

IoT MINI PROJECT CODE

ARDUINO CODE:

```
const int moistureSensorPin = A0;

const int relayPin = 7;

int sandyThreshold = 500;

int loamyThreshold = 400;

int clayeyThreshold = 300;

int selectedThreshold = 400;

bool pumpOn = false;

String soilType = "Unknown";

void setup() {

  Serial.begin(9600);

  pinMode(moistureSensorPin, INPUT);

  pinMode(relayPin, OUTPUT);

  digitalWrite(relayPin, HIGH);

  delay(2000);

  int initialMoisture = analogRead(moistureSensorPin);

  Serial.print("Initial Soil Moisture: ");

  Serial.println(initialMoisture);

  if (initialMoisture < 350) {

    soilType = "Clayey";

    selectedThreshold = clayeyThreshold;

  } else if (initialMoisture >= 350 && initialMoisture <= 450) {
```

```
    soilType = "Loamy";

    selectedThreshold = loamyThreshold;

} else {

    soilType = "Sandy";

    selectedThreshold = sandyThreshold;

}

Serial.print("Detected Soil Type: ");

Serial.println(soilType);

Serial.print("Using Threshold: ");

Serial.println(selectedThreshold);

}

void loop() {

    int moisture = analogRead(moistureSensorPin);

    Serial.print("Moisture: ");

    Serial.println(moisture);

    if (moisture < selectedThreshold && !pumpOn) {

        digitalWrite(relayPin, LOW);

        pumpOn = true;

        Serial.println("Pump ON - Soil is dry");

    }

    else if (moisture >= selectedThreshold && pumpOn) {

        digitalWrite(relayPin, HIGH);

        pumpOn = false;

        Serial.println("Pump OFF - Soil is wet");

    }

}
```

```
}  
  
delay(1000);  
  
}
```

PYTHON (FLASK) CODE:

```
import serial  
  
import matplotlib.pyplot as plt  
  
from matplotlib.animation import FuncAnimation  
  
SERIAL_PORT = 'COM5'  
  
BAUD_RATE = 9600  
  
ser = serial.Serial(SERIAL_PORT, BAUD_RATE)  
  
moisture_values = []  
  
time_stamps = []  
  
plt.style.use('ggplot')  
  
fig, ax = plt.subplots()  
  
x_data, y_data = [], []  
  
pump_status = ""  
  
threshold = 500  
  
def animate(i):  
  
    global pump_status  
  
    if ser.in_waiting:  
  
        try:  
  
            line = ser.readline().decode('utf-8').strip()  
  
            value = int(line)
```

```

moisture_values.append(value)

time_stamps.append(len(moisture_values))

x_data.append(len(x_data))

y_data.append(value)

# Determine pump status

pump_status = "ON (Soil is dry)" if value < threshold else "OFF (Soil is wet)"

ax.clear()

ax.plot(x_data[-50:], y_data[-50:], label='Soil Moisture')

ax.set_ylim(0, 1023)

ax.set_xlabel("Time")

ax.set_ylabel("Moisture Level")

ax.set_title("Smart Gardening: Live Soil Moisture Monitor")

ax.legend()

ax.text(0.02, 0.95, f"Moisture: {value}", transform=ax.transAxes, fontsize=12)

ax.text(0.02, 0.90, f"Pump Status: {pump_status}", transform=ax.transAxes,
        fontsize=12, color='blue')

except:

    pass

ani = FuncAnimation(fig, animate, interval=1000)

plt.tight_layout()

plt.show()

```