GOVERNMENT COLLEGE OF ENGINEERING ERODE

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B.E Electronics and Communication Engineering

SMART PLANT MONITORING BY WATER MANAGEMENT SYSTEM

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SMART PLANT MONITORING BY WATER MANAGEMENT

INTRODUCTION:

Smart plant monitoring by water management systems involves the use of advanced technologies to efficiently and effectively manage water resources for plant growth in various agricultural and horticultural settings. These systems integrate sensors and automation to optimize water usage, conserve resources, and enhance crop yield and quality.

WEB DEVELOPMENT IN WATER MANAGEMENT:

The monitoring system is developed for transmission and reception of the information received from various data sources with the use of sensors integrated with nodemcuESP8266. The wireless sensing real-time data are transmitted into desired form across the network through internet connection.
It is able to monitor concentration of soil moisture, temperature and relative humidity and stores the concentration values in the database.

✓ Data Collection: Establishing data collection systems to gather information from the sensors. This can involve IOT devices and stationary monitoring stations.

✓ Data Processing: Developing algorithms and software for data processing, water usage assurance, and real-time analysis to generate accurate need of water and moisture level assurance.

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✓ Communication: Implementing methods to transmit data to a central server or database. This may include cellular networks,Wi-Fi or other wireless communication technologies.

✓ User Interface: Creating user-friendly interfaces, such as mobile apps or web platforms, to display water level information to the domestic users or relevant authorities.

✓ Alerts and Warnings: Integrating alert systems that notify users when water level becomes insufficient and also notifies whenever it exceeds, enabling them to take appropriate precautions.

✓ Mobile Monitoring Units: Developing mobile monitoring units that can be deployed to specific locations or events to assess monitoring levels in real time.

✓ Mobile Apps and Wearables: The development of mobile apps and wearable devices equipped with plant monitoring sensors provide individuals with real-time data on the water level needs for the plant monitoring.

✓ Historical Data Analysis: Historical water quality data can provide valuable insights into long-term trends and the effectiveness of past interventions. Analysing this data can inform future policy decisions and environmental planning.

