

Smart Greenhouse Management System



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## Problem Statement

* + Greenhouse farming requires constant manual monitoring and adjustments of temperature, humidity, and light levels.
  + Manual labor and human error can impact crop productivity and consistency.
  + An IoT-enabled system can automate these processes, reducing labor and optimizing growing conditions.

## Type

* + IoT-based system for remote monitoring and control of greenhouse environmental factors such as temperature, humidity, and lighting.

## Industry Area

* + Agriculture, IoT, Automation, AgriTech.

## Software Expertise Required

* + **IoT Platforms**: Arduino, Raspberry Pi for sensor integration.
  + **Backend Development**: Python (Django/Flask), Node.js for data management.
  + **Frontend Development**: React, Angular for dashboards.
  + **Cloud Storage**: AWS, Firebase for data storage.
  + **Protocols/Communication**: Google Cloud IoT, MQTT for sensor communication.
  + **Real-Time Monitoring**: Web sockets or mobile notifications.

## Use Cases

* + Real-time monitoring of greenhouse conditions (temperature, humidity, light) via web/mobile app.
  + Remote control of greenhouse systems (fans, irrigation, lighting) based on sensor data.
  + Automated responses to environmental changes, reducing the need for manual intervention.

## Outcomes

* + Improved crop yields and quality through optimized growing conditions.
  + Reduced manual labor and real-time monitoring capabilities.
  + Early detection and resolution of environmental issues.

## Benefits

* + Automation of environmental control for increased productivity and reduced labor costs.
  + Remote access and control, allowing for scalable greenhouse operations.
  + Healthier, more consistent crops through precise environmental management.

## Duration

* + Estimated 4-6 months.