Smart water management

Phase:3

Introduction:

We are going to build an smart water management system it is generally consists of a controller, sensors, and an application to display the data. Sensors are the devices connected to the controller that are used to record the values like pH value, turbidity.

Components required:

HC-SR04 ultrasonic sensor

Raspberry Pi

Jumper wires

Buzzer

**Working process:**

**The Raspberry Pi serves as the core of this project, collecting data from the ultrasonic sensor, processing it, and facilitating communication with the cloud server and the user interface. The ultrasonic sensor provides accurate water level measurements, while the buzzer can be used to alert users to important events. This setup enables efficient and remote management of water resources.**

**Program:**

**#include <WiFi.h>**

**#include <ThingSpeak.h>**

**#define PIN\_TRIG 26**

**#define PIN\_ECHO 25**

**#define LOWLED 18**

**#define MIDLED 19**

**#define HIGHLED 21**

**#define MOTOR 27**

**unsigned int level = 0;**

**// ThingSpeak settings**

**char ssid[] = "WOKWI GUEST";**

**char password[] = "";**

**unsigned long myChannelNumber =2325279;**

**const char \* myWriteAPIKey = "1IHS30WB1QSUX6XK";**

**WiFiClient client;**

**void setup() {**

**pinMode(LOWLED, OUTPUT);**

**pinMode(MIDLED, OUTPUT);**

**pinMode(HIGHLED, OUTPUT);**

**pinMode(MOTOR, OUTPUT);**

**digitalWrite(LOWLED, HIGH);**

**digitalWrite(MIDLED, HIGH);**

**digitalWrite(HIGHLED, HIGH);**

**digitalWrite(MOTOR, LOW);**

**Serial.begin(115200);**

**pinMode(PIN\_TRIG, OUTPUT);**

**pinMode(PIN\_ECHO, INPUT);**

**// Connect to Wi-Fi**

**WiFi.begin(ssid, password);**

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

**delay(1000);**

**Serial.println("Connecting to WiFi...");**

**}**

**Serial.println("Connected to WiFi");**

**// Initialize ThingSpeak**

**ThingSpeak.begin(client);**

**}**

**void loop() {**

**// Start a new measurement:**

**digitalWrite(PIN\_TRIG, HIGH);**

**delayMicroseconds(10);**

**digitalWrite(PIN\_TRIG, LOW);**

**// Read the result:**

**int duration = pulseIn(PIN\_ECHO, HIGH);**

**Serial.print("Distance in CM: ");**

**Serial.println(duration / 58);**

**Serial.print("Distance in inches: ");**

**Serial.println(duration / 148);**

**level = (duration / 10);**

**if (level < 100) {**

**digitalWrite(LOWLED, LOW);**

**digitalWrite(MOTOR, HIGH);**

**digitalWrite(HIGHLED, HIGH);**

**digitalWrite(MIDLED, HIGH);**

**} else if ((level > 200) && (level < 400)) {**

**digitalWrite(LOWLED, HIGH);**

**digitalWrite(HIGHLED, HIGH);**

**digitalWrite(MIDLED, LOW);**

**} else if (level >= 400) {**

**digitalWrite(HIGHLED, LOW);**

**digitalWrite(MIDLED, HIGH);**

**digitalWrite(LOWLED, HIGH);**

**digitalWrite(MOTOR, LOW);**

**}**

**// Send data to ThingSpeak**

**ThingSpeak.setField(1, duration / 58); // Distance in CM**

**ThingSpeak.setField(2, duration / 148); // Distance in inches**

**int httpCode = ThingSpeak.writeFields(myChannelNumber, myWriteAPIKey);**

**if (httpCode == 200) {**

**Serial.println("Data sent to ThingSpeak successfully");**

**} else {**

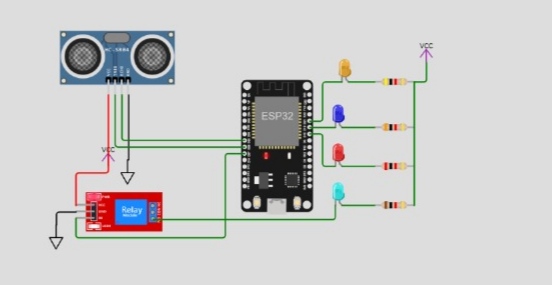
**Serial.print("Failed to send data to ThingSpeak, HTTP error code: ");**

