SAHYADRI
COLLEGE OF ENGINEERING & MANAGEMENT
An Autonomous Institution
MANGALURU

Department of Information Science & Engineering

Major-Project Synopsis - (2023-24)

Project Title:	**Green House Automated System Using IOT and ML**

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Intrduction:

The Attendance Monitoring System is an automated software or hardware solution designed track and record the presence of individuals in a particular setting, such as schools, offices, events. It utilizes modern technologies like biometrics, RFID Reader and Tags to accurately capture attendance data.

This system simplifies the traditional manual processes of taking attendance, eliminates human errors, and saves time and effort. It provides real-time monitoring, generates comprehensive reports, and enables efficient data analysis for administrators. With its ability to streamline attendance management, the Attendance Monitoring System enhances productivity, promotes accountability, and ensures accurate attendance records in a seamless and reliable manner.

Problem Description :

Traditional greenhouse management involves significant manual labor and is prone to human error, leading to suboptimal conditions for plant growth. Key challenges include maintaining consistent temperature, humidity, light levels, and soil moisture, which are critical for plant health and yield.

Inefficient use of resources such as water and energy further exacerbates the problem. The lack of real-time monitoring and predictive capabilities often results in delayed responses to environmental changes, adversely affecting crop production.

Objectives of the Project Work:

- Focused on state-of-the-art IoT-based greenhouse farming applications such as monitoring, controlling predicting, tracking, and sensing.
- Identify the major challenges and gaps as well as present some future research direction to make IoT technology more robust in greenhouse farming
- To develop machine learning models that can predict optimal conditions for plant growth and adjust the greenhouse environment accordingly.
- Proposed IoT-based greenhouse farming taxonomy and attacks taxonomy to analyze the current standing of IoT in smart farming.
- :Presented a network infrastructure for IoT-based greenhouse farming by developing network architecture, topology, and platform.

Proposed Methodology:

1 . System Design:

- **Sensor Network**: Deploy sensors to monitor temperature, humidity, light intensity, and soil moisture.
- **Actuators**: Install devices like fans, heaters, lights, and irrigation systems to control the greenhouse environment.
- **IoT Platform**: Use microcontrollers (e.g., Arduino, Raspberry Pi) to collect data from sensors and send it to a central server.

2. Data Collection and Processing:

- Collect real-time data from sensors.
- Store data in a cloud-based database for further analysis.

3. Machine Learning Model Development:

- Analyze historical data to identify patterns and correlations.
- Develop predictive models to forecast optimal conditions for plant growth.
- Implement control algorithms to adjust environmental parameters based on predictions.

4. Automation and Control:

- Integrate the ML models with the IoT platform.
- Automate the activation of actuators based on model predictions.
- Develop a feedback loop to continuously refine the models based on real-time data.

5. User Interface:

- Create a web/mobile application to display real-time data and system status.
- Provide control features for manual override and system customization.

Scope of the Work:

1. System Development: Design and deploy a functional prototype of the greenhouse automation system.
2. Data Analysis: Collect and analyze data to develop robust ML models.
3. System Integration: Ensure seamless communication between sensors, actuators, IoT platform, and ML models.
4. User Interface: Develop an intuitive and user-friendly interface for system monitoring and control.
5. Testing and Validation: Conduct thorough testing to validate the system's performance and reliability under different conditions.
6. Scalability: Design the system with scalability in mind to accommodate different greenhouse sizes and types.

