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# IBM HACKATHON PROJECT

## SMART FARMING AGENT

**Presented By**

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# OUTLINE

- Problem Statement
- Proposed system/Solution
- Technology Used
- Algorithm & Deployment
- Result
- Conclusion
- Future scope
- IBM Certifications

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# PROBLEM STATEMENT

- Small-scale farmers often face challenges due to limited access to timely, reliable agricultural information. There is a need for an AI-powered agent that can provide real-time, localized farming advice using Retrieval-Augmented Generation (RAG), by accessing trusted data sources like weather forecasts, soil reports, crop suggestions, pest control methods, and market prices. The agent should support local language interaction to bridge the knowledge gap and help farmers make informed decisions that reduce risk, improve yield, and boost income, using IBM Cloud Lite services or IBM Granite..

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# PROPOSED SOLUTION

- 1.AI-Powered Virtual Assistant
- 2.Trusted Data Integration
- 3.Localized and Personalized Guidance
- 4.Multi-Language Support
- 5.User-Friendly Interface
- 6.Risk Reduction and Yield Optimization
- 7.Built with IBM Technologies
- 8.Intelligent Farming Assistant

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# TECHNOLOGY USED

- IBM cloud lite services
- Natural Language Processing (NLP)
- Retrieval Augmented Generation (RAG)
- IBM Granite model

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# IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx AI runtime
- IBM Cloud Agent Lab
- IBM Granite foundation model

# ALGORITHM & DEPLOYMENT

The Eco Lifestyle Agent uses **RAG (Retrieval-Augmented Generation)** with **IBM Granite** to provide personalized, real-time eco-guidance.

## Algorithm Used:

- The system uses **Retrieval-Augmented Generation (RAG)** with **IBM Granite** to provide real-time, personalized eco-guidance by retrieving relevant content and generating natural responses

## Data Input:

- User queries in natural language
- Curated eco-content: tips, recycling info, government schemes

## Process Flow:

- Embed user query
- Retrieve top-matching eco documents
- Generate context-aware response using IBM Granite
- Display suggestion with optional sources

## Deployment Tools:

- IBM Watsonx AI Studio
- IBM Watsonx AI Runtime
- IBM Cloud Agent Lab IBM Granite Foundation Model

# RESULT

IBM watsonx

Upgrade ?

MEGHANA SATYAMBIKA P... Dallas MP

Projects / MEGHANA SATYAMBIKA's sandbox / Agent Lab

Share feedback β Unsaved 📁 New agent + Deploy 🔗

Build

AI Model: llama-3-3-70b-instruct

Setup

Name

Smart Farming

Description 98/100

The AI Agent for Smart Farming provides personalized advice to farmers on crop health, irrigation

Icon

Placeholder image

Quick start questions

Add up to 4 quick start questions that your users can select.

Agent preview



Sample questions

What data sources does the AI agent use to give farming advice? →

How does the agent adapt its recommendations to different crops or regions? →

Can the AI agent work offline or in low-connectivity rural areas? →

How does the agent handle sudden weather changes or pest outbreaks? →

Type something... 🔍 ▶



# RESULT

The screenshot displays the IBM Watsonx Agent Lab interface. The top navigation bar includes the IBM Watsonx logo, an 'Upgrade' button, a help icon, a notification bell, the user name 'MEGHANA SATYAMBIKA P...', the location 'Dallas', and a profile icon 'MP'. Below the navigation bar, the breadcrumb trail reads 'Projects / MEGHANA SATYAMBIKA's sandbox / Agent Lab'. The main interface is divided into two panels: 'Build' and 'Agent preview'.

**Build Panel:**

- Model:** llama-3-3-70b-instruct
- Setup:**
  - Name:** Smart Farming
  - Description:** The AI Agent for Smart Farming provides personalized advice to farmers on crop health, irrigation. (98/100 characters)
  - Icon:** A circular icon with the letters 'ac'.
  - Placeholder image:** A diagram showing a central node connected to several peripheral nodes, representing a network or data flow.
  - Quick start questions:** Add up to 4 quick start questions that your users can select.

