SMART FARMING

Faculty : Zia Abbas

TA : Muskan Raina

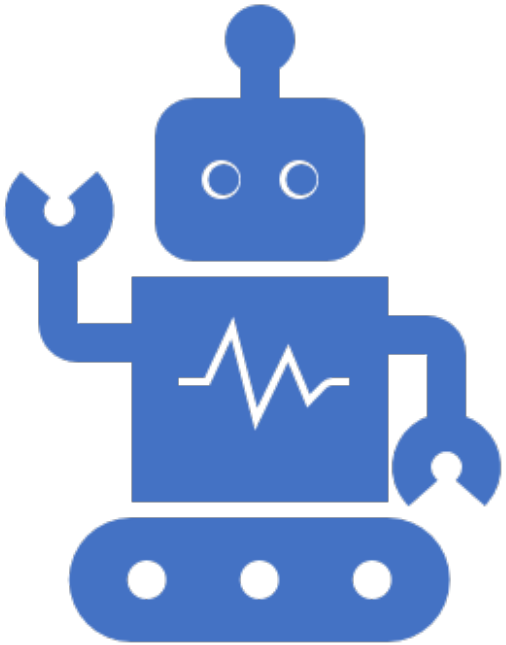
Team No:28 (Aakashavani)

Team Members:

- Dileep – 2022101007
- Revanth – 2022101049
- Bharath – 2022101044
- Karthikeya - 2022101059

Individual Contributions:

- MQTT & webpage –Dileepkumar Adari
- Soil Moisture & Sensor integration – Revanth Reddy
- DHT Sensor & data collection – Gajawada Bharath
- LDR Sensor & ppt – Chaganti Karthikeya



Motivation

The Future of Agriculture

- Smart farming, the fusion of traditional agriculture with cutting-edge IoT technology, represents the future of agriculture.

Quality and Efficiency

- Its primary objective is to enhance the quality of agricultural products while minimizing human intervention.

Addressing Farmer Challenges

- In response to the challenges faced by farmers today, we are dedicated to improving agricultural quality and quantity through intelligence calling it "smart farming".

Data-Driven Agriculture

- IoT technology, driven by data, empowers farmers with comprehensive crop monitoring capabilities.

Precision Farming

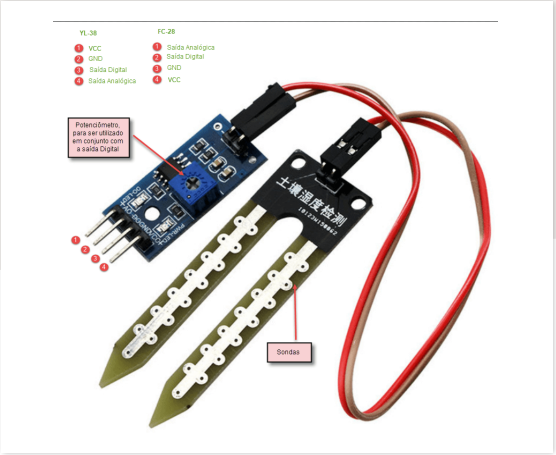
- Smart farming tracks every aspect of crop production, issuing real-time alerts regarding crop health, soil conditions, and temperature requirements, accessible through interconnected smart devices.

Progress made so far

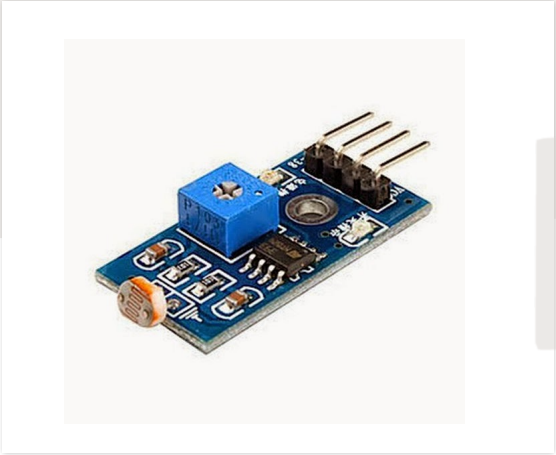
- Testing Sensors.
- Integrating The Sensors.
- Sending Data To The Server.
- Basic Web Design.

