Agro-Sense User Manual

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1. Introduction

1.1 Purpose

The Agro-Sense system is designed to provide farmers with real-time data on critical factors affecting crop health, including NPK levels, temperature, humidity, and soil moisture. This user manual will guide you through the setup and usage of the system.

1.2 System Overview

The Agro-Sense system consists of two Arduino Nano-based nodes equipped with sensors, a Raspberry Pi for data aggregation and display, and an IFTTT integration for email alerts.

1.3 System Components

- **Arduino Nano Nodes**: These nodes collect data from sensors and transmit it to the Raspberry Pi.
- **Raspberry Pi**: The Raspberry Pi aggregates and displays real-time data through a graphical user interface.
- **IFTTT**: An email alert system that notifies you when sensor data falls below or exceeds predefined thresholds.

2. Hardware Setup

2.1 Node Assembly

1. **Node Components**: Assemble the Arduino Nano nodes as per the provided instructions.
2. **Sensor Connection**: Ensure that NPK, DHT, and soil moisture sensors are correctly connected to the Arduino Nano nodes.
3. **Power Supply**: Connect a suitable power supply to the Arduino Nano nodes.

2.2 Raspberry Pi Setup

1. **Raspberry Pi Connection**: Connect the Raspberry Pi to a power source and display (if necessary).

2. **Internet Connection**: Ensure the Raspberry Pi is connected to the internet for real-time data transmission.

3. Software Configuration

3.1 Raspberry Pi Configuration

1. **Operating System**: Ensure your Raspberry Pi is running a compatible operating system (e.g., Raspbian).
2. **Software Installation**: Follow the instructions on our GitHub repository to install the required software components.

3.2 Arduino Nano Configuration

1. **Arduino IDE**: Download and install the Arduino IDE on your computer.
2. **Uploading Code**: Upload the provided Arduino code to each Arduino Nano node. Configure the communication settings as outlined in the code.

3.3 IFTTT Integration

1. **IFTTT Account**: Create an IFTTT account if you don't have one.
2. **Email Alert Configuration**: Set up IFTTT applets to send email alerts based on the predefined sensor thresholds.

4. Using the Agro-Sense System

4.1 Raspberry Pi GUI

1. **Accessing the GUI**: Open a web browser and enter the Raspberry Pi's IP address (provided in the setup) to access the GUI.
2. **Real-Time Data**: View real-time data on NPK levels, temperature, humidity, and soil moisture on the GUI.

4.2 Real-Time Data

1. **Data Updates**: The data on the GUI is updated in real time. Refresh the page to see the most recent data.
2. **Data Interpretation**: Use the data to make informed decisions about irrigation and fertilization.

4.3 Receiving Email Alerts

1. **Email Notifications**: When sensor data falls below or exceeds predefined thresholds, you will receive email alerts from the IFTTT integration.

5. Troubleshooting

5.1 Common Issues

- If you encounter any issues with sensor data or the GUI, first check the hardware connections and software configurations.
- Ensure that the Raspberry Pi and Arduino Nano nodes are powered and connected to the same network.
- Review the Arduino code for communication settings and sensor configurations.

5.2 Contact Support

If you experience issues that you cannot resolve, contact our support team at [prabhjot4884.be22@chitkara.edu.in] or visit our GitHub repository for additional documentation and community support.