

# IBM HACKATHON PROJECT

## RESEARCH AGENT

**Presented By:**

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**College Name & Department : MIT Academy of Engineering  
Alandi – Computer Department**

# OUTLINE

- Problem Statement
- Technology used
- Wow factor
- End users
- Result
- Conclusion
- Git-hub Link
- Future scope
- IBM Certifications

# PROBLEM STATEMENT

An AI Agent for Smart Farming Advice, powered by RAG (Retrieval-Augmented Generation), supports small-scale farmers by delivering real-time, localized agricultural guidance. It retrieves trusted data on weather forecasts, soil conditions, crop recommendations, pest control measures, and current market prices from agricultural departments, meteorological sources, and agri tech platforms. Farmers can interact in their local language and ask questions like “What crop is best for this season?” or “What is today’s mandi rate for tomatoes?” The agent ensures timely, data-driven decisions that reduce risk, increase yield, and boost income. This AI-driven assistant bridges the knowledge gap and brings smart farming to the grassroots.

## Proposed Solution:

To address the research overload and inefficiency in literature review, we propose building an AI-powered Research Agent using IBM Cloud Lite services and Granite-3.3-8b-Instruct (IBM’s optimized instruction-following LLM).

This intelligent assistant will help users—students, researchers, and academicians—by understanding their research goals and delivering context-aware summaries, suggestions, and citations via a conversational interface powered by IBM Watson Assistant.

By leveraging Retrieval-Augmented Generation (RAG) and Natural Language Processing (NLP), the agent will provide accurate, relevant, and up-to-date academic insights to streamline the research workflow.

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# TECHNOLOGY USED

IBM cloud lite services

Natural Language Processing (NLP)

Retrieval Augmented Generation (RAG)

IBM Granite model

## IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx AI runtime
- IBM Cloud Service
- IBM Cloud Storage Object
- IBM Cloud Agent Lab
- IBM Granite (via Watsonx.ai studio)

# WOW FACTORS

This intelligent assistant significantly reduces research time, improves the quality of literature reviews, supports early-stage researchers, and fosters interdisciplinary collaboration by making academic knowledge more accessible and actionable.

## Unique features:

- Weather Forecasts  
Provides real-time, location-based weather updates.
- Soil Advice  
Recommends crops and fertilizers based on soil conditions.
- Crop Recommendations  
Suggests best crops for the current season and region.
- Pest & Disease Control  
Offers alerts and treatment tips for common crop issues.
- Mandi Rates  
Shares daily market prices for fruits, vegetables, and grains.
- Local Language Support  
Farmers can ask questions in their native language.

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## END USERS

- **Students** – Especially undergraduate and postgraduate students who need help in literature reviews, project reports, or thesis writing.
- **Academic Researchers** – Who require assistance in discovering relevant papers, identifying research gaps, and summarizing vast volumes of research.
- **Professors & Faculty** – Looking to stay updated with the latest research in their fields and support students with up-to-date references.
- **Industry Professionals & R&D Teams** – Who want to explore academic insights, technical advancements, and emerging trends for innovation and product development.
- **Data Scientists & Engineers** – Who require datasets, technical papers, or algorithmic references for solving domain-specific problems.

# SETTING UP

IBM watsonx

Upgrade ?

Vaishnavi Phad's Account

London

VP

Projects / farmer\_AgentSpace / Agent Lab

Share feedback β Unsaved 📁 ▼ New agent + Deploy 🚀

Build

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

Quick start questions

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

"Do you want to check the weather forecast for your area?" (क्या आप अपने क्षेत्र का मौसम जानना चाहते हैं?)

Would you like to know today's mandi price for any crop?" (क्या आप किसी फसल का आज का मंडी भाव जानना चाहेंगे?)

Are you facing any pests or disease problems in your crops?" (क्या आपकी फसल में कोई कीट या रोग की समस्या है?)

Do you know your soil type or need help selecting the right crop for it?" (क्या आपको अपनी मिट्टी के अनुसार सही फसल चुनने में मदद चाहिए?)