TESTING OF SENSORS

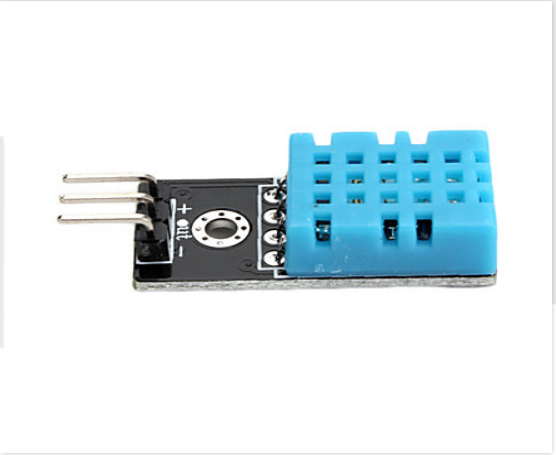
SGP30



Soil Moisture Sensor



LDR Sensor Module



DHT 11

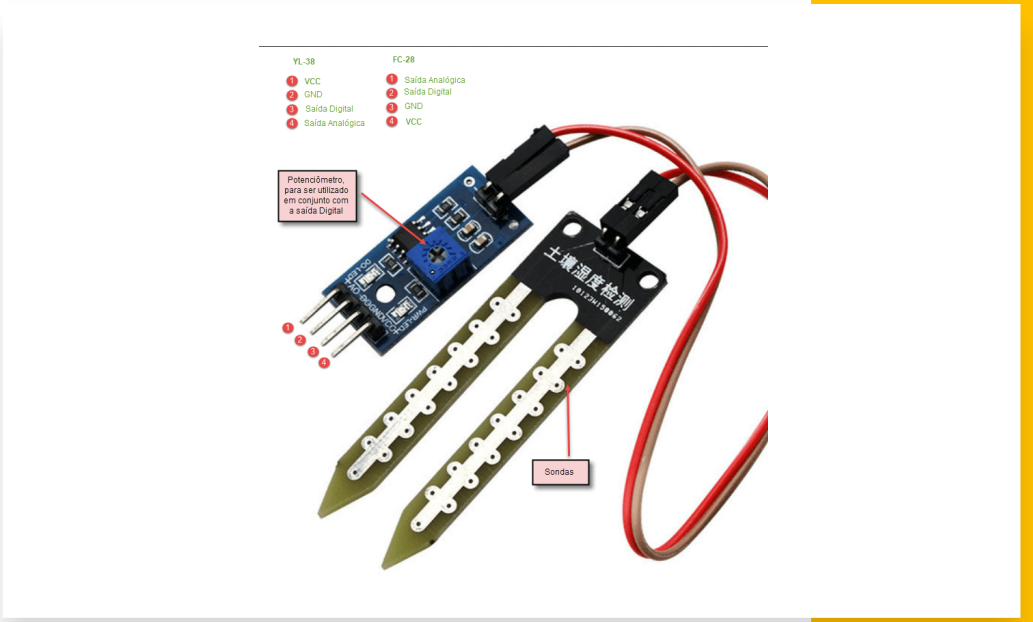
Soil Moisture Sensor

Working Principle:

- The Soil Moisture Sensor measures soil water content by assessing dielectric permittivity, which varies with moisture. It generates a voltage reflecting this permittivity, providing a water content reading.

Use Of Soil Moisture Sensor:

- To measure the soil moisture of the plant at any instance of time
- When the soil moisture reading is less than threshold value an alert is sent to the user.



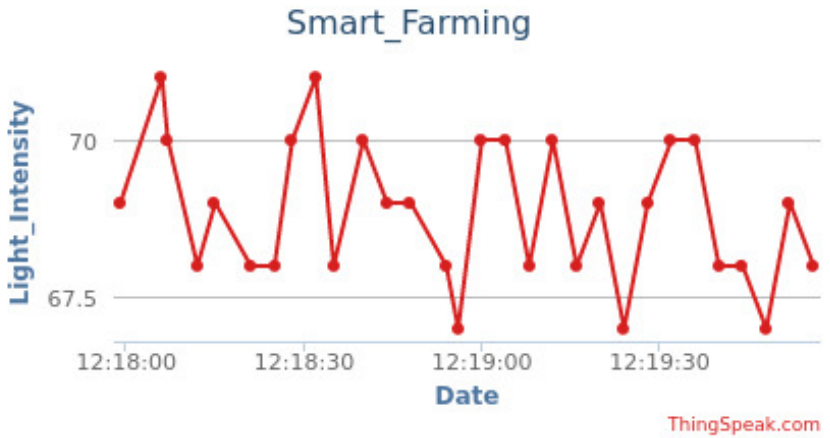
LDR Sensor

Working Principle:

- An LDR (Light Dependent Resistor) works by changing its electrical resistance in response to the amount of light it receives. More light leads to lower resistance, while less light results in higher resistance. This property allows LDRs to detect and measure variations in light levels.

Use Of LDR Sensor:

- To measure the intensity of light upon the plant at any instance of time.
- When the reading is outside the range, an alert is sent to the user.



