NEHRU ARTS AND SCIENCE COLLEGE

APPLIED INDUSTRIAL INTERNET OF THINGS

Flood Monitoring System

BATCH 10

Group Members

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GITHUB LINK: https://github.com/Padrinathan/Flood-Monitoring-system

AIM:

*The **aim** of a **Flood Monitoring System*** To design and simulate a flood monitoring system using the Wokwi simulator, integrating sensors and microcontrollers to detect rising water levels, provide real-time alerts, and enhance early warning systems for flood-prone areas.

PROBLEM STATEMENT:

Floods are one of the most devastating natural disasters, causing loss of life, property damage, and economic disruption. Traditional flood monitoring systems often rely on manual observation, which can lead to delayed responses and increased casualties.

There is a need for an **automated flood monitoring system** that can provide **real-time water level detection, early warnings, and alerts** to prevent disasters. However, implementing such a system in a real environment can be costly and complex.

To address this, **Wokwi**, an online simulation platform, can be used to design and test a flood monitoring system before physical deployment. This simulation-based approach allows for cost-effective development, testing, and refinement of the system, ensuring its reliability before real-world implementation.

SCOPE OF THE SOLUTION:

The **Flood Monitoring System** using **Wokwi** has a wide scope in disaster management and early warning systems. Here's how it can be applied

1. Simulation & Testing

- Enables **cost-effective** development and testing before real-world deployment.
- Allows **fine-tuning** of sensors and alerts in a **virtual** environment.

2. Real-Time Flood Detection

- Detects **rising water levels** using an **ultrasonic sensor**.
- Provides **immediate alerts** via **LEDs, buzzer, and OLED display**.

3. Disaster Preparedness

- Can be integrated with **Wi-Fi and IoT** (Blynk, ThingSpeak) for **remote monitoring**.
- Helps in **early warning systems** for **residential, agricultural, and urban areas**.

4. Scalability & Future Enhancements

- Can be **expanded** with **GSM modules** for SMS alerts.
- Can include **AI-based predictions** using weather data.
- Can be connected to **smart city infrastructure** for automated flood control.

REQUIRED COMPENENTS TO DEVELOP SOLUTION:

1. Microcontroller:

- **ESP32** or **Arduino Uno** (for processing sensor data and sending alerts)

2. Sensors:

- **Ultrasonic Sensor (HC-SR04)** – To measure water level.
- **Water Level Sensor** – To detect water presence at different levels.
- **DHT11 or DHT22** – To monitor temperature and humidity (optional)

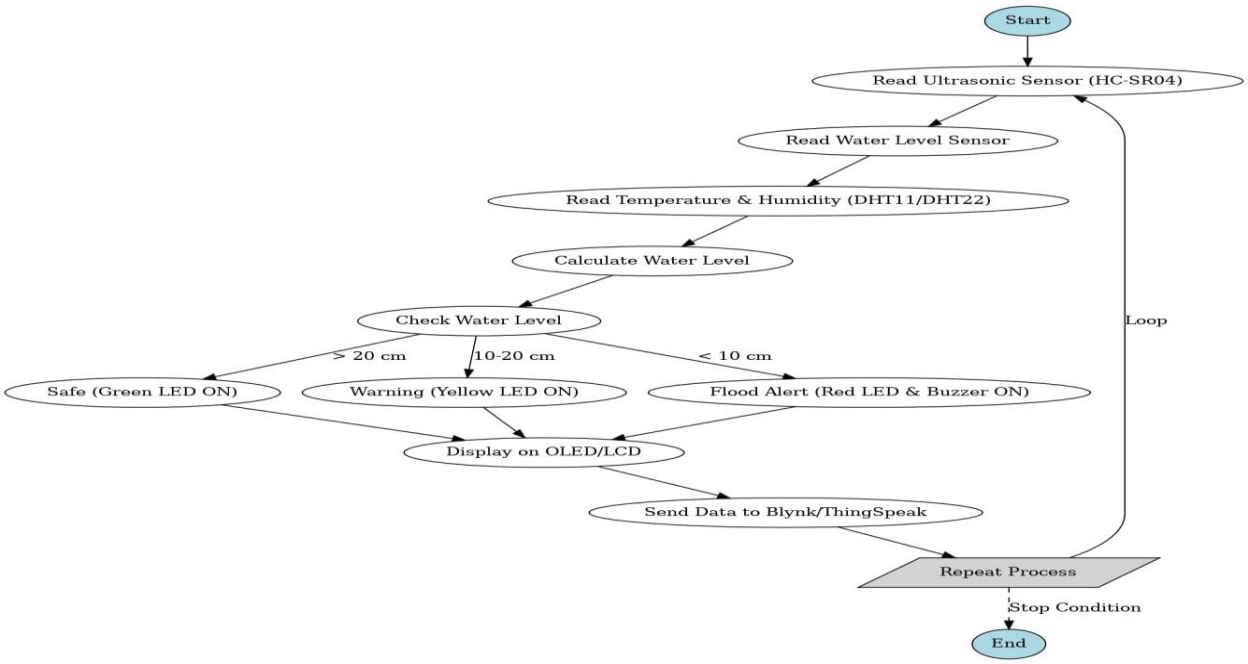
3. Communication Modules:

