BATCH-17

PROJECT NAME: FLOOD MONITORING SYSTEM

ROLL NUMBERS:

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IOT BASED FLOOD MONITORING AND DETECTION SYSTEM

PROBLEM STATEMENT:

"Develop a system that uses Internet of Things (IoT) technology to monitor and detect flood conditions in real-time. The system should be capable of collecting data from various sensors placed in flood-prone areas and transmit this information to a central hub. The goal is to provide timely and accurate alerts to authorities and residents, enabling proactive measures to mitigate the impact of floods and ensure the safety of the community."

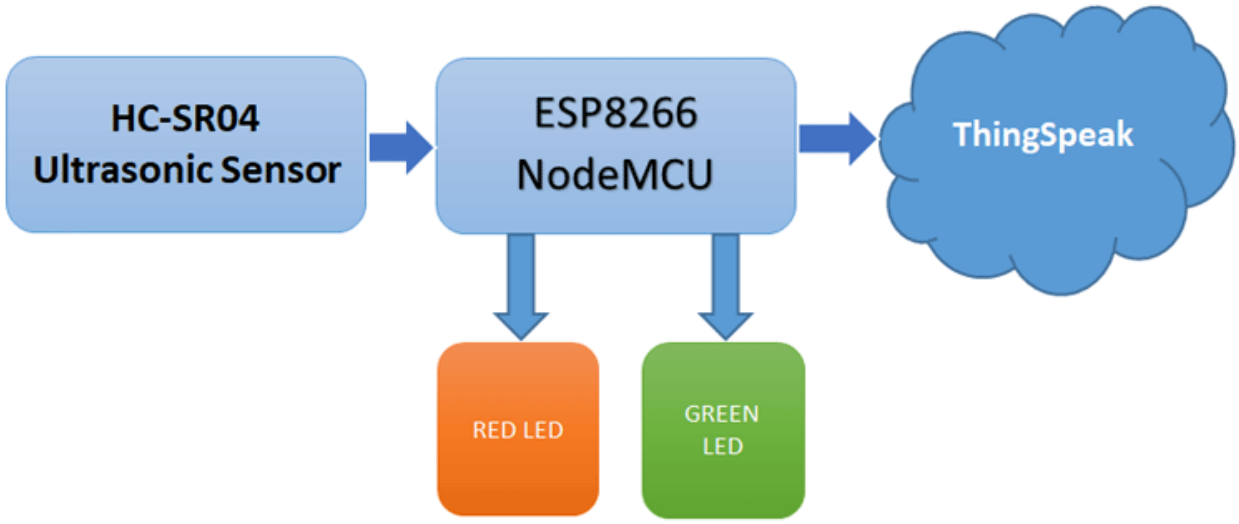
SCOPE OF SOLUTIONS:

The scope of a flood monitoring system using IoT includes deploying sensors in flood-prone areas to collect real-time data on water levels and weather conditions. This information is transmitted to a central hub for processing and analysis. The system generates alerts based on predefined thresholds, notifying authorities and residents through various communication channels. A user-friendly interface and monitoring dashboard provide real-time insights, and the system is designed for scalability, adaptability, regulatory compliance, and reliability. It also incorporates power-efficient solutions, integrates with emergency response systems, and emphasizes community engagement and education on flood risks.

REQUIRED COMPONENTS TO DEVELOP SOLUTION:

