IoT Based Flood Monitoring And Early Warning

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.

Things used in this project

Hardware components –

1. 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
9. Male to Female Jumper Wires- 15 pcs
10. Male to Male Jumper Wires- 10 pcs
11. Female to Female Jumper Wires- 5 pcs
12. 9v Battery and Snap Connector
13. USB Cable

Software components –

1. Arduino IDE
2. Python 3.7 IDLE
3. Bolt IoT Cloud
4. HuBolt IoT Android App
5. Twillo SMS Messaging API
6. Mailgun EMAIL Messaging APISoftware components

Hardware Setup

Step 1: Design IoT Sensor System
Identify and procure the necessary components and sensors:

Water Level Sensors:

Use ultrasonic or pressure sensors to measure water levels. They can be installed in areas prone to flooding.

Weather Sensors:

Include weather stations to monitor rainfall, temperature, humidity, and wind speed. This data is crucial for flood prediction.

Step 2:

Power Supply:

Ensure a stable power source, which may include solar panels, batteries, or a backup generator to keep the system operational during power outages.

Central Server:

Set up a central server to receive and process data from sensors. You may need to use a cloud-based solution for data storage and analysis.

GIS (Geographic Information System):

Use GIS to map and visualize flood-prone areas, which helps in planning and response efforts.

Sowtware Development:

The software setup for our project needs to,
Download and Install Arduino IDE and Python IDE

main.py: This file consists of the main coding facility. Discussed earlier it will be used to send sms and emails alerts. It will be also helpfull to keep close monitor on water level to send alerts whenever required.

Demonsration:

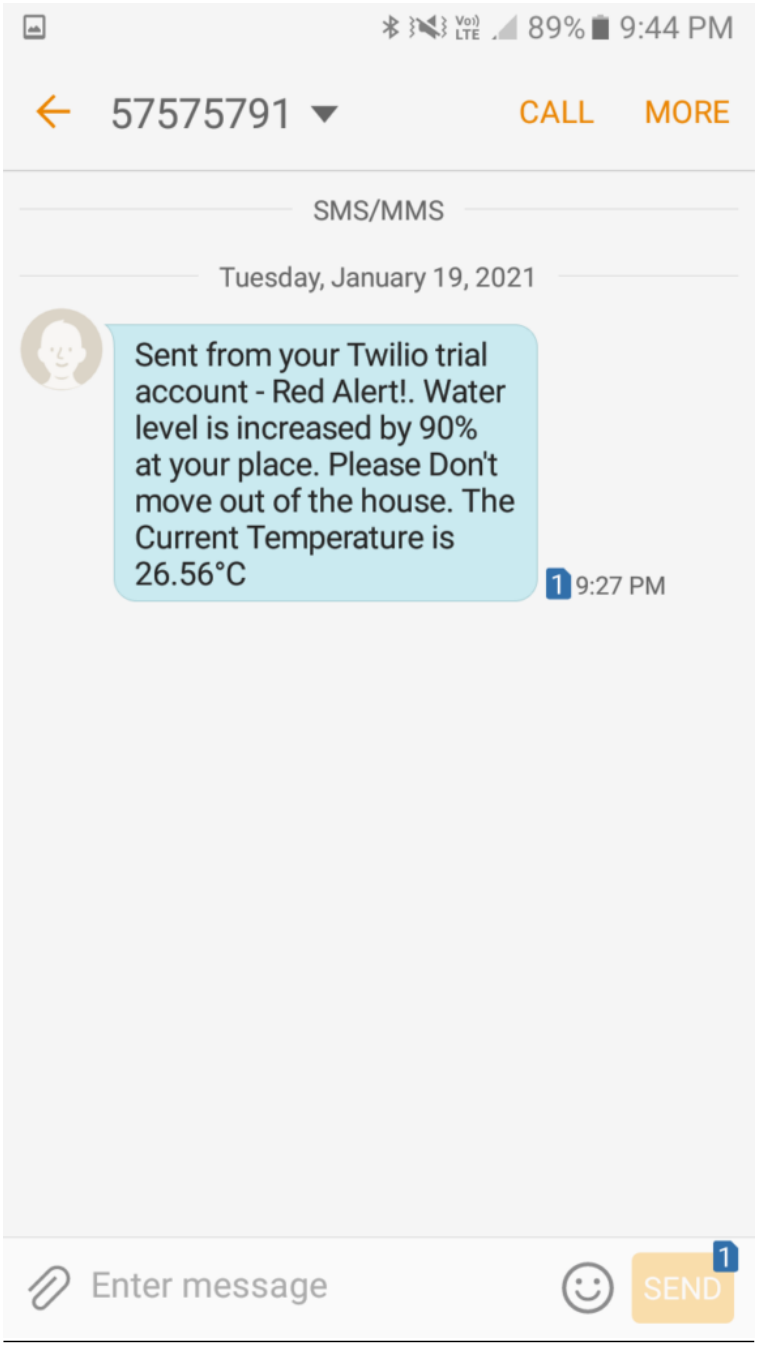
For doing the practical demonstration. First connect the USB cable type-B to the Laptop's USB slot for power supply. Also simultaneously run the python program(i.e Main.py). Firstly the ultrasonic sensor will sense the water level in distance and then the arduino program will help to convert it into percentage. Also the sensed water level will be displayed on Lcd display(In Percentage) along with zone/area the water level is present. The full water tank/container is divided into 3 zones i.e Green, Orange and Red. Now lets look into each zone.