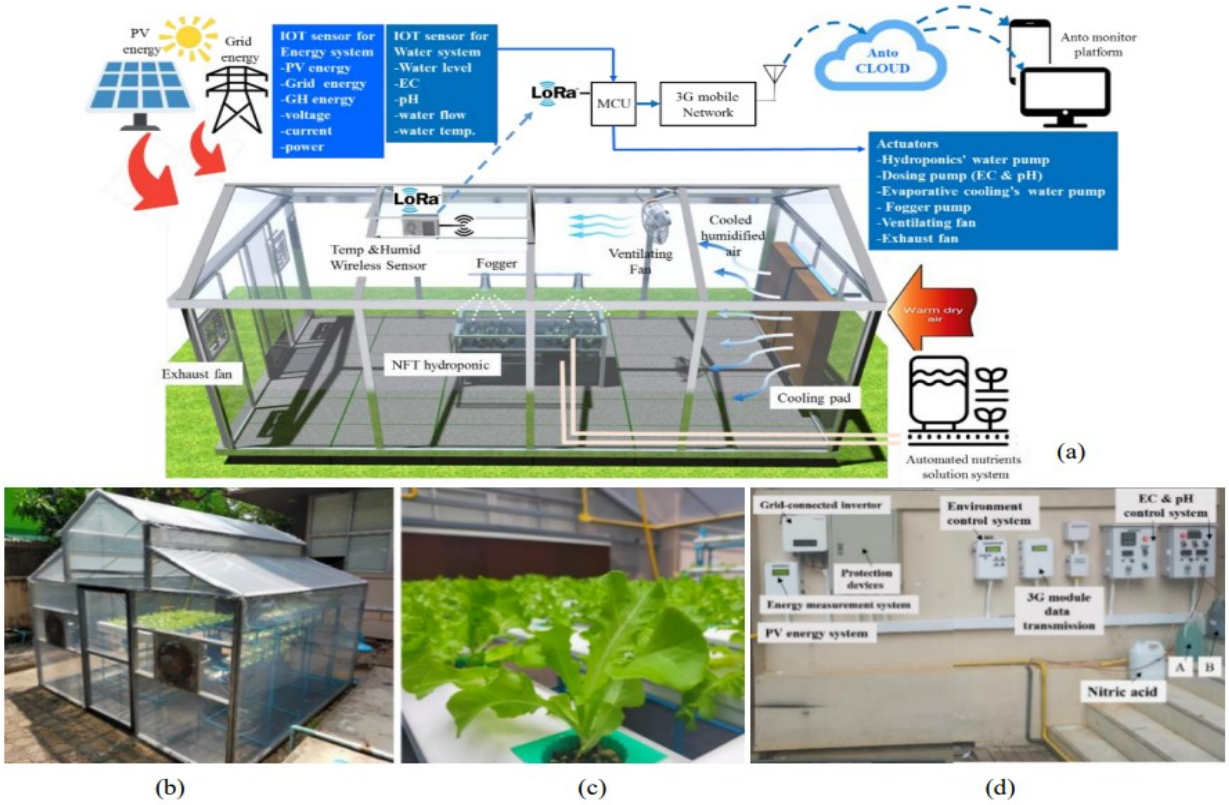
Technical Details:

Hardware Requirements:

1. Soil moisture Sensor – Soil moisture
2. BME280 Sensor -Humidity and Atmospheric presure
3. BH1750 light Sensor -Light intensity
4. DS18B20 Sensor – Temprature
5. GSNM module -Transfer Data to server
6. RTC module – Keep accurate time of ech data set
7. Humidifier and Dehumidifier
8. Extraction Fan
9. Cooling pad
10. Heater
11. Irrigation System

Software Requirements:

