Smart Agriculture System Using AI and IoT

Objective:

To optimize crop productivity and resource usage through an AI-powered smart agriculture system that collects real-time farm data using IoT sensors and predicts crop yields.

1. Key IoT Sensors Needed:

Sensor Type	Purpose
Soil Moisture Sensor	Monitor water levels in soil
Temperature Sensor	Track ambient conditions
Humidity Sensor	Monitor air moisture levels
Light (LUX) Sensor	Measure sunlight intensity
pH Sensor	Assess soil acidity/alkalinity
Rainfall Sensor	Track precipitation
Wind Speed Sensor	Detect wind patterns affecting crops
GPS Module	Geotag data for precision farming
Camera (Optional)	Image-based health and growth analysis

2. AI Model for Crop Yield Prediction:

Model Type: Random Forest Regression (or LSTM if using time-series data)

Inputs:

- Historical crop yield data

- Real-time sensor readings (moisture, temperature, light, pH, etc.)

- Weather forecast data

Output:

- Predicted crop yield (e.g., kg/hectare)

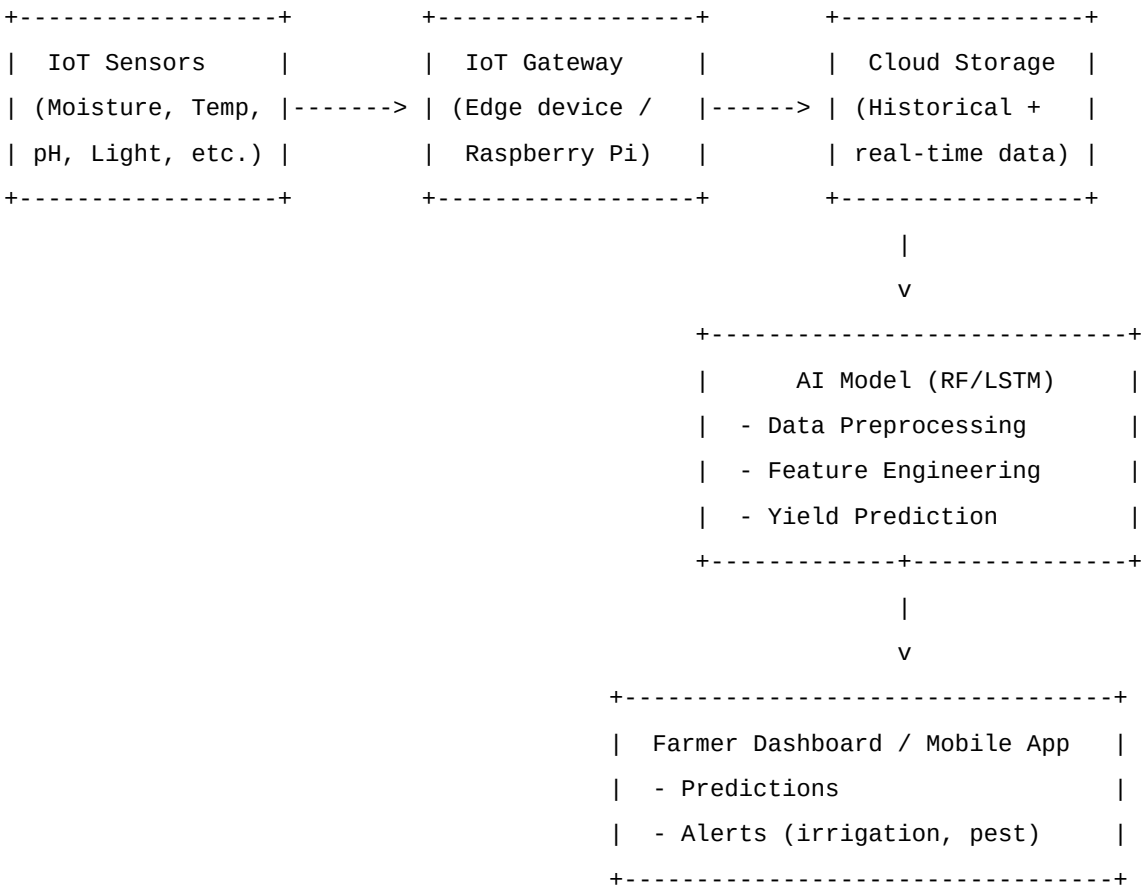
- Recommendations on irrigation, fertilization, and planting schedules

Justification:

Random Forest is robust, handles nonlinear data, and works well with environmental features. LSTM is ideal if you use time-based data sequences (daily/weekly logs).

Smart Agriculture System Using AI and IoT

3. Data Flow Diagram:



Conclusion:

This smart agriculture system leverages AI and IoT to predict crop yields and guide farming decisions with real-time insights, ultimately increasing productivity, conserving resources, and supporting sustainable agriculture.