

Working Model Report

Project Title: Smart Agriculture Garden: AI-Driven Sustainable and Protected Farming System

Hackathon: AgriTech Hackathon by KIT Skill Hub & Pavaman Technologies

Overview of the Working Model

The working model integrates multiple AI-powered components into a single system to support smart, sustainable, and protected farming. The system includes:

- CNN-based plant disease detection
- Soil health analysis (simulated for prototype)
- Smart irrigation system logic
- Night-time garden protection simulation
- Optional web interface planned (Streamlit/Flask)

This model can serve both farmers (for practical use) and students/researchers (as a learning and demonstration tool).

Images :-





Modules in the Working Model

1. Plant Disease Detection

- Uses a CNN model trained on PlantVillage dataset.
- Classifies plant leaves as Healthy, Blight, Spot.
- Example accuracy: ~93% on validation data.
- Input: Image of plant leaf.
- Output: Predicted disease type + confidence level.

2. Soil Health Analysis

- Simulated logic based on mock soil parameters.
- Future extension: integrate actual sensor or API data.
- Output: Nutrient status (e.g., "Good", "Needs fertilizer", "Needs water").

3. Smart Irrigation

- Simple rule-based logic (can integrate with weather API):
 - 1.If rain predicted → no irrigation
 - 2.Else → irrigation activated
- Saves water, supports sustainable farming.

4. Night Protection System

- Simulated pest detection using random triggers.
- Planned future extension: camera + YOLO for small animal detection.
- Output: Alert when a pest (e.g., rat or rabbit) is detected at night.

Technology Stack

- Python 3.x
- TensorFlow / Keras – CNN model
- OpenCV – Image processing
- NumPy / Matplotlib – Data handling + visualization
- (Optional) Streamlit / Flask for interface
- (Optional) Raspberry Pi, ultrasonic sensor (for hardware prototype)

Key Features

- One integrated Python program combining all modules.
- Modular design — easy to extend with real data/sensors.
- User-friendly — results printed or displayed on simple dashboard.

Future Improvements

- Replace simulated parts with actual:
 - 1.Weather API for irrigation
 - 2.Soil sensor integration
 - 3.Pest detection with real-time camera + AI
- Build mobile app or farmer-friendly web app
- Multilingual support (Tamil, Hindi, etc.)

Code & Demo

GitHub: <https://github.com/han200711/Smart-Agriculture-Garden-AI>

- Contains:
 - 1.Python code
 - 2.Example dataset info
 - 3.Report, annexure, references