LoRa Based Green House Monitoring And Control System Using IoT and Fertilizer Recommendation

V. Vidhya Gowri, Paduchuri Dattukumar, Pranesh S, Priyadharshini S, Ramabathina Dinesh

Associate professor, Department of Electronics and Communication Engineering, Jansons Institute of Technology, Coimbatore

UG -Students, Department of Electronics and Communication Engineering, Jansons Institute of Technology, Coimbatore

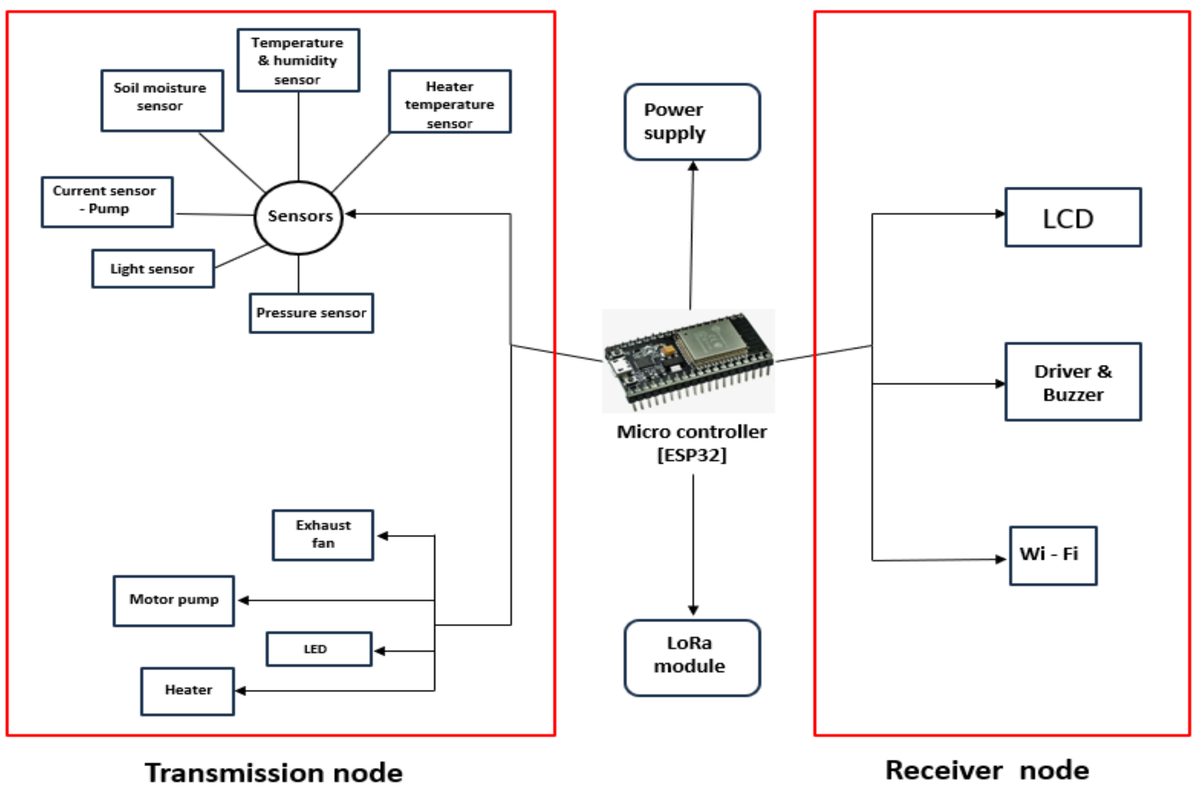
Introduction

This project proposes a distributed, multi-span greenhouse monitoring and control system using LoRa communication and IoT technology to enhance agricultural productivity. Greenhouses provide a controlled environment for optimal plant growth while protecting crops from extreme weather conditions. The system continuously monitors key environmental factors such as temperature, moisture, lighting, pressure, and humidity. Automated control of devices like exhaust fans, sprinklers, and lighting systems is implemented based on predefined logic and climate conditions. Smart Alerts notify farmers of environmental stress or hardware failures through real-time app notifications. Additionally, Automated Contingency Protocols and Weather-Linked Automation ensure proactive responses to emergencies, minimizing risks. By integrating real-time monitoring and intelligent automation, this system optimizes crop growth, improves resource efficiency, and enhances resilience against environmental uncertainties.