Agent preview

Sample questions

"Do you want to check the weather forecast for your area?" (क्या आप अपने क्षेत्र का मौसम जानना चाहते हैं?) →

Would you like to know today's mandi price for any crop?" (क्या आप किसी फसल का आज का मंडी भाव जानना चाहेंगे?) →


Are you facing any pests or disease problems in your crops?" (क्या आपकी फसल में कोई कीट या रोग की समस्या है?) →


Do you know your soil type or need help selecting the right crop for it?" (क्या आपको अपनी मिट्टी के अनुसार सही फसल चुनने में मदद चाहिए?) →

Type something... 🗨 ▶




# AGENT INSTRUCTION

 IBM watsonx

Upgrade ? 

Vaishnavi Phad's Account ▾

Sydney ▾

VP 

Deployment spaces / FarmingAgentSpace / FarmingAgent /      FarmingAgent ✓ Deployed OnlineAPI reference Test **Preview**

New chat +

which crops taken in india

 FarmingAgent 12:43 AM

Here are some of the crops that are commonly grown in India:

1. **Rice (Dhan)** - Grown in states like West Bengal, Uttar Pradesh, Punjab, and Tamil Nadu.
2. **Wheat (Gehun)** - Majorly cultivated in Uttar Pradesh, Punjab, Haryana, and Madhya Pradesh.
3. **Cotton (Kapas)** - Grown in Gujarat, Maharashtra, and Telangana.
4. **Sugarcane (Ganna)** - Cultivated in Uttar Pradesh, Maharashtra, and Karnataka.
5. **Pulses (Dal)** - Such as chickpeas, pigeon peas, and lentils, grown in various states.
6. **Oilseeds** - Like groundnut, mustard, and soybean, cultivated in different regions.

type something... 

# ADD TOOLS

## Prediction results

Display format for prediction results

☐ Table view ☒ JSON view

☐ Show input data ⓘ

JSON view

```
{
  "choices": [
    {
      "index": 0,
      "message": {
        "content": " Hi, I am Farming Agent. How can I help you?",
        "role": "assistant"
      }
    }
  ]
}
```

Download JSON file

# QUICK START QUESTIONS

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Upgrade ?

Disha Satpute's Account

Dallas

DS

Projects / Disha's\_Research\_Agent / Disha's Research Agent

Share feedback β Autosaved 10:43 PM New agent + Deploy

Build

AI Model: granite-3-3-8b-instruct

Quick start questions

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

Suggest topics for a Computer Science research project

Find recent research papers on Artificial Intelligence

Can you summarize the latest research on artificial intelligence in healthcare?

Suggest some project ideas related to climate change and sustainability.

Configuration

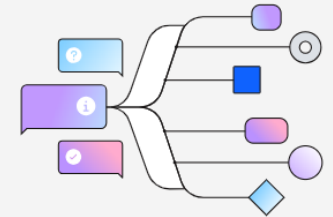
Framework LangGraph

Architecture ReAct

Agent preview

Welcome to Disha's Research Agent

AI-powered Research Agent by watsonx.ai.



Sample questions

Suggest topics for a Computer Science research project

Find recent research papers on Artificial Intelligence

Can you summarize the latest research on artificial intelligence in healthcare?

Suggest some project ideas related to climate change and sustainability.

Type something...

# DEPLOYMENT

## Disha's Research Agent




Overview





Assets


Deployments



Jobs

Manage

  Search 

| Name   | Type   | Status   | Asset                  | Asset type | Tags  | Last modified                      |   |
|--|--------|--|------------------------|------------|---|------------------------------------|---|
|  Disha's Research Agent | Online |  Deployed | Disha's Research Agent | Ai service | <span>wx-agent</span>  | 2 hours ago<br>Disha Satpute (You) |  |