1. Arudino Cloud
2. Disease Data set
3. Python



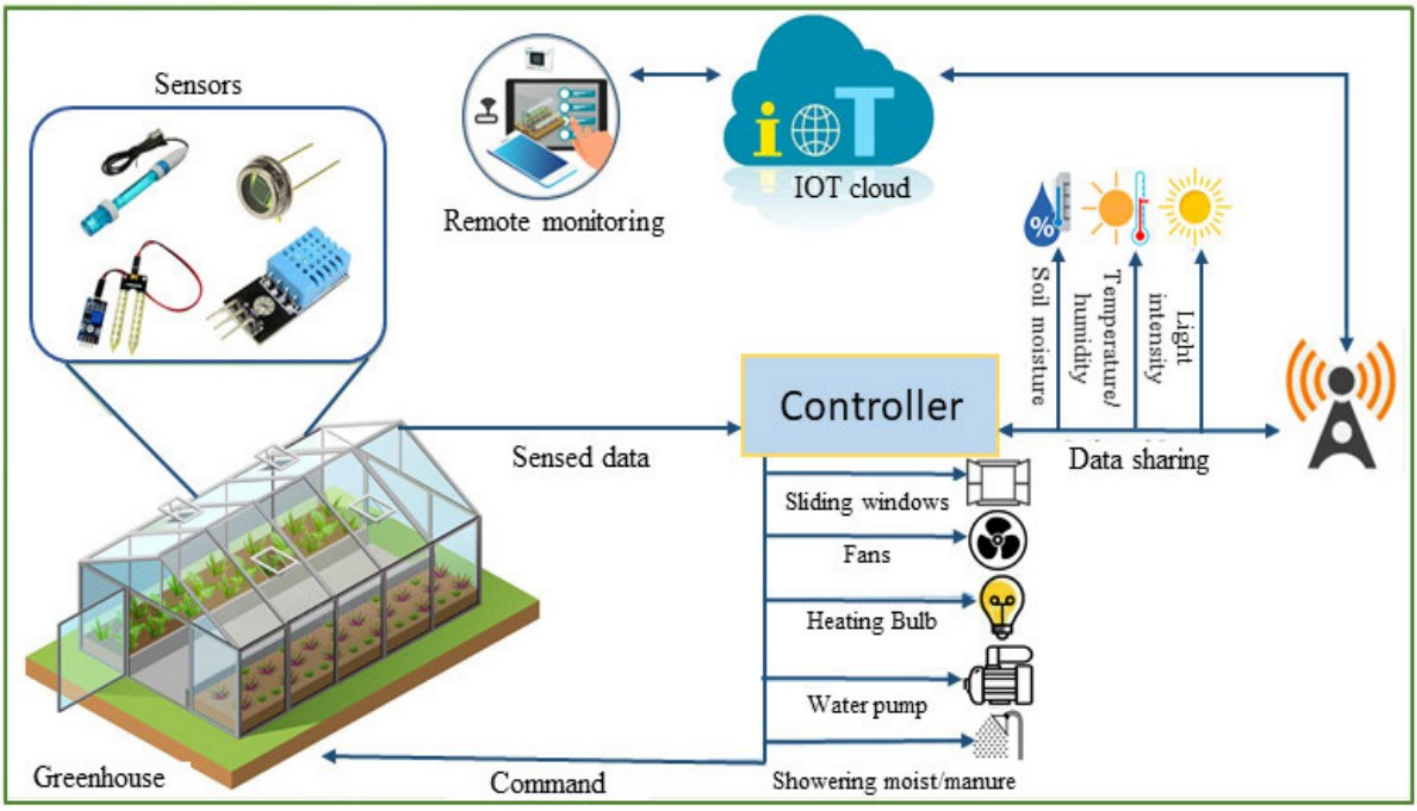


FIGURE 4. **Smart-greenhouse.**

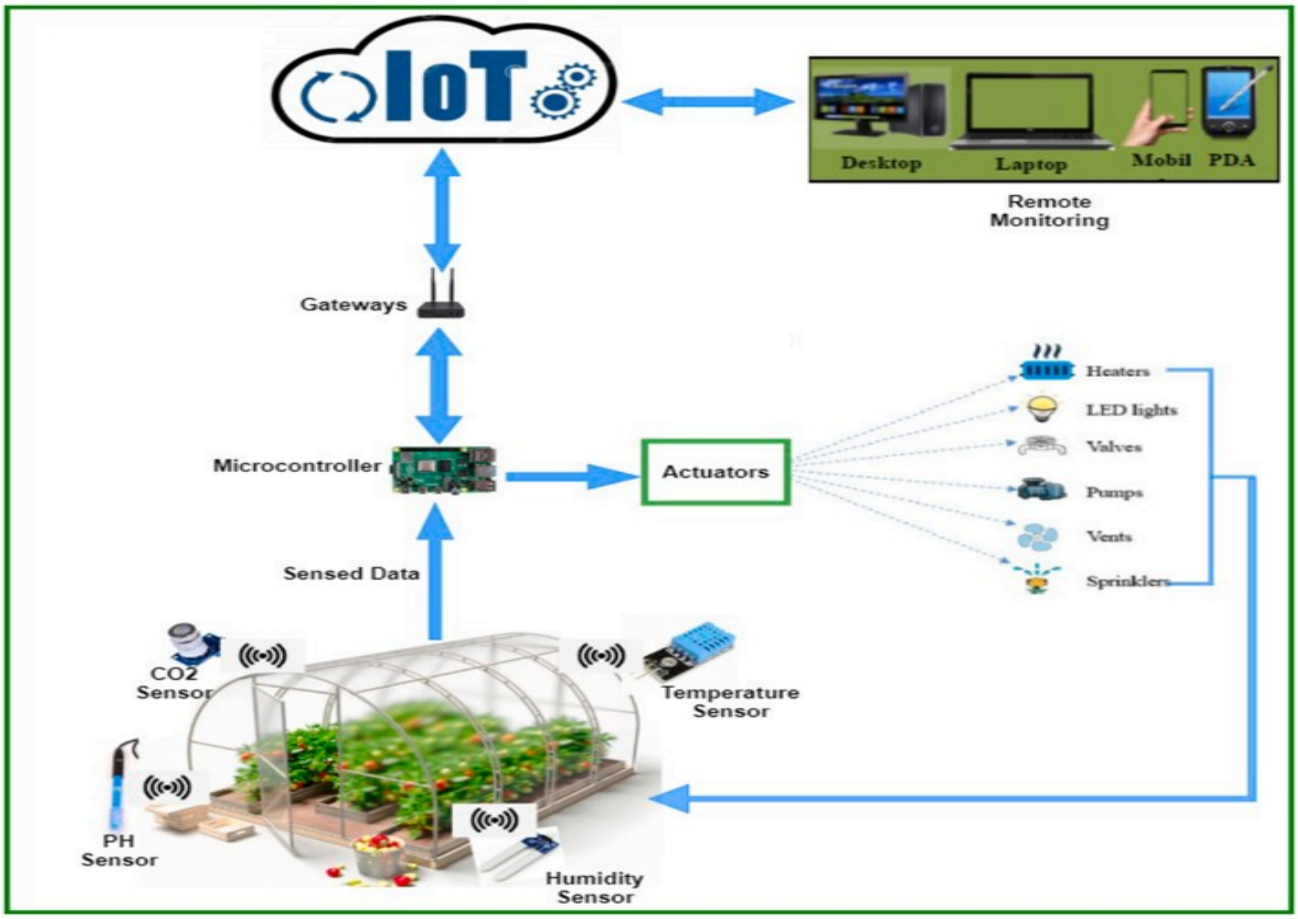