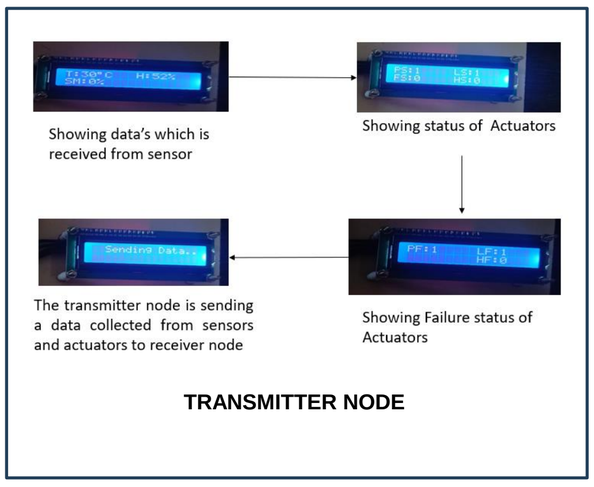
Objectives

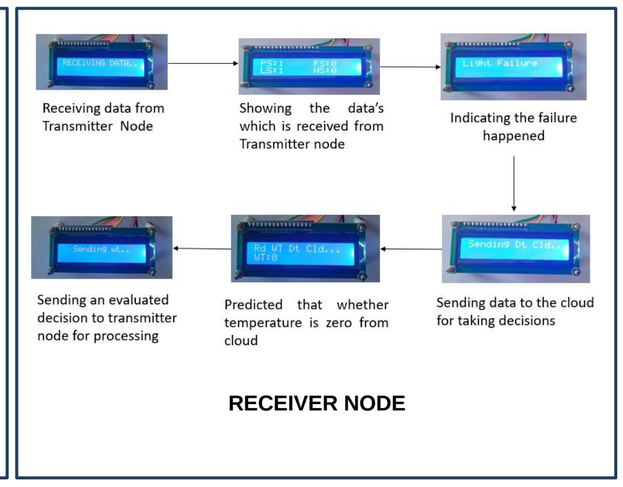
This project is intended toward the development of a LoRa-based IoT system for real-time monitoring and automated control of greenhouses. The key focused objectives are temperature, humidity, illumination, and soil moisture optimization for better crop growth. In case of environmental stress and equipment malfunction alerts, Smart Alerts ensure that the farmers are notified so that they can act in time. Also, Automated Contingency Protocols take over in emergencies like a spike in temperature or equipment failure. To greenhouse conditions adjust to be the best for the moment based on actual predictions; Weather-Linked Automation adds another layer of flexibility. In conclusion, an intelligent automation system will be introduced to modern greenhouse farming for enhanced efficiency, scalability, and sustainability.