Items per page: 20  1-1 of 1 items

1 of 1 pages  

# API REFERENCES

Deployment spaces / Disha's Research Agent / Disha's Research Agent /

🗑️ ⓘ 📄 ⌛ 💬 ⚙️

Disha's Research Agent ✔️ Deployed Online

API reference

Test

Preview

## Endpoints for inferencing ⓘ

Private endpoint

|  |   |
|--|---|
| <code>https://us-south.ml.cloud.ibm.com/ml/v4/deployments/19ee3c89-f7d4-4a8c-a173-a11f352600d6/ai_service?version=2021-05-01</code>        | 📄 |
| <code>https://us-south.ml.cloud.ibm.com/ml/v4/deployments/19ee3c89-f7d4-4a8c-a173-a11f352600d6/ai_service_stream?version=2021-05-01</code> | 📄 |

Bearer <token> ⓘ

IAM

Public endpoint

|  |   |
|--|---|
| <code>https://us-south.ml.cloud.ibm.com/ml/v4/deployments/19ee3c89-f7d4-4a8c-a173-a11f352600d6/ai_service?version=2021-05-01</code>        | 📄 |
| <code>https://us-south.ml.cloud.ibm.com/ml/v4/deployments/19ee3c89-f7d4-4a8c-a173-a11f352600d6/ai_service_stream?version=2021-05-01</code> | 📄 |

[Learn more](#) about the 2021-05-01 version query parameter


## Code snippets






| cURL | Java | JavaScript | Python | Scala |
|------|------|------------|--------|-------|
|------|------|------------|--------|-------|

# NOTE: you must set \$API\_KEY below using information retrieved from your IBM Cloud account (<https://dataplatform.cloud.ibm.com/docs/content/wsj/analyze-data/ml-authentication.html?context=wx>)





📄





# PREVIEW

 IBM watsonx


Upgrade Vaishnavi Phad's Account  Sydney  VP

Projects / Farming\_Agent1 / Agent Lab


Share feedback  Unsaved   New agent + Deploy 

 Build  Model: llama-3-2-11b-vision-instruct  

Framework

LangGraph 

Architecture


ReAct 

Instructions


[Advanced configuration](#)

You are a helpful assistant that uses tools to answer questions in detail.  
When greeted, say "Hi, I am watsonx.ai agent. How can I help you?"

Knowledge





Tools



Add a tool

Create custom tool

Added tools (1)

Google search  

Agent preview

Other crops grown in Maharashtra include:

1. Ragi

2. Onion

3. Potato

4. Betelvine

5. Gram (chickpea)


6. Soybean

7. Green gram



8. Black gram

It's worth noting that the specific crops grown in Maharashtra can vary depending on the region, season, and other factors.

► How did I get this answer?



Type something...

# CONCLUSION

- The AI-Powered Farming Agent is a smart, accessible, and reliable solution designed to empower small-scale farmers with real-time, data-driven agricultural guidance. By integrating Retrieval-Augmented Generation (RAG), IBM Granite LLM, and IBM Cloud Lite services, the agent bridges the information gap at the grassroots level. It supports informed decisions on crop planning, soil management, pest control, and market pricing—ultimately enhancing productivity, reducing risks, and increasing income.

This innovation brings the power of AI directly to the fields, making smart farming a reality for every farmer.

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## GITHUB LINK

[https://github.com/Vaishnavi1955/Farming\\_AgentProject](https://github.com/Vaishnavi1955/Farming_AgentProject)



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# FUTURE SCOPE

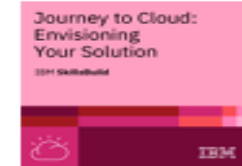
- Multilingual Research Support
- Voice-Activated Research Assistant
- Real-Time Collaboration Features
- Research Gap and Novel Topic Identification
- Integration with Publishing Platforms
- AI-Assisted Paper Drafting

# IBM CERTIFICATIONS



# IBM CERTIFICATIONS

In recognition of the commitment to achieve  
professional excellence



**Vaishnavi Phad**

Has successfully satisfied the requirements for:

**Journey to Cloud: Envisioning Your Solution**



Issued on: Jul 20, 2025  
Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/8a0c2683-2949-4b02-9736-87fe01436d37>



## RAG LAB certificate





**THANK YOU**