ESP8266 Hydroponic Automation Sensor Module Documentation

Introduction

The ESP8266 Hydroponic Automation Sensor Module is a crucial component of a larger hydroponic automation system. Developed by Varad Chaskar, this codebase facilitates the collection of essential environmental data using sensors. The gathered information, including temperature, humidity, light intensity, and water level, is transmitted to the ThingSpeak cloud platform for real-time monitoring and analysis.

Dependencies

- **[WiFiManager](https://github.com/tzapu/WiFiManager):** Library for simplified WiFi connection handling.
- **[ESP8266WiFi](https://github.com/esp8266/Arduino/tree/master/libraries/ESP8266 WiFi):** ESP8266 WiFi library.
- **[DHT](https://github.com/adafruit/DHT-sensor-library):** DHT sensor library for interfacing with the DHT11 sensor.
- **[ThingSpeak](https://github.com/mathworks/thingspeak-arduino):** Library for seamless communication with the ThingSpeak IoT platform.

Setup

1. Install Dependencies:
- Install the required libraries mentioned in the Dependencies section.

2. Hardware Setup:
- Connect the DHT11 sensor to pin D5 on the ESP8266.
- Connect the LDR to analog pin A0.
- Ensure the ESP8266 is properly powered and connected.

3. Configuration:
- Open the Arduino IDE and load the provided code.
- Set the appropriate ThingSpeak channel number and API keys.
- Adjust any pin configurations if needed.

4. Upload and Run:
- Upload the code to the ESP8266.
- Open the Serial Monitor to monitor the connection status and data transmission.

Functionality

The sensor module operates as follows:
- Establishes a connection to a WiFi network using WiFiManager for convenient setup.
- Initializes the DHT sensor and reads temperature and humidity data.
- Measures light intensity by reading analog input from the LDR.
- Retrieves water level data from ThingSpeak.
- Sends temperature, humidity, light intensity, and water level data to ThingSpeak for remote monitoring.

Usage

The ESP8266 Hydroponic Automation Sensor Module is designed for effortless deployment within a hydroponic automation system. After configuring the necessary parameters, the module will automatically connect to WiFi and commence transmitting data to ThingSpeak.

Troubleshooting

Connection Issues:
- Ensure the correct WiFi credentials are provided during setup.
- Check for any errors in the Serial Monitor.

Sensor Readings:
- Verify the sensor connections and pin configurations.
- Adjust the code for different sensor models if necessary.