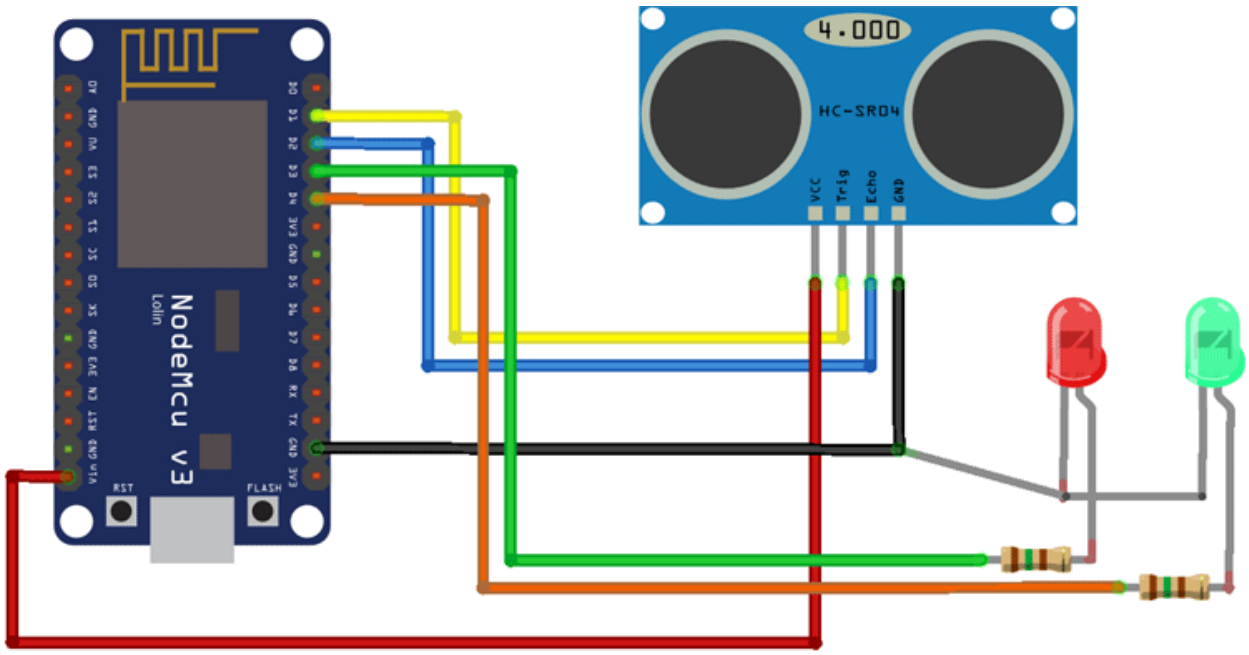
- ESP8266 Node MCU
- Ultrasonic Sensor
- Power supply
- LEDs (Red & Green)
- Breadboard
- Jumpers

BLOCK DIAGRAM:



We previously used ESP8266 Node MCU to build many IoT projects. The above block diagram shows the working of this IoT based flood monitoring system. Here, the ultrasonic sensor is used to sense the water level of the river. The data output from the ultrasonic sensor is fed to the Node MCU, where it is processed and sent to Thing Speak for Graphical monitoring and Critical alert. Here, a red LED is used to alert during the critical flood conditions, and the Green LED is used to indicate the normal condition.

SIMULATED CIRCUIT:



CODE FOR THE SOLUTION:

```
#include "ThingSpeak.h"
#include <ESP8266WiFi.h>
const int trigPin1 = D1;
const int echoPin1 = D2;
#define redled D3
#define grnled D4
unsigned long ch_no = 1026389;//Replace with Thingspeak Channel number
```

```
const char * write_api = "XK88XXXXXXX";//Replace with Thingspeak write API
char auth[] = "fu0o5JaLXXXXXXXXXXXXXXXXX";
char ssid[] = "admin";
char pass[] = "";
unsigned long startMillis;
unsigned long currentMillis;
const unsigned long period = 10000;
WiFiClient  client;
long duration1;
int distance1;
void setup()
{
  pinMode(trigPin1, OUTPUT);
  pinMode(echoPin1, INPUT);
  pinMode(redled, OUTPUT);
  pinMode(grnled, OUTPUT);
  digitalWrite(redled, LOW);
  digitalWrite(grnled, LOW);
  Serial.begin(9600);
  WiFi.begin(ssid, pass);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);
    Serial.print(".");
  }
  Serial.println("WiFi connected");
  Serial.println(WiFi.localIP());
  ThingSpeak.begin(client);
  startMillis = millis();  //initial start time
}
void loop()
```

```
{
  digitalWrite(trigPin1, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin1, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin1, LOW);
  duration1 = pulseIn(echoPin1, HIGH);
  distance1 = duration1 * 0.034 / 2;
  Serial.println(distance1);
  if (distance1 <= 4)
  {
    digitalWrite(D3, HIGH);
    digitalWrite(D4, LOW);
  }
  else
  {
    digitalWrite(D4, HIGH);
    digitalWrite(D3, LOW);
  }
  currentMillis = millis();
  if (currentMillis - startMillis >= period)
  {
    ThingSpeak.setField(1, distance1);
    ThingSpeak.writeFields(ch_no, write_api);
    startMillis = currentMillis;
  }
}
```

CONCLUSION:

In conclusion, the Flood Monitoring System IoT project provides an effective and efficient solution for real-time flood detection and monitoring. By leveraging Internet of Things (IoT) technology, the system enhances early warning capabilities, enabling prompt response to potential flood situations. The integration of sensors, data transmission, and cloud-based analytics ensures accurate and timely information for decision-makers. This project demonstrates the practical application of IoT in addressing critical environmental challenges, emphasizing the importance of proactive measures in mitigating the impact of floods. Overall, the Flood Monitoring System serves as a valuable tool in safeguarding communities and infrastructure from the devastating effects of flooding.