**Agent preview Panel:**

- Message 1:** You: 07:50 PM. Question: What data sources does the AI agent use to give farming advice?
- Message 2:** Smart Farming 07:50 PM. Answer: The AI agent uses various data sources to give farming advice, including:
  - 1. Weather forecasts
  - 2. Agricultural data
  - 3. Farm-specific data
  - 4. Climate data
  - 5. Soil data
  - 6. Crop data
  - 7. Sensor data
  - 8. Historical farming data
- Message 3:** These data sources are used to provide personalized advice on irrigation, fertilization, and pest control, as well as to detect climate hazards and predict methane emissions. The AI agent also uses machine learning algorithms to analyze and interpret the data, and to provide recommendations to farmers.
- Message 4:** ► How did I get this answer?

The bottom of the 'Agent preview' panel features a text input field with the placeholder text 'Type something...' and a 'Send' button.

# RESULT

The screenshot displays the IBM watsonx Agent Lab interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and user information for 'MEGHANA SATYAMBIKA P...' in 'Dallas'. Below this, a breadcrumb trail shows 'Projects / MEGHANA SATYAMBIKA's sandbox / Agent Lab'. The main interface is split into two panels. The left panel, titled 'Build', contains a 'Setup' section with fields for 'Name' (filled with 'Smart Farming') and 'Description' (filled with 'The AI Agent for Smart Farming provides personalized advice to farmers on crop health, irrigation'). It also features an 'Icon' section with a circular logo and a 'Placeholder image' section with a diagram of interconnected nodes. At the bottom of the 'Build' panel is a 'Quick start questions' section with a text input and a plus icon. The right panel, titled 'Agent preview', shows a chat log. The first message is from 'You' at 07:51 PM asking 'How does the agent adapt its recommendations to different crops or regions?'. The second message is from 'Smart Farming' at 07:51 PM, providing a detailed response about the agent's adaptive capabilities based on various factors like climate, soil, and local conditions. Below the chat log is a text input field with the placeholder 'Type something...' and a send button.

IBM watsonx

Upgrade ?

MEGHANA SATYAMBIKA P... Dallas MP

Projects / MEGHANA SATYAMBIKA's sandbox / Agent Lab

Share feedback β Unsaved New agent + Deploy

**Build** AI Model: llama-3-3-70b-instruct

**Setup**

Name

Smart Farming

Description 98/100

The AI Agent for Smart Farming provides personalized advice to farmers on crop health, irrigation

Icon

Placeholder image

Quick start questions

Add up to 4 quick start questions that your users can select. +

**Agent preview**

MP You: 07:51 PM

How does the agent adapt its recommendations to different crops or regions?

