

IBM SKILLS BUILD INTERNSHIP PROJECT

AI AGENT FOR SMART FARMING ADVICE

Presented By:

Student Name > Aditya Saini

College Name > University School Of Automation And Robotics

Department > Industrial Internet Of Things

OUTLINE

- Problem Statement
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- System Development Approach (Technology Used)
- Algorithm & Deployment
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PROBLEM STATEMENT

In many rural and semi-urban regions, farmers face challenges in accessing timely and accurate agricultural advice. Factors such as unpredictable weather, pest outbreaks, and inefficient irrigation practices lead to reduced crop yields. There is a need for a smart, AI-powered system that can provide personalized farming recommendations based on real-time data.

PROPOSED SOLUTION

The proposed system aims to deliver intelligent farming advice using AI agents that:

- Analyze weather, soil, and crop data
- Recommend irrigation, fertilization, and pest control strategies
- Provide market price updates
- Communicate in local languages

Components:

- **Data Collection:** Weather, soil sensors, crop history, market prices
- **Data Preprocessing:** Cleaning, feature extraction
- **Machine Learning:** Predictive models for crop health and yield
- **Deployment:** Mobile/web interface for farmers
- **Evaluation:** Accuracy, usability, and impact metrics

SYSTEM APPROACH

System Requirements:

- IBM Cloud account
- watsonx.ai access
- Python , Docker/Podman

Libraries Used:

- scikit-learn, pandas, numpy
- LangGraph or CrewAI
- IBM Granite models

ALGORITHM & DEPLOYMENT

Algorithm Selection:

- LSTM for time-series prediction (weather, irrigation)
- Decision Trees for crop recommendation
- RAG (Retrieval-Augmented Generation) for contextual advice

Data Input:

- Weather forecasts, soil moisture, crop type, pest alerts

Training Process:

- Historical agricultural datasets
- Hyperparameter tuning and cross-validation

Prediction Process:

- Real-time advice based on sensor and external data
- Deployed via IBM watsonx.ai and accessible via mobile app

RESULT

Ai Agent For Smart Farming Advice (Smart Krishi) ✓ Deployed Online

API reference

Test

Preview



Ai Agent For Smart Farming Advice (Smart Krishi) 01:47 PM

Welcome to Ai Agent For Smart Farming Advice (Smart Krishi)

Smart Farming Ai Agent



Type something...



RESULT

Ai Agent For Smart Farming Advice (Smart Krishi) ✓ Deployed Online

API reference

Test

Preview



You 01:49 PM

Hi



Ai Agent For Smart Farming Advice (Smart Krishi) 01:49 PM

Hello! How can I assist you today?



You 01:49 PM

Can You Tell How To Grow Cucumbers



Ai Agent For Smart Farming Advice (Smart Krishi) 01:49 PM

To grow cucumbers, follow these steps:

RESULT



Ai Agent For Smart Farming Advice (Smart Krishi) 01:49 PM

To grow cucumbers, follow these steps:

1. **Choose the Right Variety:** Decide whether you want slicing cucumbers, pickling cucumbers, or seedless cucumbers. Each type has different growth habits and fruit characteristics.
2. **Start Seeds Indoors or Directly Outdoors:** Cucumbers can be started indoors 2-3 weeks before the last expected frost, or directly outdoors when soil temperatures reach at least 70°F (21°C).
3. **Planting:** Space plants 1 to 3 feet apart, depending on the variety, in rich, well-drained soil. Cucumbers can grow on trellises or fences to save space and make harvesting easier.
4. **Watering:** Cucumbers need consistent moisture. Water the soil, not the leaves, to prevent disease. Mulching can help

RESULT

4. **Watering:** Cucumbers need consistent moisture. Water the soil, not the leaves, to prevent disease. Mulching can help retain soil moisture.
5. **Pollination:** Cucumbers are monoecious, meaning each plant has both male and female flowers. However, pollination is crucial for fruit production. Bees are the most common pollinators. If bee populations are low, you can hand-pollinate by gently shaking the flowers or using a small paintbrush to transfer pollen from male to female flowers.
6. **Pest and Disease Control:** Keep an eye out for common pests like cucumber beetles and diseases like powdery mildew. Use organic or chemical controls as necessary.
7. **Harvesting:** Harvest cucumbers when they are about 4-7 inches long for the best flavor. Regular harvesting encourages more fruit production.
8. **Storage:** Cucumbers are best eaten fresh. If you must store them, keep them in the refrigerator for up to a week.

For more detailed information, you can use the Wikipedia tool with the query "Cucumber (plant)".

RESULT

Ai Agent For Smart Farming Advice (Smart Krishi) ✓ Deployed Online

API reference

Test

Preview

For more detailed information, you can use the Wikipedia tool with the query "Cucumber (plant)".



You 01:52 PM

Can You Tell How To Protect Cucumbers From Pests



Ai Agent For Smart Farming Advice (Smart Krishi) 01:52 PM

To protect cucumbers from pests, consider the following strategies:

1. **Cucumber Beetles:** These are one of the most common pests. They feed on leaves and can transmit bacterial wilt. Use row covers to protect young plants. Introduce beneficial insects like ladybugs or use insecticidal soap or neem oil to control them.
2. **Squash Bugs:** These pests suck sap from leaves and stems. Handpick them off plants, use floating row covers, or apply

RESULT

Ai Agent For Smart Farming Advice (Smart Krishi) ✓ Deployed Online

API reference

Test

Preview

2. **Squash Bugs:** These pests suck sap from leaves and stems. Handpick them off plants, use floating row covers, or apply diatomaceous earth.
3. **Spider Mites:** These tiny pests suck sap and cause speckling on leaves. Increase humidity around plants (regular watering helps), or use insecticidal soap.
4. **Aphids:** These small insects suck sap and can cause curled, yellowed leaves. Use water sprays, insecticidal soap, or neem oil. Ladybugs and lacewings are beneficial insects that can help control aphids.
5. **Japanese Beetles:** These pests can devour leaves. Handpick them off plants, use beetle traps, or apply appropriate beetle-specific pesticides.
6. **Preventive Measures:** Crop rotation, maintaining plant health, and providing adequate space between plants can help prevent pest infestations.

For more detailed information, you can use the DuckDuckGo tool with the query "organic cucumber pest control".

CONCLUSION

- The AI agent provides personalized, data-driven farming advice
- Helps reduce resource waste and improve crop yield
- Scalable across regions and adaptable to various crops
- Challenges: Data availability, model generalization

FUTURE SCOPE

- Integration with drone and satellite imagery
- Expansion to livestock and aquaculture
- Use of edge computing for offline access
- Multilingual voice-based interfaces
- Collaboration with agricultural universities and NGOs

REFERENCES

- IBM watsonx.ai Documentation
- Research papers on smart farming and AI in agriculture
- LangGraph and CrewAI GitHub repositories
- Government agricultural datasets

IBM CERTIFICATIONS



IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Aditya Saini

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



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Completion Certificate



This certificate is presented to

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for the completion of

**Lab: Retrieval Augmented Generation with
LangChain**

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 25 Jul 2025 (GMT)

Learning hours: 20 mins



THANK YOU