**Serial.println(httpCode);**

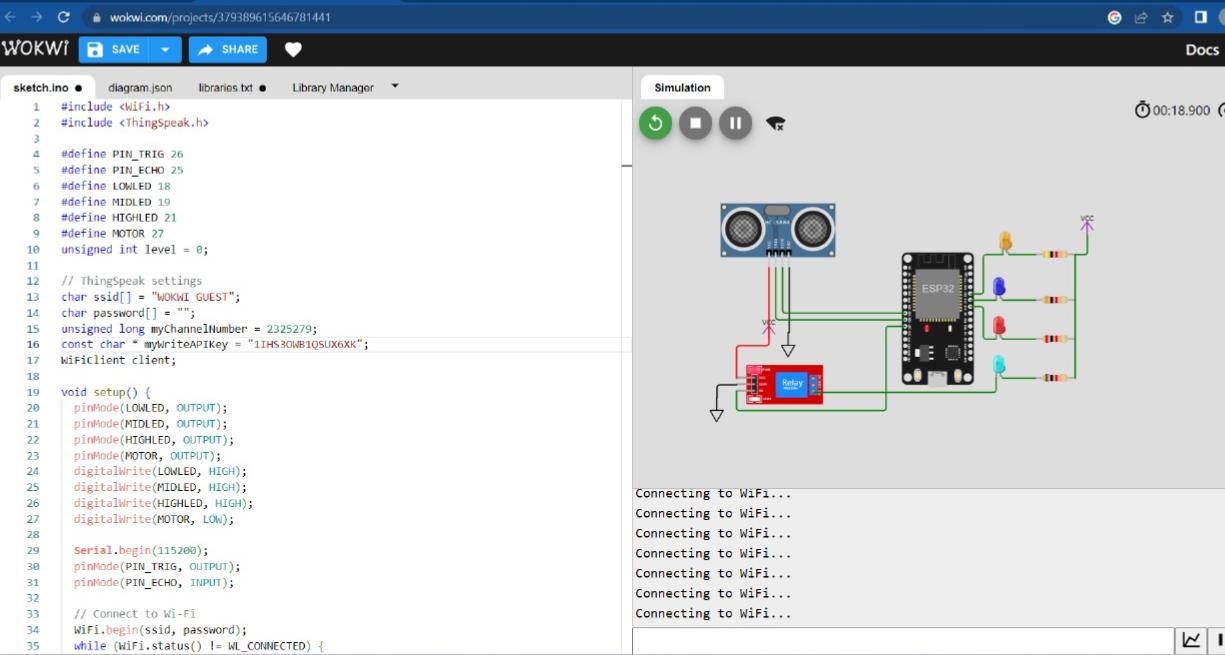
**}**

**delay(1000); // Delay before the next measurement**

**}**

**Simulation circuit** : ****

**Output:**

**In ThingSpeak:**

Application:

1.Agriculture:

Implementing sensor-based irrigation systems to optimize water usage in farming.

2. Urban Planning:

Using smart technology to monitor and manage water supply, detect leaks, and improve water distribution in cities.

3. Industrial Use :

Employing water recycling systems and smart sensors to reduce water consumption in manufacturing processes.

4. Residential Usage:

smart meters and devices to monitor and control household water consumption.

5.Environmental Conservation :

Utilizing data analytics and IoT devices to monitor water quality in lakes, rivers.

Conclusion:

Smart water management represents a pivotal solution in addressing global water challenges by leveraging technology and data-driven approaches. Through efficient monitoring, optimized consumption, and proactive conservation methods, it offers a promising pathway to ensure sustainable and responsible use of this precious resource, benefiting agriculture, urban development, industry, households, and environmental preservation. The integration of smart technologies presents a practical and necessary step towards securing a water-sustainable future for generations to come.