

["ultrasonic1:ECHO", "uno:8", "cyan", ["v0"]],

["lcd1:V0", "pot1:SIG", "yellow", ["v39.74", "h14.45"]],

["uno:5V", "pot1:VCC", "red", ["h-56.08", "v146.93", "h757.73"]],

["uno:GND.3", "pot1:GND", "black", ["h-46.52", "v120.3", "h800.57", "v-607.79", "h-52.4"]]

],

"dependencies": {}

}

CONDITION:

Issuing early warning alerts to the public and relevant authorities when there's a high probability of flooding. These alerts can be delivered through various channels like mobile apps, SMS, sirens, and broadcast media.

CONCLUSION:

By integrating sensor data collection into flood monitoring and early warning systems, it is possible to provide timely and accurate information to help mitigate the impact of floods and protect lives and property.