// Step 1: Sensor Code for Flood Detection with MQTT and SMS Alert

// Hardware: Arduino + HC-SR04 Sensor

// Libraries required: PubSubClient for MQTT, SoftwareSerial for GSM communication

#include <PubSubClient.h>

#include <WiFi.h>

#include <SoftwareSerial.h>

#define TRIG\_PIN 9

#define ECHO\_PIN 10

#define THRESHOLD 14 // Threshold level in cm for flood alert

// WiFi credentials

const char\* ssid = "YOUR\_WIFI\_SSID";

const char\* password = "YOUR\_WIFI\_PASSWORD";

// MQTT broker details

const char\* mqtt\_server = "broker.hivemq.com";

const int mqtt\_port = 1883;

const char\* mqtt\_topic = "flood/alert";

// Phone number for SMS alert

const char\* phone\_number = "+5562985665020";

WiFiClient espClient;

PubSubClient client(espClient);

SoftwareSerial gsm(2, 3); // RX, TX for GSM module

void setup() {

pinMode(TRIG\_PIN, OUTPUT);

pinMode(ECHO\_PIN, INPUT);

Serial.begin(9600);

gsm.begin(9600);

setup\_wifi();

client.setServer(mqtt\_server, mqtt\_port);

}

void setup\_wifi() {

delay(10);

Serial.println();

Serial.print("Connecting to ");

Serial.println(ssid);

WiFi.begin(ssid, password);

while (WiFi.status() != WL\_CONNECTED) {

delay(1000);

Serial.print(".");

}

Serial.println("\nWiFi connected");

}

void send\_sms(const char\* message) {

gsm.println("AT+CMGF=1"); // Set SMS to text mode

delay(100);

gsm.print("AT+CMGS=\"");

gsm.print(phone\_number);

gsm.println("\"");

delay(100);

gsm.print(message);

delay(100);

gsm.write(26); // ASCII code for CTRL+Z

delay(1000);

Serial.println("SMS sent");

}

void loop() {

// Measure distance

digitalWrite(TRIG\_PIN, LOW);

delayMicroseconds(2);

digitalWrite(TRIG\_PIN, HIGH);

delayMicroseconds(10);

digitalWrite(TRIG\_PIN, LOW);

long duration = pulseIn(ECHO\_PIN, HIGH);

int distance = duration \* 0.034 / 2;

Serial.print("Distance: ");

Serial.print(distance);

Serial.println(" cm");

if (distance <= THRESHOLD) {

Serial.println("Flood alert! Sending MQTT and SMS...");

// Publish MQTT message

if (!client.connected()) {

reconnect\_mqtt();

}

client.publish(mqtt\_topic, "Flood detected: Water level critical");

// Send SMS alert

send\_sms("Flood alert! Water level reached 14 cm.");

}

delay(1000); // Wait 1 second before next measurement

}

void reconnect\_mqtt() {

while (!client.connected()) {

Serial.print("Attempting MQTT connection...");

if (client.connect("FloodSensorClient")) {

Serial.println("connected");

} else {

Serial.print("failed, rc=");

Serial.print(client.state());

Serial.println(" try again in 5 seconds");

delay(5000);

}

}

}