IBM SKILLS BUILD INTERNSHIP PROJECT

AI AGENT FOR SMART FARMING ADVICE

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OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach (Technology Used)
- Algorithm & Deployment
- Result (Output Image)
- Conclusion
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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, Al-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 Al 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 CrewAl
- 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:

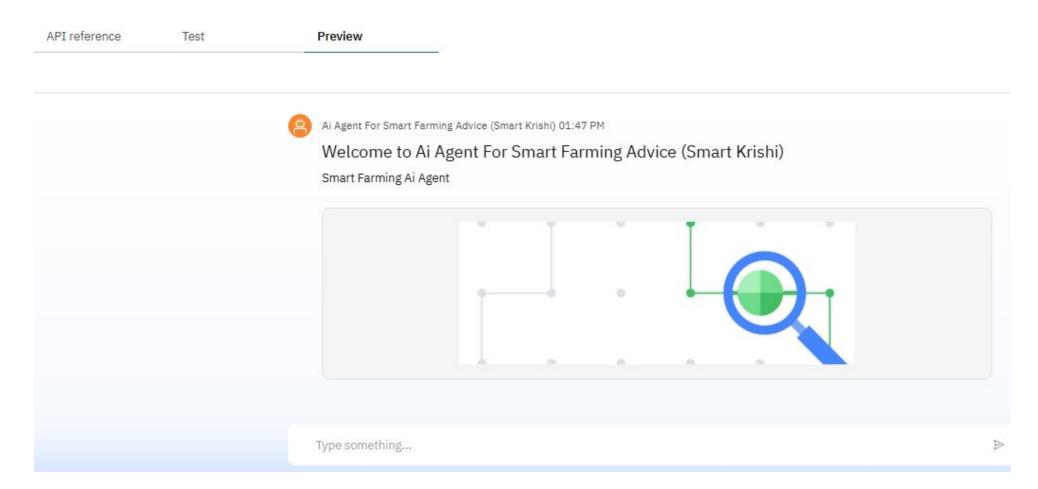
- Historical agricultural datasets
- Hyperparameter tuning and cross-validation

Prediction Process:

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

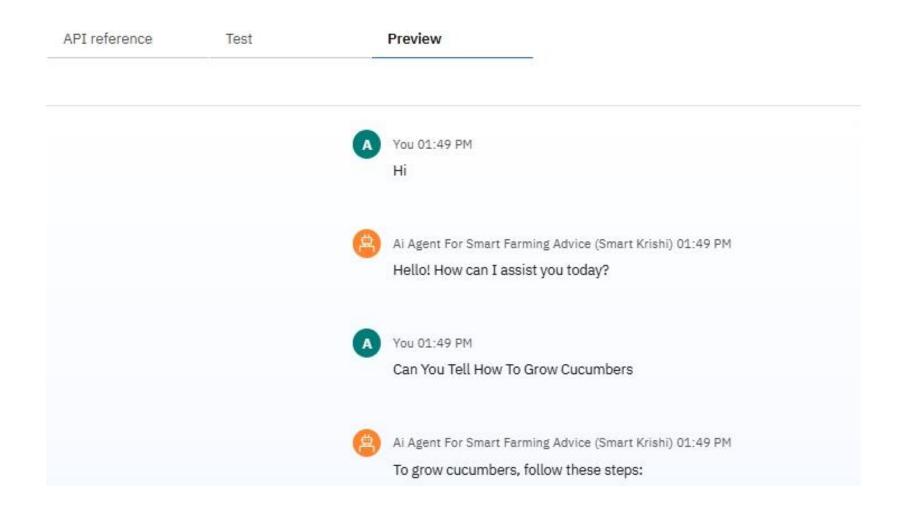


Ai Agent For Smart Farming Advice (Smart Krishi) Deployed Online





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







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

To grow cucumbers, follow these steps:

- Choose the Right Variety: Decide whether you want slicing cucumbers, pickling cucumbers, or seedless cucumbers. Each
 type has different growth habits and fruit characteristics.
- 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).
- 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

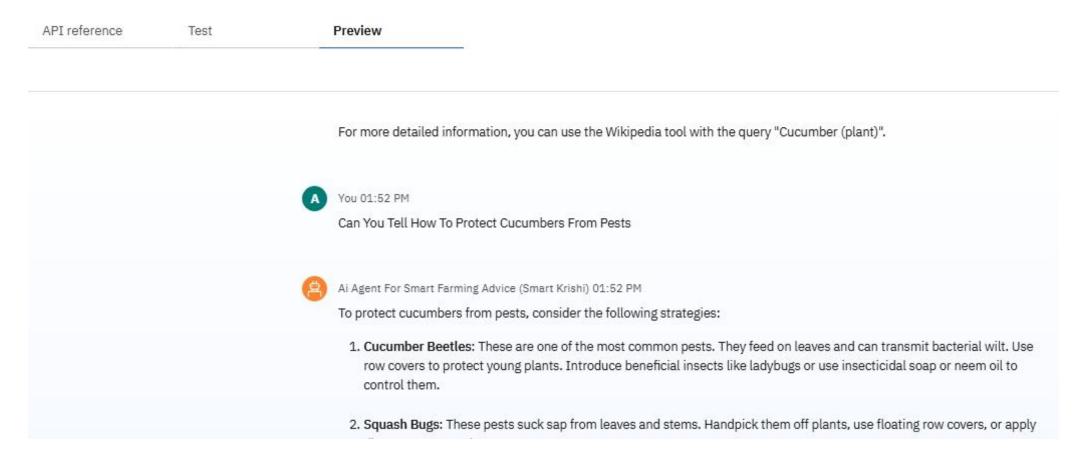


- Watering: Cucumbers need consistent moisture. Water the soil, not the leaves, to prevent disease. Mulching can help retain soil moisture.
- 5. Pollination: Cucumbers are monoecious, meaning each plant has both male and female flowers. However, pollination is crucial for fruit production. Bees are the 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.
- 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.
- 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)".



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





Ai Agent For Smart Farming Advice (Smart Krishi) Openloyed Online

API reference	Test	Preview
		 Squash Bugs: These pests suck sap from leaves and stems. Handpick them off plants, use floating row covers, or apply diatomaceous earth.
		 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.
		 Japanese Beetles: These pests can devour leaves. Handpick them off plants, use beetle traps, or apply appropriate beetle-specific pesticides.
		 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 Al 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 Al in agriculture
- LangGraph and CrewAl GitHub repositories
- Government agricultural datasets



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Completion date: 25 Jul 2025 (GMT)

Learning hours: 20 mins



THANK YOU