- **Wi-Fi (ESP32 Built-in Wi-Fi)** – To send real-time alerts.
- **Buzzer** – To provide local alarms.
- **LEDs** – To indicate flood warning levels.

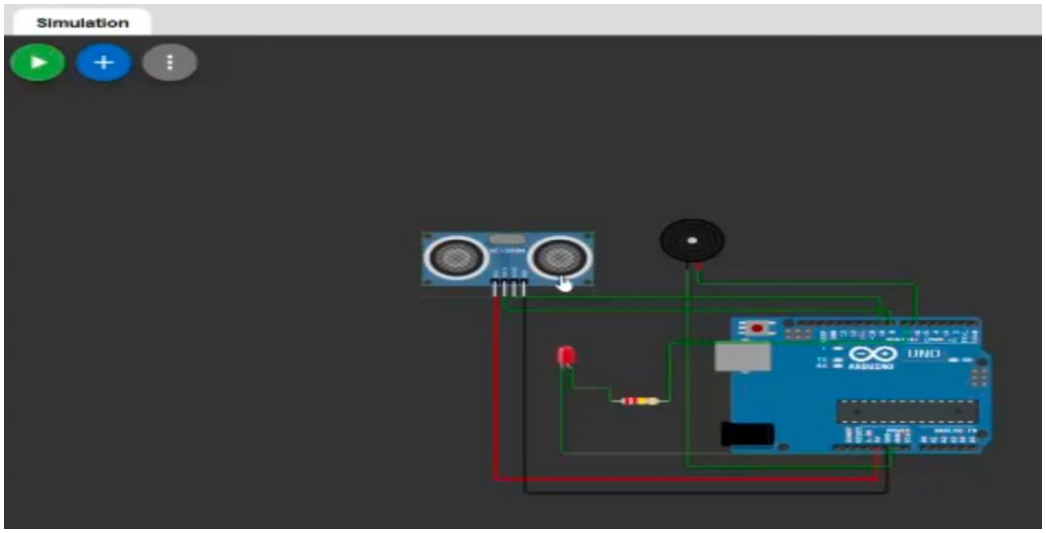
4. Display & Output:

- **OLED Display (SSD1306)** – To display water level status.
- **LCD (16x2 with I2C Module)** – Alternative for displaying flood status.
- **Cloud Platform (Blynk or ThingSpeak)** – To visualize real-time data (if required).

FLOW CHART OF CODE:



SIMLULATE CIRCUIT:



Conclusion:

The Flood Monitoring System using ESP32/Arduino Uno effectively detects and alerts about rising water levels using HC-SR04 ultrasonic sensors, water level sensors, and DHT11/DHT22 for environmental monitoring. The system provides real-time visual alerts through LEDs, buzzers, and OLED/LCD displays while also sending data to cloud platforms (Blynk/Thing Speak) for remote monitoring.

This project enhances flood preparedness by offering a low-cost, automated solution for early warning and disaster management. Future improvements could include battery backup, GSM alerts, and AI-based flood prediction models for more advanced monitoring.