

Smart Agriculture Simulation System

1. Required Sensors

Environmental Sensors:

- **Soil Moisture Sensor** - Measures water content in soil
- **Temperature Sensor** - Ambient and soil temperature
- **Humidity Sensor** - Air humidity levels
- **Light Intensity Sensor** - Sunlight exposure
- **pH Sensor** - Soil acidity/alkalinity
- **NPK Sensor** - Nitrogen, Phosphorus, Potassium levels
- **CO2 Sensor** - Carbon dioxide levels

Crop Monitoring:

- **Multispectral Camera** - Plant health monitoring
- **Growth Height Sensor** - Ultrasonic distance measurement
- **Leaf Wetness Sensor** - Disease prevention

Irrigation & Control:

- **Water Flow Sensor** - Irrigation monitoring
- **Valve Position Sensors** - Irrigation control

Key Features

Real-time Monitoring:

- Continuous sensor data collection
- Instant anomaly detection
- Automated alert system

Predictive Analytics:

- Ensemble AI model (Random Forest + Neural Network)
- Yield prediction based on multiple factors
- Growth pattern analysis

Automated Control:

- Smart irrigation based on soil moisture
- Nutrient management
- Environmental control

Scalability:

- Modular architecture
- Cloud-ready implementation
- Easy sensor integration

Dataflow diagram

