Smart Agriculture System Using AI & IoT

Overview

This system leverages IoT sensors and AI models to monitor crop conditions in real time and predict crop yields, enabling precision farming for better resource use and improved productivity.

1. Required Sensors

Sensor Type	Purpose
Soil Moisture	Detects irrigation needs
Temperature Sensor	Tracks environmental conditions
Humidity Sensor	Monitors air moisture levels
Light Sensor	Measures sunlight exposure
pH Sensor	Determines soil acidity or alkalinity
CO_2 Sensor	Tracks plant respiration environment

2. Proposed AI Model

Model Type: Random Forest Regressor (or LSTM for time series)

Input Features:

Soil moisture, pH, temperature, humidity, sunlight, CO_2 levels

Historical crop yield data

Planting dates and irrigation patterns

Output:

Predicted crop yield (in kg/hectare)

Why Random Forest?

Handles nonlinear relationships and noisy sensor data well

Easy to interpret and tune

Performs robustly with small-to-medium datasets

3. Data Flow Diagram

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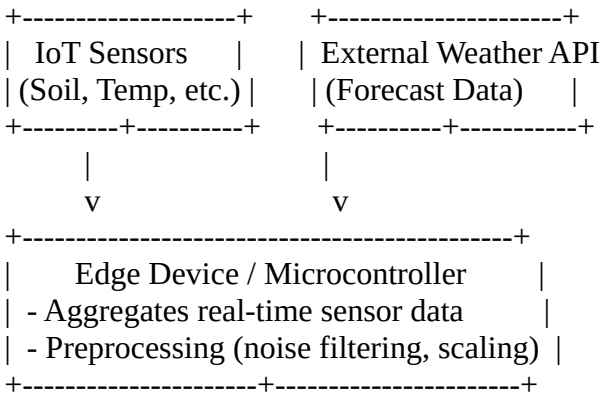

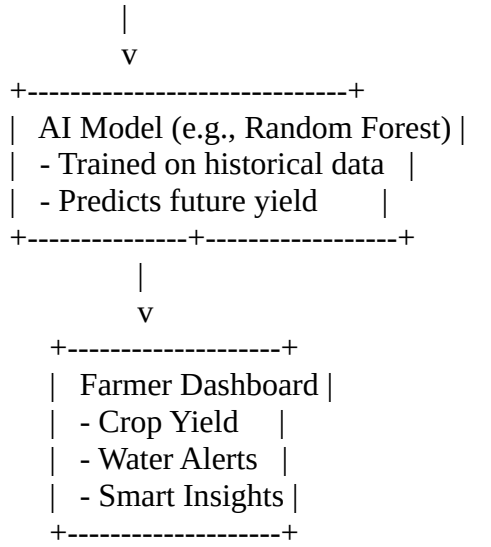

Benefits

Data-driven decisions on irrigation, fertilization, and harvest timing

Reduced waste of water and chemicals

Increased yield and farm profitability

Sustainable agriculture practices