Fig. 3. Explanation of smart greenhouse farming based on IoT.

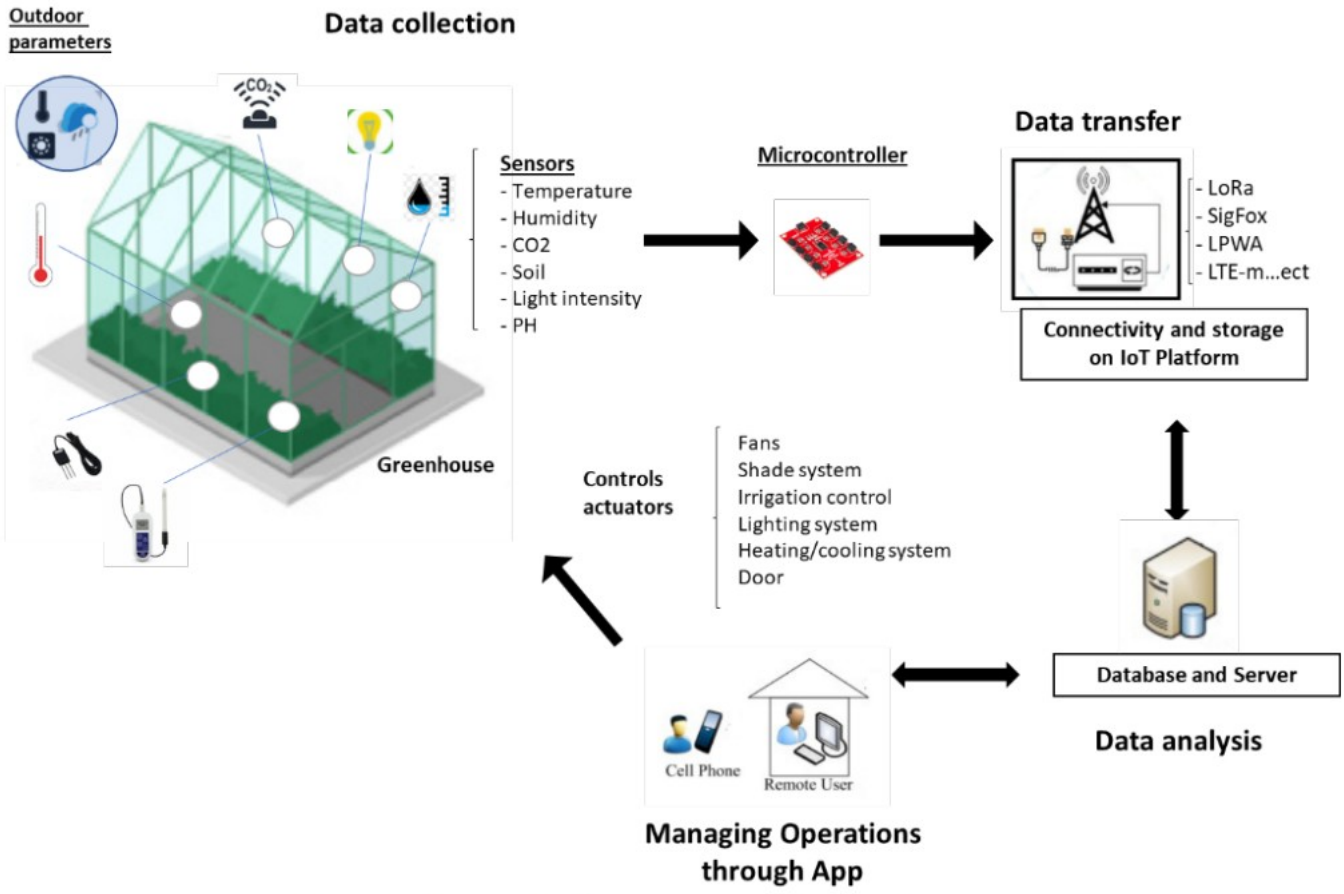


Figure 1. IOT General architecture for greenhouse applications.