When water level is at Min/Normal level. That resembles 'Green Alert'. This means that water is at normal position and no sign about flood condition. Also green led will glow and it will also show green alert in Lcd display with water level.

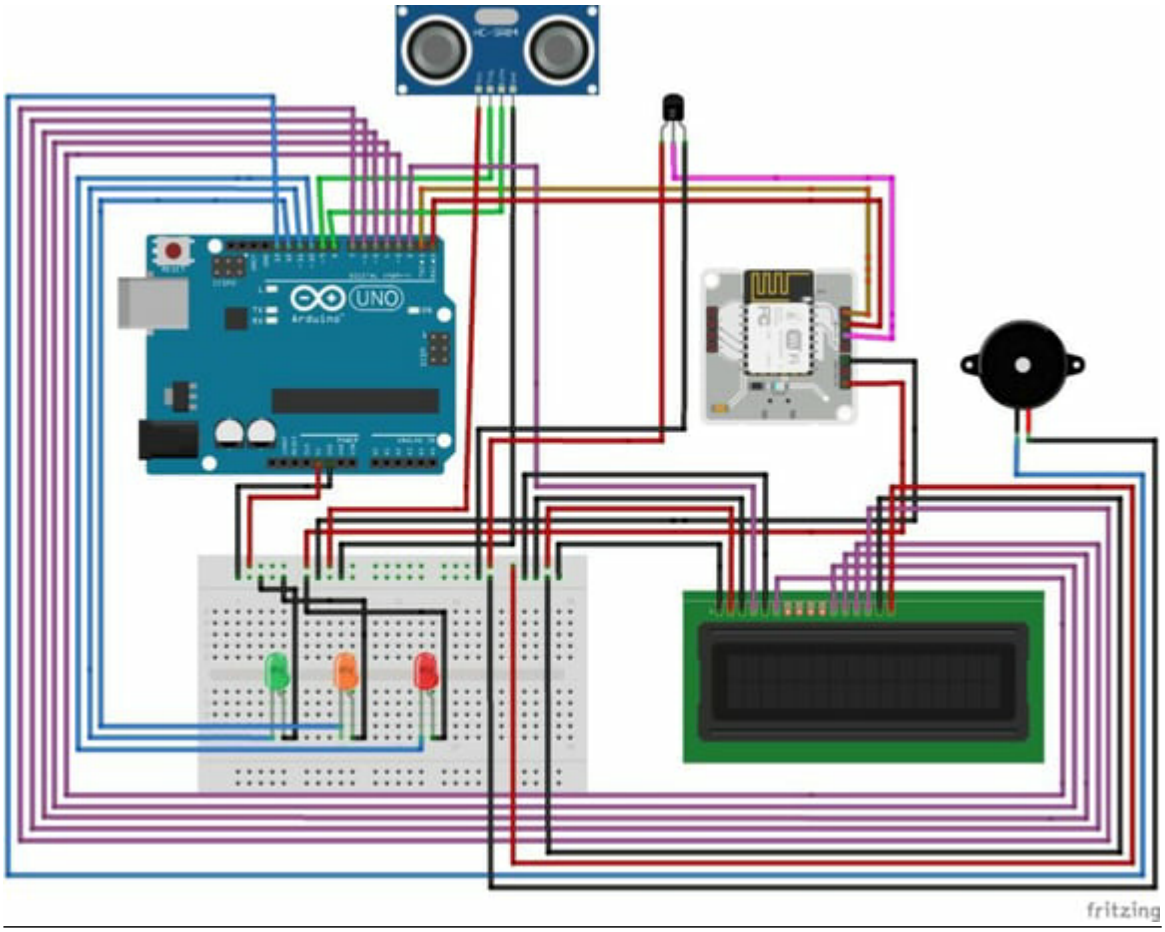
When water level crosses the Intermediate level. That resembles 'Orange Alert'. This means that water has crossed the 55% mark and there can be chances of flood condition at that place. With increase in water level the system sends Sms and Email alerts to the authority or registered user from Twillo and Mailgun Services respectively. Also orange led will glow and buzzer will buzz. It will also show orange alert in Lcd display.

When water level crosses the Max Level. That resembles 'Red Alert'. This means that water level has crossed the 80% and flood situation has occured at that place. With increase in water level the system sends Sms and Email alerts to the authority or registered user from Twillo and Mailgun Services respectively. Also red led will glow and buzzer will buzz for two times. It will also show red alert in Lcd display.
Also Sms and Email is send to registered user with proper message and current temperature of that place.

Sample Pic for message alert:



Circuit Diagram: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