SRM Institute of Science and Technology
College of Engineering and Technology

+SCHOOL OF COMPUTING

MINI PROJECT REPORT

ODD Semester:2024-2025

Lab code & Sub Name   : 21CSS201T & Computer Organization and Architecture

Year & Semester   : II & III

Project Title   : Soil Moisture Monitoring System

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Particulars	Max. Marks	Marks Obtained	
		Name:	
		Register No:	
Review 1 and 2	05		
Demo verification &viva	03		
Project Report	02		
Total	**10**		

Date   :

Staff Name   :

Signature   :

Soil Moisture Monitoring System

Introduction

A Soil Moisture Monitoring System is a technological solution used to track the amount of moisture in the soil. This system is particularly useful in agriculture, gardening, landscaping, and environmental monitoring. The main goal is to optimize water usage by determining the appropriate times for irrigation based on real-time data, thus improving water conservation and plant health.

Components

The key components of a soil moisture monitoring system are:

1. Soil Moisture Sensor: This device measures the volumetric water content in the soil.

2. Microcontroller: A processing unit (e.g., Arduino,) that collects data from the sensor and processes it.

3. Power Source: The system may require a battery, solar panels, or a direct connection to a power source.

4. Communication Module: This component enables remote monitoring by transmitting data to a smartphone or computer

5. Data Display/Storage: Data can be displayed on Laptop

Working Principle

The soil moisture sensor detects the amount of water in the soil by measuring its dielectric constant, which varies with moisture levels. When the sensor detects a low moisture level, the system can trigger alerts or activate irrigation systems. The collected data can be transmitted to a central monitoring unit, where users can observe trends and make informed decisions regarding irrigation schedules.

Benefits

1. Water Conservation: Helps in efficient water usage, reducing wastage.

2. Increased Crop Yield: Ensures plants receive optimal water for growth.

3. Automation: Can be integrated with automated irrigation systems for a hands-free solution.

4. Cost-Effective: Reduces labor and water costs.

5. Environmentally Friendly: Promotes sustainable farming practices.

Applications

Agriculture: For large-scale farming, to optimize irrigation.

Gardening: Helps maintain optimal moisture levels in small home gardens.

Environmental Monitoring: For monitoring soil conditions in forests or nature reserves.

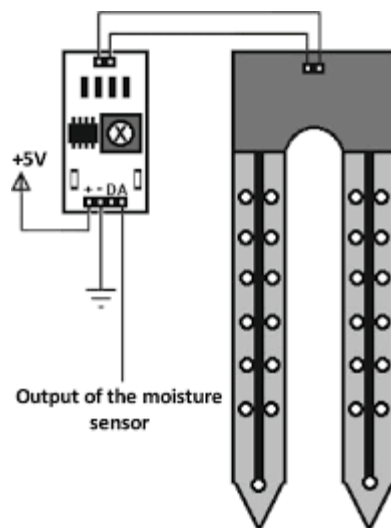Greenhouses: To ensure crops receive the right amount of water.

Challenges

Sensor Accuracy: Soil type and environmental conditions can affect sensor accuracy.

Cost of Installation: Initial costs can be high for a fully automated system.

Maintenance: Sensors and communication devices may require periodic maintenance or replacement.

DIAGRAM

PROGRAM

```
int sensor_pin = A0;

void setup()
{
  Serial.begin(9600);
  pinMode(sensor_pin, INPUT);
}

void loop()
{
  int sensor_data = analogRead(sensor_pin);
//  Serial.print("Sensor_data:");
//  Serial.print(sensor_data);
  Serial.print("\t ");
  float moisture_percentage;
  int sensor_analog;
  sensor_analog = analogRead(sensor_pin);
  moisture_percentage = ( 100 - ( (sensor_analog/1023.00) * 100 ) );


  if(sensor_data > 950)
  {
```
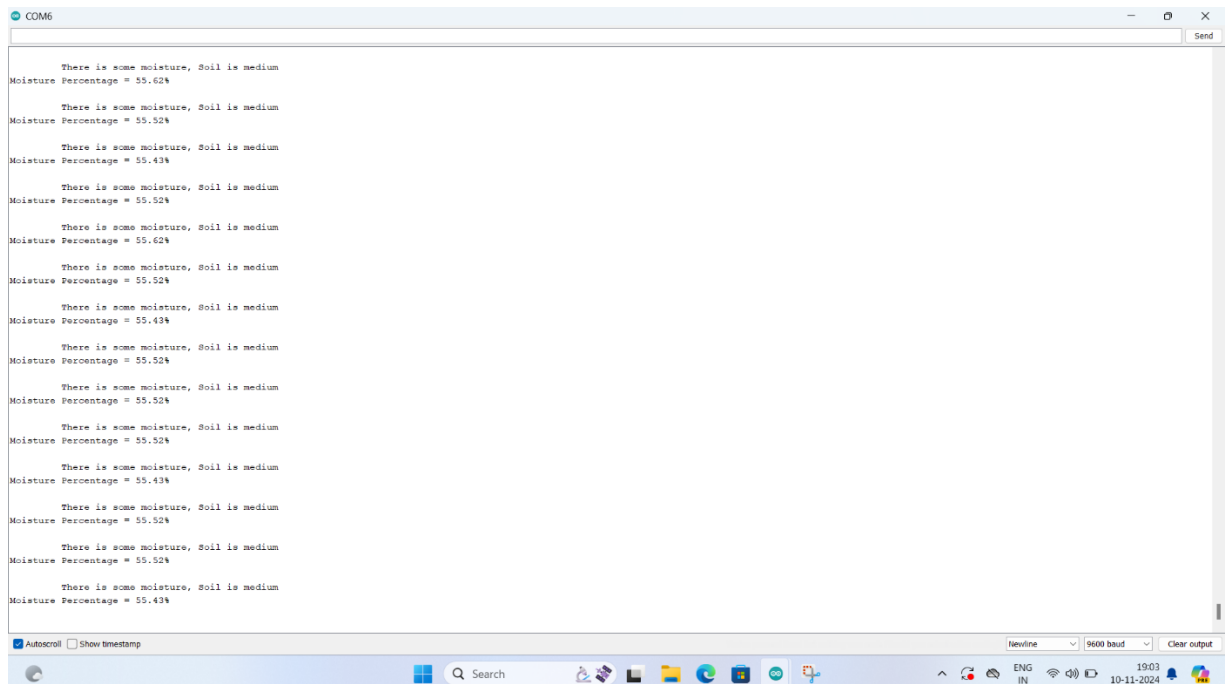
```
      Serial.println("No moisture, Soil is dry");
      Serial.print("Moisture Percentage = ");
      Serial.print(moisture_percentage);
      Serial.print("%\n\n");
  }
  else if(sensor_data >= 400 && sensor_data <= 950)
  {
    Serial.println("There is some moisture, Soil is medium");
      Serial.print("Moisture Percentage = ");
      Serial.print(moisture_percentage);
      Serial.print("%\n\n");
  }
  else if(sensor_data < 400)
  {
    Serial.println("Soil is wet");
      Serial.print("Moisture Percentage = ");
      Serial.print(moisture_percentage);
      Serial.print("%\n\n");
  }

  delay(300);
}
```

OUTPUT

Conclusion

The Soil Moisture Monitoring System is an essential tool for modern agriculture and gardening. It helps in maintaining an efficient irrigation system, reduces water wastage, and enhances plant health and crop yield. As technology advances, these systems are becoming more affordable, reliable, and user-friendly.

This report can be expanded further depending on specific use cases, technical details, or additional features of the system you're working with. Let me know if you'd like a more detailed or customized version.