National Institute of Technology Agartala

INDUSTRIAL INSTRUMENTATION PROJECT

3RD YEAR PROJECT WORK

(ELECTRONICS AND INSTRUMENTATION ENGINEERING)

PROJECT NAME : Moisture & Air Quality sensor system implemented with Arduino UNO.

Meet The Group

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Objective: To determine the moisture content in the soil and air quality index of atmosphere:-

This abstract presents system consisting of moisture & air quality sensor implemented with Arduino UNO, designed to monitor and manage the soil moisture levels and air quality for optimal plant growth. This system integrates a capacitive moisture sensor and a air quality detector(MQ135) with an Arduino UNO microcontroller, allowing real-time measurement. The Arduino reads analog signals from the sensor, converts them to digital data, and processes the information to determine the moisture & air quality levels. The obtained data is then used to determine the excess water the soil requires, ensuring that plants receive the appropriate amount of water, proper atmosphere and soil containing moisture appropriate for the plant sapling/seed.

Uses:

1. Sustainable and efficient agricultural practices: The project aims to create an efficient and automated solution for maintaining soil moisture, contributing to sustainable and efficient agricultural practices.

2. Monitoring soil moisture levels: This project involves the design and implementation of a moisture sensor system for monitoring moisture level of the soil using an soil moisture sensor.

The Soil Moisture Sensor uses capacitance to measure dielectric permittivity of the surrounding medium. In soil, dielectric permittivity is a function of the water content. The sensor creates a voltage proportional to the dielectric permittivity, and therefore the water content of the soil

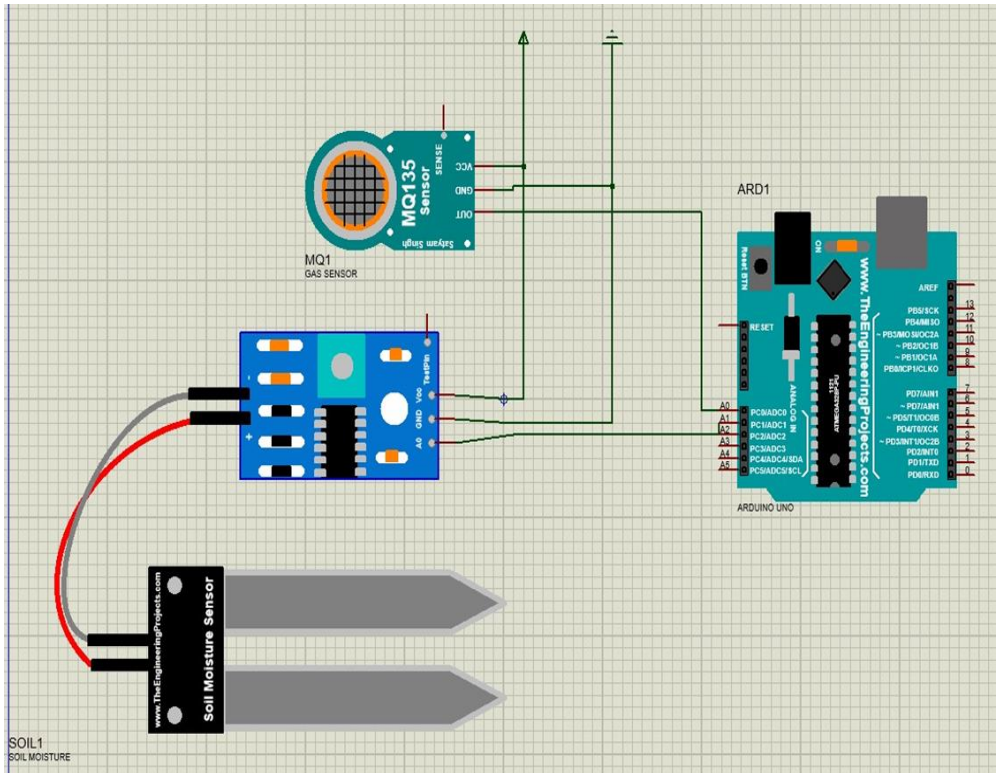
3. Air Quality Measurement:

This project focuses on the development and implementation of an air quality measurement sensor system for soil analysis using an Arduino microcontroller. The sensor employs advanced detection mechanisms to assess key air quality parameters such as volatile organic compounds (VOCs), gases, and particulate matter in the soil environment. The Arduino platform facilitates seamless integration with the sensor, enabling real-time data collection, processing, and visualization.

Components Used:

1. Arduino UNO
2. MQ 135 sensor
3. Soil Moisture Sensor
4. Soil Moisture Electrodes
5. Connecting Wires

Circuit Diagram:



Code:

```
int air_quality_sensor_pin = A0;
int soil_moisture_sensor_pin = A1;

void setup() {
  Serial.begin(9600);
  pinMode(air_quality_sensor_pin, INPUT);
  pinMode(soil_moisture_sensor_pin, INPUT);
}
void loop() {
  // Reading air quality sensor data
  int air_quality_sensor_data = analogRead(air_quality_sensor_pin);
  Serial.print("Air Quaality Sensor Data: ");
  Serial.println(air_quality_sensor_data);
  // Reading soil moisture sensor data
  int soil_moisture_data = analogRead(soil_moisture_sensor_pin);
  Serial.print("Soil Moisture Sensor Data: ");
  Serial.println(soil_moisture_data);
  // Analyzing Air quality sensor data (example thresholds)
  if (air_quality_sensor_data > 800) {
    Serial.println("Bad Air Quality!");
  } else if (air_quality_sensor_data >= 500 && air_quality_sensor_data <=
800) {
    Serial.println("Minimal Air Quality");
  } else {
    Serial.println("Best Air Quality");
  }
  // Analyzing soil moisture data (example thresholds)
  if (soil_moisture_data > 950) {
    Serial.println("No moisture, Soil is dry");
  } else if (soil_moisture_data >= 400 && soil_moisture_data <= 950) {
    Serial.println("There is some moisture, Soil is medium");
  } else {
    Serial.println("Soil is wet");
  }
delay(2000); // Delay for 2 second between readings
}
```