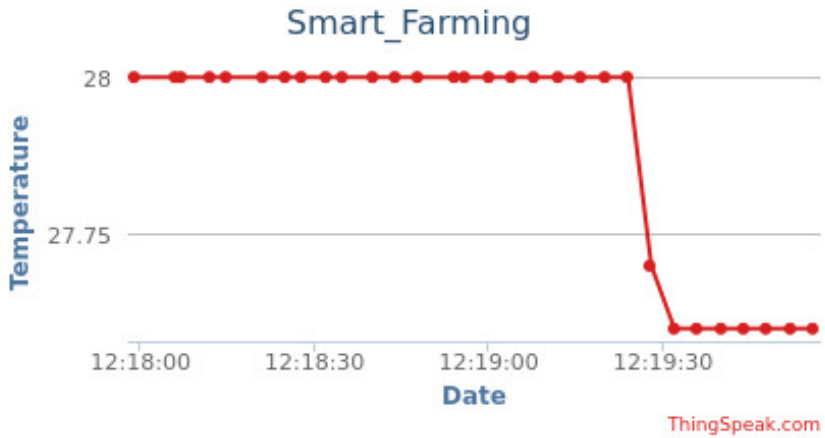
DHT 11 Sensor

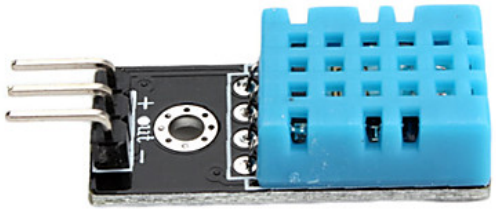
Working Principle:

- The DHT11 is a temperature and humidity sensor that operates by measuring changes in resistance of a humidity-sensitive element(polymer) and built in thermistor in response to temperature and humidity variations. It converts these changes into digital signals for microcontrollers to read.

Use Of DHT11 Sensor:

- To measure the Temperature and humidity in the plant's surroundings at any instance of time
- When the reading is outside the range, an alert is sent to the user.





Integrating the Sensors & Sending Data to the Server

- **Sensor Integration:** We have integrated the DHT11, LDR, and soil moisture sensor into our project using a ESP32. Each sensor is connected to the ESP32 through appropriate interfaces, and we have written code to read data from these sensors.
- **Data Processing:** Once we collect data from the sensors, we process it on the ESP32 to ensure accuracy and consistency. This involve calibration or filtering to remove noise from the sensor readings. We then store this processed data in variables or data structures within the microcontroller's memory.
- **Sending Data to Server:** To transmit the sensor data to a server, we use Wi-Fi to establish a connection to the server using MQTT and then send the data to Thingspeak. On the server side, we have a program or script that listens for incoming data and stores it in a database and is presented in graphs to perform real-time analysis.

Basic Web Design

GREEN PLANT

Type to search...

NAVIGATION

- Home
- Statistics
- Analysis
- Circuit
- History
- Alerts
- About
- Settings

Dashboard

Home / Dashboa

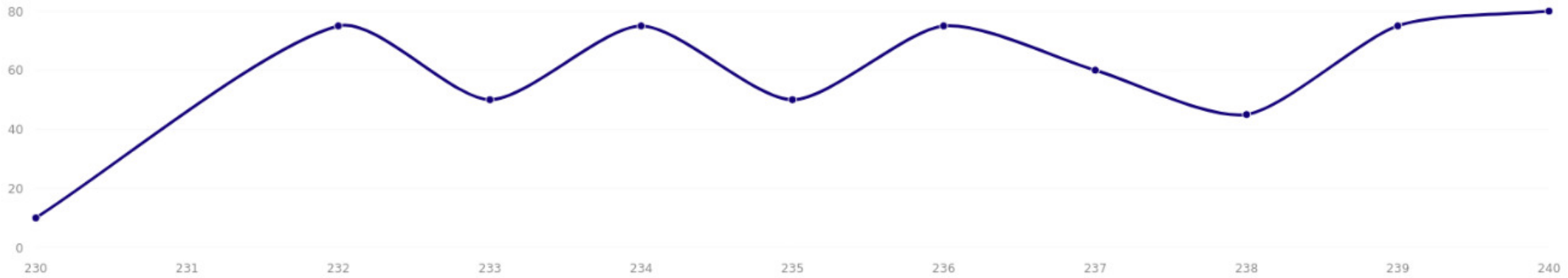
Humidity	Temperature	Light Intensity	Soil Moisture
None	27.60	68.00	61

179

Carbondioxide

3% higher than the average

Volatile Organic Compund (for last 10 minutes)



Future Scope Of Our Project

As we move towards the project's completion, there are several important developments and outcomes that you can expect, including:

- **User Interface Design**: Creation of an intuitive and user-friendly interface for effective data visualization and seamless control of the system, enhancing the user experience.
- **Alert Mechanism**: Development of a robust alert mechanism to promptly notify users of unfavorable environmental conditions, ensuring the timely response to protect plant health.
- **Working on VOC Sensor.**

CHALLENGES

- **Power Supply and Energy Efficiency:** Power management is critical when working with sensors for extended periods, especially in remote or outdoor environments. We need to design power-efficient circuits and possibly explore energy harvesting techniques to extend the project's runtime without frequent battery replacements.
- **Sensor Calibration and Accuracy:** Ensuring that the sensors are accurately calibrated is a significant challenge. Calibration is crucial to obtaining reliable data from these sensors.
- **Data Handling and Communication:** Collecting data from multiple sensors and transmitting it to a central monitoring system or storage platform can be complex. Challenges include selecting the appropriate communication protocol (e.g., Wi-Fi, Bluetooth, LoRa), dealing with data transmission errors, ensuring data integrity, and managing data storage.

Working Video Of the Project

Thank You