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"Smart AgroSense: IoT-Based Multi-Point Wireless Sensor System for Precision Farming"

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Project Summary

Smart AgroSense is a multi-disciplinary IoT solution designed to optimize modern farming by combining wireless communication, environmental sensing, and intelligent automation. The system leverages ESP32 microcontrollers and nRF24L01 modules to establish an ad hoc wireless sensor network, transmitting data from multiple farm zones to a central node in a fixed sequence.Each sensor node monitors key parameters such as temperature, humidity, and soil moisture using DHT22 and capacitive soil sensors. Real-time data is displayed on the Blynk IoT dashboard, enabling farmers to make informed decisions and control irrigation remotely. This integration of communication protocols, IoT interfaces, and agriculture intelligence ensures optimized crop yield and sustainable resource use.

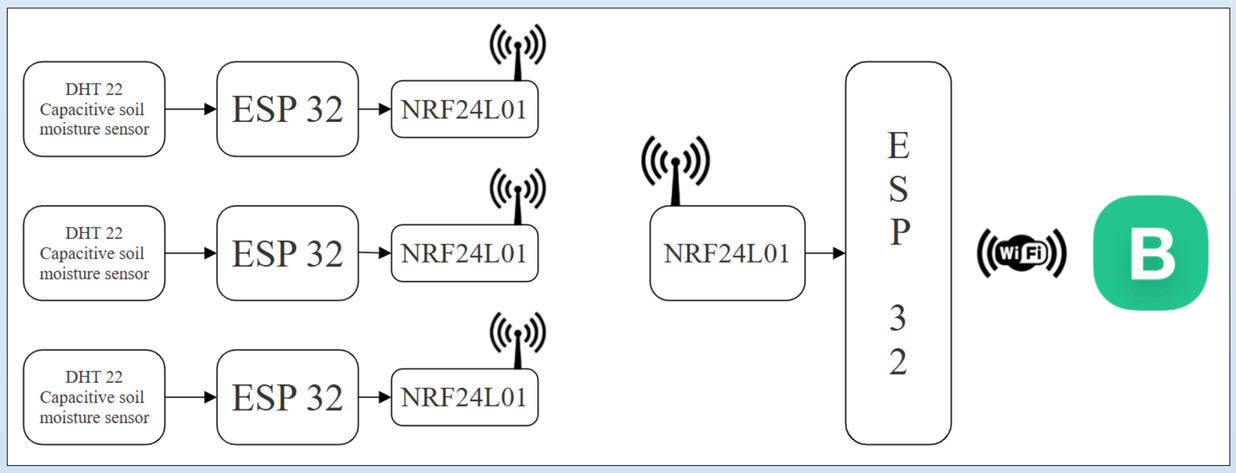
System Features

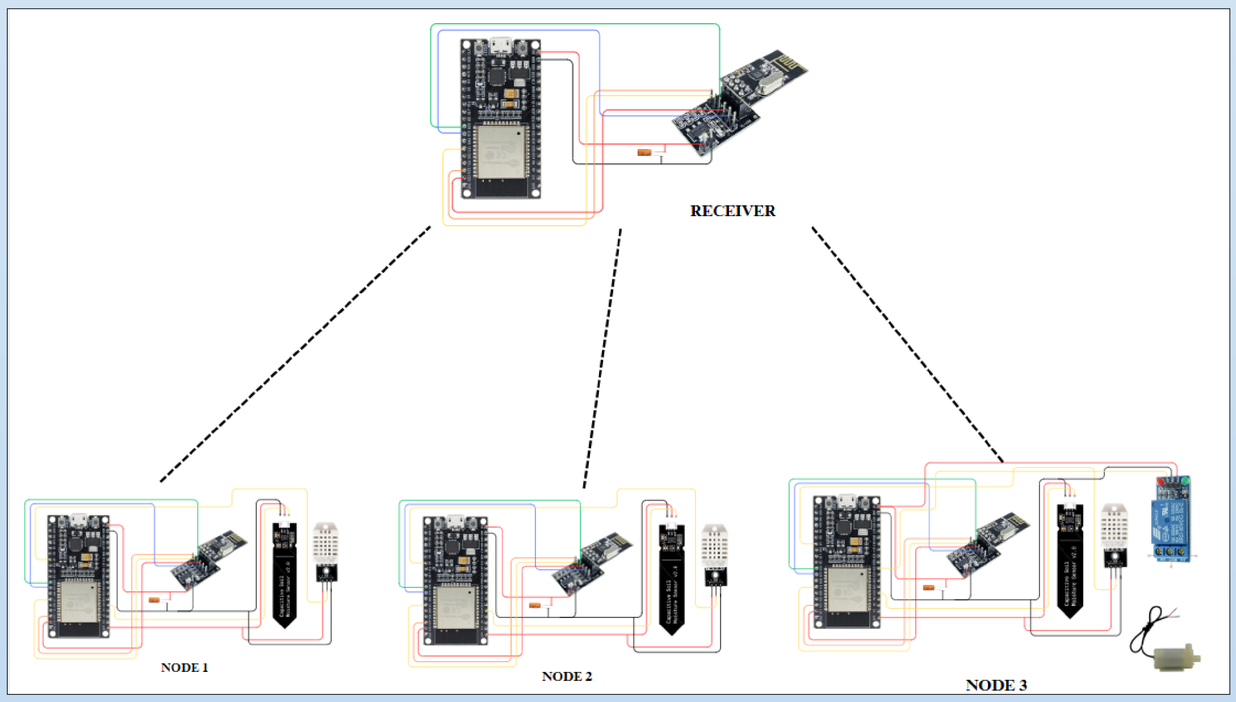
- Ad hoc wireless communication using nRF24L01 with ESP32
- Multi-node data transmission in fixed sequence: Node 1 → Node 2 → Node 3
- Sensors: DHT22 (Temperature & Humidity), Capacitive Soil Moisture Sensor
- Blynk IoT Dashboard for real-time monitoring and motor control

Objectives

- Provide farmers with real-time insights for smarter decisions
- Reduce water usage through automated irrigation
- Use wireless technology to simplify multi-point data collection
- Promote sustainable agriculture using IoT innovation

Diagram





Applications

- Precision Agriculture
- Greenhouse Management
- Irrigation Systems
- Agri-Tech Solutions
- Sustainable Agri-Tech Solutions
- Remote Farm Management

Future Scopes

- Expandable to more nodes with dynamic addressing
- Nutrient Level Monitoring & Fertilizer Automation
- AI/ML Integration for Predictive Agriculture
- Include automated weather-based irrigation triggers
- Mobile App with Predictive Insights
- Solar Power Integration

Guided By: A.S. Patil