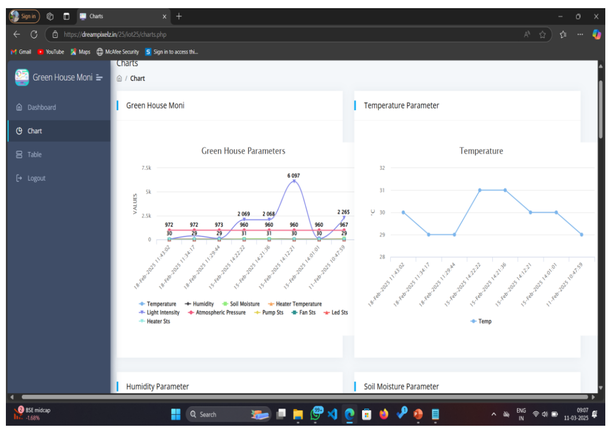
Block diagram



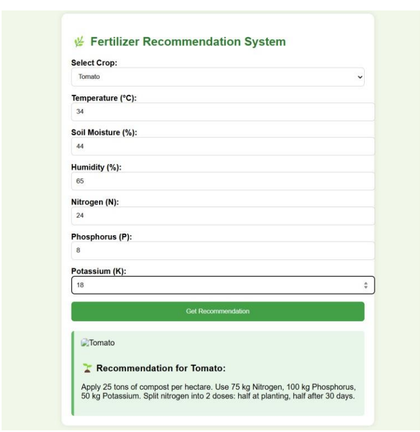
Results





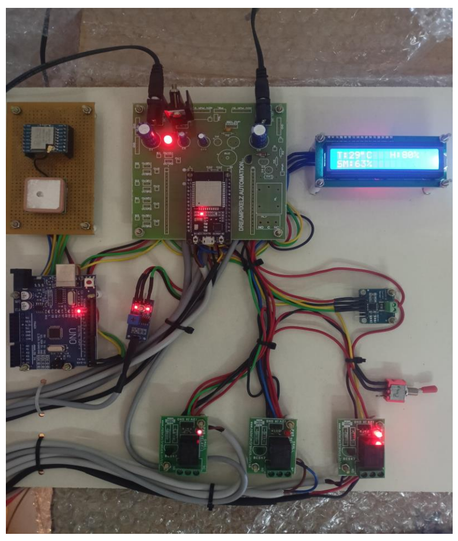


REAL-TIME DATA MONITORING THROUGH CLOUD

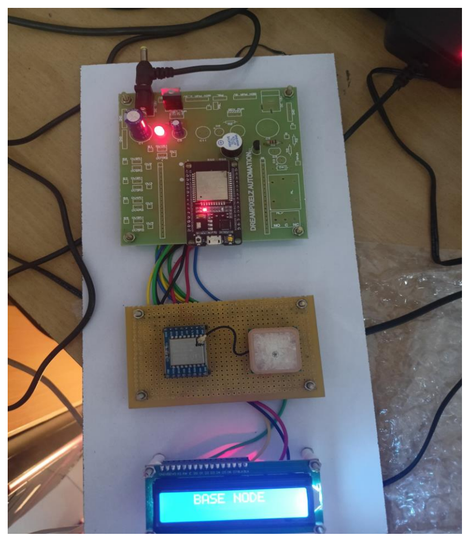


REAL-TIME FERTILIZER RECOMMENDATION

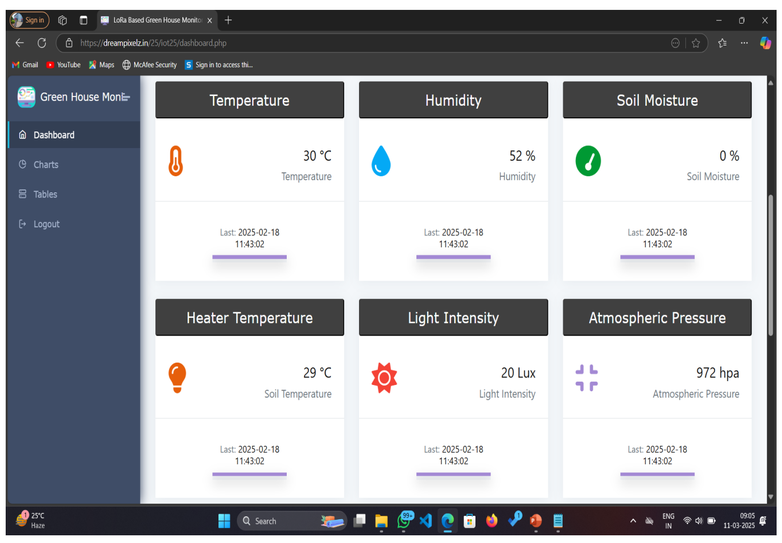
Prototype



TRANSMITTER NODE



RECEIVER NODE



MONITORING AND CONTROLLING BY WEBSITE

SMART ALERTS BY MOBILE WIDGETS

Conclusion

The proposed LoRa-based Greenhouse Monitoring and Control System integrates IoT technology to improve agricultural output in an effective manner. Through continuous monitoring of vital environmental factors like temperature, humidity, moisture in the soil, light level, and pressure, the system maintains ideal conditions for crop growth. Automation of vital operations like ventilation, irrigation, and heating minimizes human interference and maximizes resource allocation. Smart warnings and instant data transmission facilitate pre-emption in decision-making processes to improve efficiency and make operations more sustainable. LoRa technology's low power consumption and extended range make it suitable for mass-scale greenhouses to provide secure data transport even in far-flung agricultural lands.