Smart Plant Monitoring System

(IoT-Based Automated Terrarium Project)

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Project Overview

This IoT-based Smart Plant monitoring system project monitors and manages environmental conditions inside a plant pod using multiple sensors.

It automates lighting, humidity control, and alerts for soil dryness, ensuring an optimal environment for plant growth.

Hardware Components Used

Component	Description
DHT11 Sensor	Measures temperature and humidity inside the pod.
LDR (Light Dependent Resistor)	Detects ambient light levels to control lighting.
Soil Moisture Sensor	Detects moisture levels in the soil to prevent under-watering.
Relay Modules (2x)	Used to switch high-power components (light and humidifier) based on sensor data.
Humidifier	Adds moisture to the air when humidity is low.
Buzzer	Alerts the user when soil moisture is too low.
9V Batteries (2x)	Power supply for the system.
Arduino UNO	Processes sensor data and controls outputs.

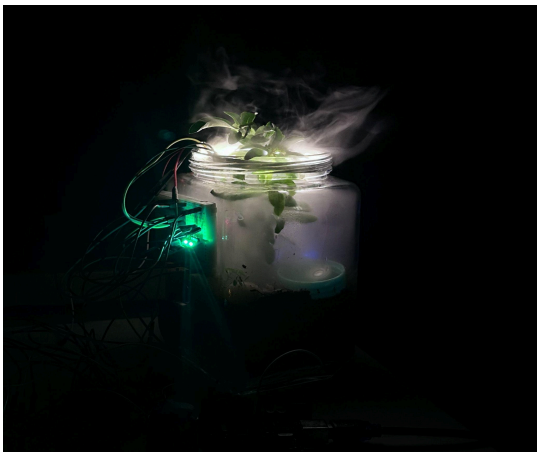
System Functionality

1. Light Control using LDR Sensor

- Condition: Absence of ambient light.
- Action: Turns on internal pod light using a relay module.

2. Humidity Control using DHT11 Sensor

- Condition: Humidity falls below a predefined threshold.
- Action: Activates the humidifier via relay to maintain suitable humidity.



3. Soil Moisture Monitoring

- Condition: Soil moisture level is too low.
- Action: Buzzer is activated to alert the user to water the plant.

Code

```
#include <DHT.h>

#define DHT_PIN 4
#define RELAY_PIN 11
#define RELAY_PIN2 13
#define moisture A3
#define buzzer 9



DHT dht(DHT_PIN, DHT11);

void setup() {
  Serial.begin(9600);
  dht.begin();
  pinMode(RELAY_PIN, OUTPUT);
  pinMode(RELAY_PIN2,OUTPUT);
}

void loop() {
  float humidity = dht.readHumidity();
  float temperature = dht.readTemperature();

  if (isnan(humidity) || isnan(temperature)) {
    Serial.println("Error reading DHT sensor");
    return;
  }

  int ldr = analogRead(A0);
  Serial.print("Light: ");
  Serial.println(ldr);

  if(ldr<300){
    digitalWrite(RELAY_PIN2, LOW);
  } else {
    digitalWrite(RELAY_PIN2, HIGH);
  }

  int moist = analogRead(A3);
```

```
  Serial.print("Moisture: ");
  Serial.println(moist);
  if (moist>300){
   digitalWrite(buzzer,HIGH);
  }
  else{
    digitalWrite(buzzer,LOW);
  }

  Serial.print("Humidity: ");
  Serial.print(humidity);
  Serial.print("%  ");
  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.println("°C");

  if (humidity < 65) {
    digitalWrite(RELAY_PIN, HIGH);
  } else {
    digitalWrite(RELAY_PIN, LOW);
  }


  delay(2000);
}
```

Applications

- Smart terrariums and greenhouses
- Indoor plant monitoring systems
- Automated agriculture

Demo Video Link