Smart Farming 07:51 PM

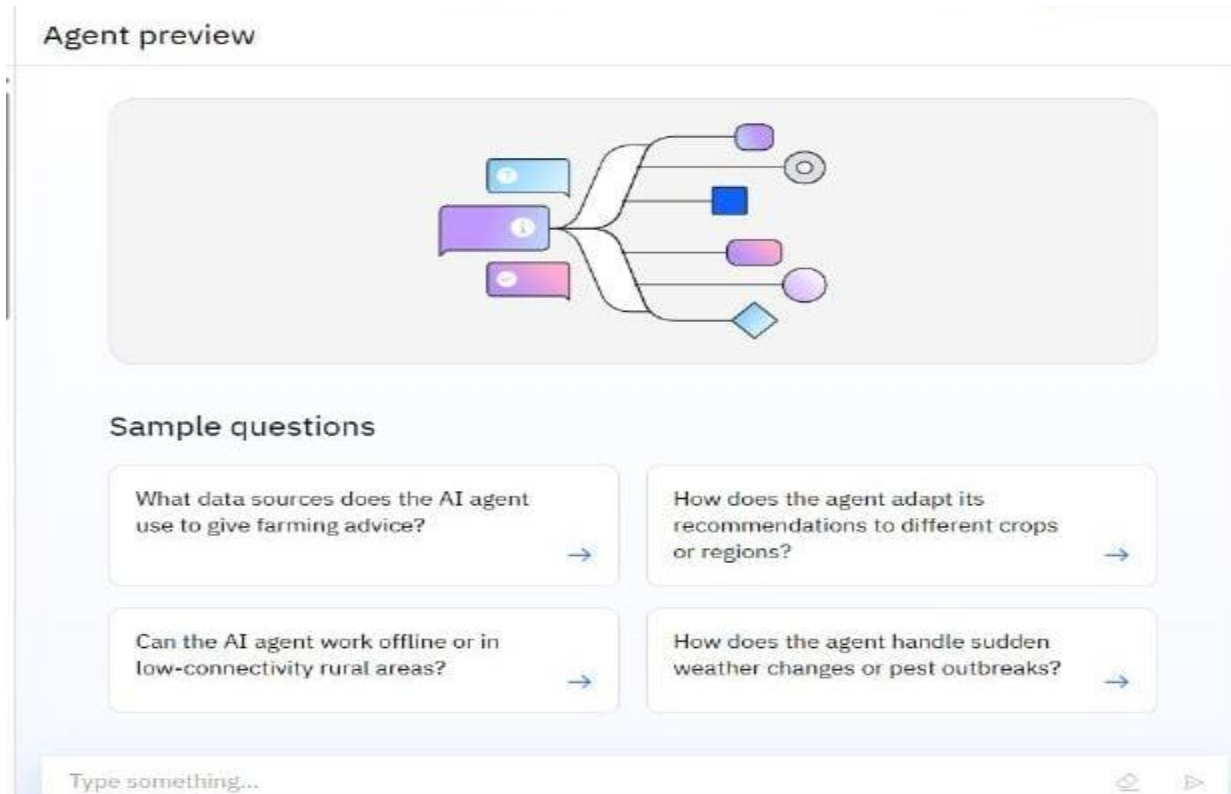
The agent adapts its recommendations to different crops or regions by considering various factors such as climate change, soil type, and local conditions. It uses techniques like precision agriculture, crop diversification, and climate-smart agriculture to provide tailored advice. The agent also takes into account the specific needs of different crops and regions, such as the use of adapted crops and varieties, and the implementation of conservation agriculture practices. Additionally, it considers the social and economic context of the region, including the availability of resources, market demand, and the needs of local communities. By taking a holistic approach, the agent can provide effective and sustainable recommendations for farmers to improve their productivity and resilience in the face of climate change.

► How did I get this answer?

Type something...

# RESULT

## Deployed AI Agent





You: 08:05 PM

What data sources does the AI agent use to give farming advice?



Smart Farming 08:05 PM

The AI agent uses various data sources to give farming advice, including:

1. Weather forecasts
2. Agricultural data
3. Farm-specific data
4. Climate data
5. Soil data
6. Crop data
7. Sensor data
8. Historical farming data

These data sources are used to provide personalized advice on irrigation, fertilization, and pest control, as well as to detect climate hazards and predict methane emissions. The AI agent also uses machine learning algorithms to analyze and interpret the data, and to provide recommendations to farmers.

► How did I get this answer?

Type something...



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# CONCLUSION

The AI Agent for Smart Farming Advice empowers small-scale farmers with real-time, localized, and data-driven agricultural support. By integrating Retrieval-Augmented Generation (RAG) with trusted sources and enabling interaction in local languages, the solution bridges the information gap in rural farming. Using IBM Cloud Lite services or IBM Granite, this project ensures scalability, reliability, and accessibility—leading to smarter decisions, improved yields, and enhanced farmer livelihoods. Ultimately, it brings the power of AI to the grassroots, promoting sustainable and inclusive agricultural growth.

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# FUTURE SCOPE

- Advanced Crop Prediction
- Voice Assistant Expansion
- Personalized Farming Calendar
- Sustainability Insights
- Marketplace Integration
- Offline Functionality

# IBM CERTIFICATIONS

In recognition of the commitment to achieve  
professional excellence



MEGHANA SATYAMBIKA POTHABATTULA

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



Issued on: Jul 18, 2025  
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IBM **SkillsBuild**

Completion Certificate



This certificate is presented to  
**MEGHANA SATYAMBIKA POTHABATTULA**

for the completion of  
**Lab: Retrieval Augmented Generation with  
LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 24 Jul 2025 (GMT)

**Learning hours:** 20 mins



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# THANK YOU