Greenhouse Humidity and Temperature Sensing System

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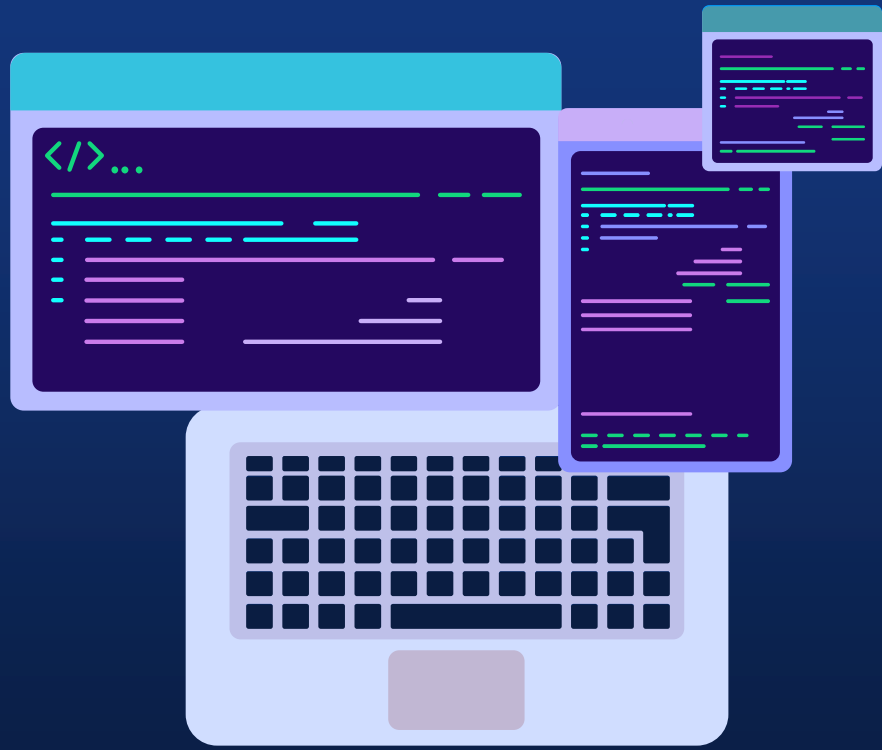


Project Background

- Monitoring the temperature to ensure it is maintained at an ideal level of 27 °C.
- Set the minimum temperature to 24 °C and the maximum temperature to 32 °C.

01

System Architecture

Major Components

Arduino Uno

The application is running as data is being gathered from the sensor, and it will then go through its decision-making process to decide what the fan should do

C++

While loops were used in the programming to create the cases. If the temperature had risen/fallen it would run through a series of different scenarios.

Major Components

IoT Cloud

Records the temperature and humidity and processes the data to output the appropriate commands to the motor.

Servo Motor & DHT11 Sensor

Measures temperature and humidity, and the Servo Motor (Fan) is automatically turned on/off by the program.

Use Cases:

UC-01

Increase in temperature

The system checks for sudden increases in humidity or temperature. When the temperature or humidity hasn't returned to normal, the system collects the data and turns on the fan.

UC-02

Decrease in Temperature

When there is an abrupt fall in temperature and humidity, and when it hasn't returned to normal. The user would receive a warning to close the door to the green house.

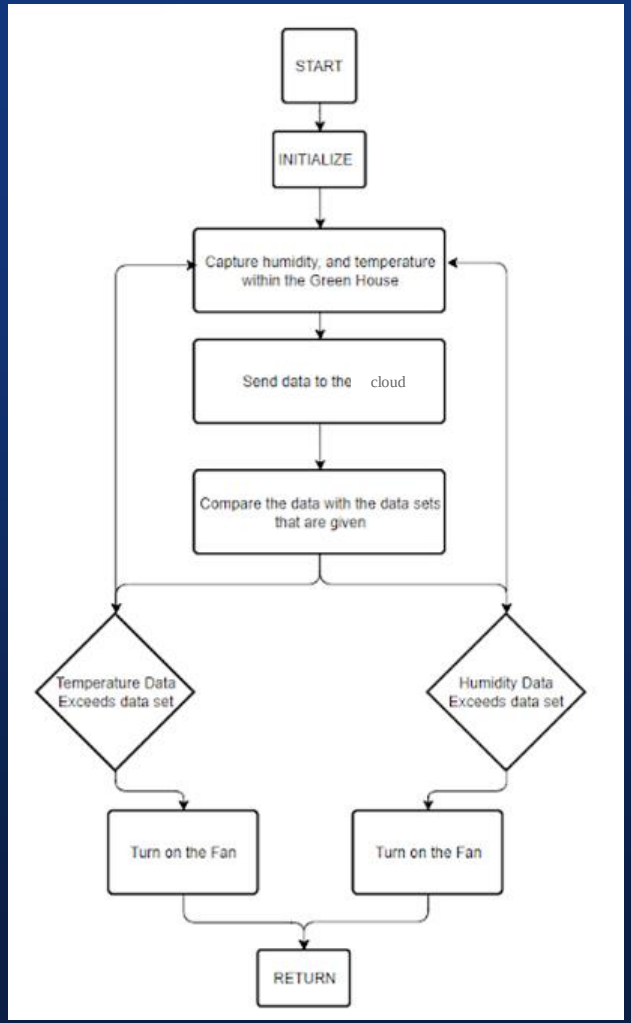
UC-03

Stable environment

While data is being gathered and the environment hasn't changed all that much. The user could assess the app's stability by checking it.

02

Flow Chart


START
INITIALIZE
Capture humidity, and temperature within the Green House
Send data to the cloud
Compare the data with the data sets that are given
Temperature Data Exceeds data set
Humidity Data Exceeds data set
Turn on the Fan
Turn on the Fan
RETURN

03

IoT Cloud Platform

04

Device Demonstration Video - Embedded System

IoT Cloud Platform

- Attempt 1: ThingSpeak
  - Using the network credentials, we were able to obtain an IP Address.
  - The IP address was entered on the browser and it would open up an HTML page which would show the live data readings from the DHT11.
  - The HTML page would be pushed into ThingSpeak which would then collect and analyze the data from the DHT11 sensor.
  - According to the data collected, ThingSpeak would then push commands to the Arduino for the servo to act accordingly.
  - However, using the IP address retrieved would result into connectivity issues and it would keep timing out.
  - Lastly, the tried using the updated Arduino IDE, however it would give compilation errors (beta version).

IoT Cloud Platform

- Attempt 2: IoT Cloud

    - Using IoT Cloud had given us success in a working IoT cloud platform with accepting data and outputting it onto the platform.
    - It consisted of a Temperature chart, and gauge as well as the humidity value with the status of the green house indicating the check as it was safe, and red that the Greenhouse isn’t in an appropriate temperature.
    - There was also a manual servo switch that was provided for the user but it would automatically be turned on and off according to the data and the restrictions that we gave.

05

Device Demonstration Video - IoT System

IoT System Demo