CODE IMPLEMENTATION:

```
//Include the library files
#define BLYNK_TEMPLATE_ID "TMPL3RpinReNQ"
#define BLYNK_TEMPLATE_NAME "smart plant monitoring"
#define BLYNK_AUTH_TOKEN "n_U0uPZSqA2_tr9C-ZfWBK7HDn6c0zch"
#include <LiquidCrystal_I2C.h>
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include <DHT.h>

//Initialize the LCD display
LiquidCrystal_I2C lcd(0x3F, 16, 2);
#define FIREBASE_HOST "https://water-iot-3-default-rtdb.firebaseio.com/"
#define FIREBASE_AUTH "T0gvmm1NVBnVDR4kh6RQhTlcXPkE1q1IDlCijV05"
char auth[] = "n_U0uPZSqA2_tr9C-ZfWBK7HDn6c0zch";  //Enter your Blynk Auth token
char ssid[] = "Redmi 9 Prime";  //Enter your WIFI SSID
char pass[] = "subi2423";  //Enter your WIFI Password

DHT dht(D4, DHT11);//(DHT sensor pin,sensor type)  D4 DHT11 Temperature Sensor
BlynkTimer timer;

//Define component pins
#define soil A0     //A0 Soil Moisture Sensor
#define PIR D5      //D5 PIR Motion Sensor
int PIR_ToggleValue;

void checkPhysicalButton();
```

```
int relay1State = LOW;
int pushButton1State = HIGH;
#define RELAY_PIN_1       D3   //D3 Relay
#define PUSH_BUTTON_1     D7   //D7 Button
#define VPIN_BUTTON_1    V12

//Create three variables for pressure
double T, P;
char status;



void setup() {
  Serial.begin(9600);
  lcd.begin();
  lcd.backlight();
  pinMode(PIR, INPUT);

  pinMode(RELAY_PIN_1, OUTPUT);
  pinMode(PUSH_BUTTON_1, INPUT_PULLUP);
  digitalWrite(RELAY_PIN_1, relay1State);
  Blynk.begin(auth, ssid, pass, "blynk.cloud", 80);
  dht.begin();

  lcd.setCursor(0, 0);
  lcd.print(" Initializing ");
  for (int a = 5; a <= 10; a++) {
    lcd.setCursor(a, 1);
    lcd.print(".");
    delay(500);
  }
  lcd.clear();
  lcd.setCursor(11, 1);
  lcd.print("W:OFF");
  //Call the function
  timer.setInterval(100L, soilMoistureSensor);
  timer.setInterval(100L, DHT11sensor);
  timer.setInterval(500L, checkPhysicalButton);
}
```

```
//Get the DHT11 sensor values
void DHT11sensor() {
  float h = dht.readHumidity();
  float t = dht.readTemperature();

  if (isnan(h) || isnan(t)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }
  Blynk.virtualWrite(V0, t);
  Blynk.virtualWrite(V1, h);

  lcd.setCursor(0, 0);
  lcd.print("T:");
  lcd.print(t);

  lcd.setCursor(8, 0);
  lcd.print("H:");
  lcd.print(h);

}

//Get the soil moisture values
void soilMoistureSensor() {
  int value = analogRead(soil);
  value = map(value, 0, 1024, 0, 100);
  value = (value - 100) * -1;
  if(value < 40){
    digitalWrite(RELAY_PIN_1,LOW);
  }
  else if(value >= 80){
    digitalWrite(RELAY_PIN_1,HIGH);
  }

  Blynk.virtualWrite(V3, value);
  lcd.setCursor(0, 1);
  lcd.print("S:");
  lcd.print(value);
  lcd.print(" ");

}
```

```
//Get the PIR sensor values
void PIRsensor() {
  bool value2 = digitalRead(PIR);
  if (value2) {
    Blynk.logEvent("PIRMOTION","WARNING!  Motion  Detected!");  //Enter
your Event Name
    WidgetLED LED(V5);
    LED.on();
  } else {
    WidgetLED LED(V5);
    LED.off();
  }
  }

BLYNK_WRITE(V6)
{
 PIR_ToggleValue = param.asInt();
}


BLYNK_CONNECTED() {
  // Request the latest state from the server
  Blynk.syncVirtual(VPIN_BUTTON_1);
}

BLYNK_WRITE(VPIN_BUTTON_1) {
  relay1State = param.asInt();
  digitalWrite(RELAY_PIN_1, relay1State);
}

void checkPhysicalButton()
{
  if (digitalRead(PUSH_BUTTON_1) == LOW) {
    // pushButton1State is used to avoid sequential toggles
    if (pushButton1State != LOW) {

      // Toggle Relay state
      relay1State = !relay1State;
      digitalWrite(RELAY_PIN_1, relay1State);
```

```
      // Update Button Widget
      Blynk.virtualWrite(VPIN_BUTTON_1, relay1State);
    }
    pushButton1State = LOW;
  } else {
    pushButton1State = HIGH;
  }
}


void loop() {
    if (PIR_ToggleValue == 1)
    {
    lcd.setCursor(5, 1);
    lcd.print("M:ON ");
      PIRsensor();
      }
     else
     {
    lcd.setCursor(5, 1);
    lcd.print("M:OFF");
    WidgetLED LED(V5);
    LED.off();
     }

if (relay1State == HIGH)
{
  lcd.setCursor(11, 1);
  lcd.print("W:ON ");
  }
  else if (relay1State == LOW)
  {
    lcd.setCursor(11, 1);
    lcd.print("W:OFF");
   }


  Blynk.run();//Run the Blynk library
  timer.run();//Run the Blynk timer

  }
```

CONCLUSION:

Wifi, Apps and online sites are included to monitor the quality of water which are measured by the Smart Water Management system installed in the appropriate geographical area to monitor the quality of water. It will be helpful for peoples to know about the Quality of water, they are using for irrigation. It should be mainly installed in areas surrounded by farming lands even in home gardening to often check the water quality to avoid severe consequences.