

IoT Based Smart Green House System

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Abstract: *The growing need for sustainable farming practices and optimized resource management has led to the adoption of the Internet of Things(IoT) technologies in greenhouse farming. An Internet of Things-based smart greenhouse system is presented in this research.*

designed to monitor, analyze, and regulate key environmental parameters vital for plant growth, such as light intensity, soil moisture, temperature, and humidity. By integrating multiple sensors and actuators, the system ensures ideal conditions for growth while minimizing resource wastage.

The setup is powered by an ESP32 microcontroller, which collects real-time sensor information and transmits it to a cloud-based platform for remote access. Users can monitor greenhouse conditions and actuators for control such as exhaust fans, ventilation systems, water pumps, as well as fogging mechanisms via a mobile or web application using the Blynk IoT platform. The system operates in both automatic and manual modes, allowing seamless control even when WiFi connectivity is unavailable. Additionally, an LCD display provides real-time updates on system status, including control mode and WiFi connection.

By implementing automated decision-making algorithms, the system enhances resource efficiency by reducing water consumption, optimizing energy use, and minimizing manual labor. A prototype implementation demonstrates significant improvements in crop yield and quality, validating the efficiency of the suggested approach. The study emphasizes the possibilities of IoT-based smart greenhouses in addressing challenges such as climate variability, labor shortages, and sustainable food production, making it a promising solution for modern precision agriculture

Keywords: sustainable farming

