CAPSTONE PROJECT

AI AGENT FOR SMART FARMING ADVICE

Presented By: RAHUL MS SRI SAIRAM COLLEGE OF ENGINEERING DEPT OF A.I.M.L



OUTLINE

- **Y** Problem Statement
- **Y** Proposed System/Solution
- **Y** System Development Approach
- **Y** Algorithm & Deployment
- Y Result
- Y Conclusion
- **Y** Future Scope
- Y References



PROBLEM STATEMENT

- Y Small-scale farmers in India often lack access to timely, location-specific, and actionable agricultural advice. This makes them vulnerable to unpredictable weather, suboptimal crop choices, pest attacks, and fluctuating market rates, resulting in reduced yields and unstable incomes. There is a critical need for an Al-based system that can interact in local languages, retrieve trusted agricultural data in real time, and provide personalized farming guidance.
- Y Objective: Develop an AI Agent powered by Retrieval-Augmented Generation (RAG) and deployed on IBM Cloud Lite/Granite that delivers real-time, localized advice on weather, soil conditions, crop selection, pest management, and market prices, supporting grassroots smart farming.



PROPOSED SOLUTION

- Y The Smart Farming Al Agent offers small-scale farmers:
- Y Conversational Interface in Local Languages: Farmers interact via text/voice in their native language for easy access.
- Y Trusted Data Integration: Weather data (forecast, rainfall, temperature) Soil conditions and healthCrop recommendations based on season, soil, and marketPest/disease control and prevention suggestionsCurrent local mandi rates for crops
- Y Retrieval-Augmented Generation (RAG): The system retrieves real-time information from reliable agricultural sources, processes it using advanced NLP models, and generates precise, actionable advice for the farmer.



SYSTEM APPROACH

- Y Cloud Platform:IBM Cloud Lite (mandatory), using Watson Studio, Object Storage, Watson Assistant, and optionally IBM Granite LLM for language support.
- Y System Flow:Farmer submits query in local languageQuery is pre-processed and translated if necessaryRAG model retrieves relevant data, generates responseDynamic, context-driven recommendation returnedContinuous learning from new queries and feedback

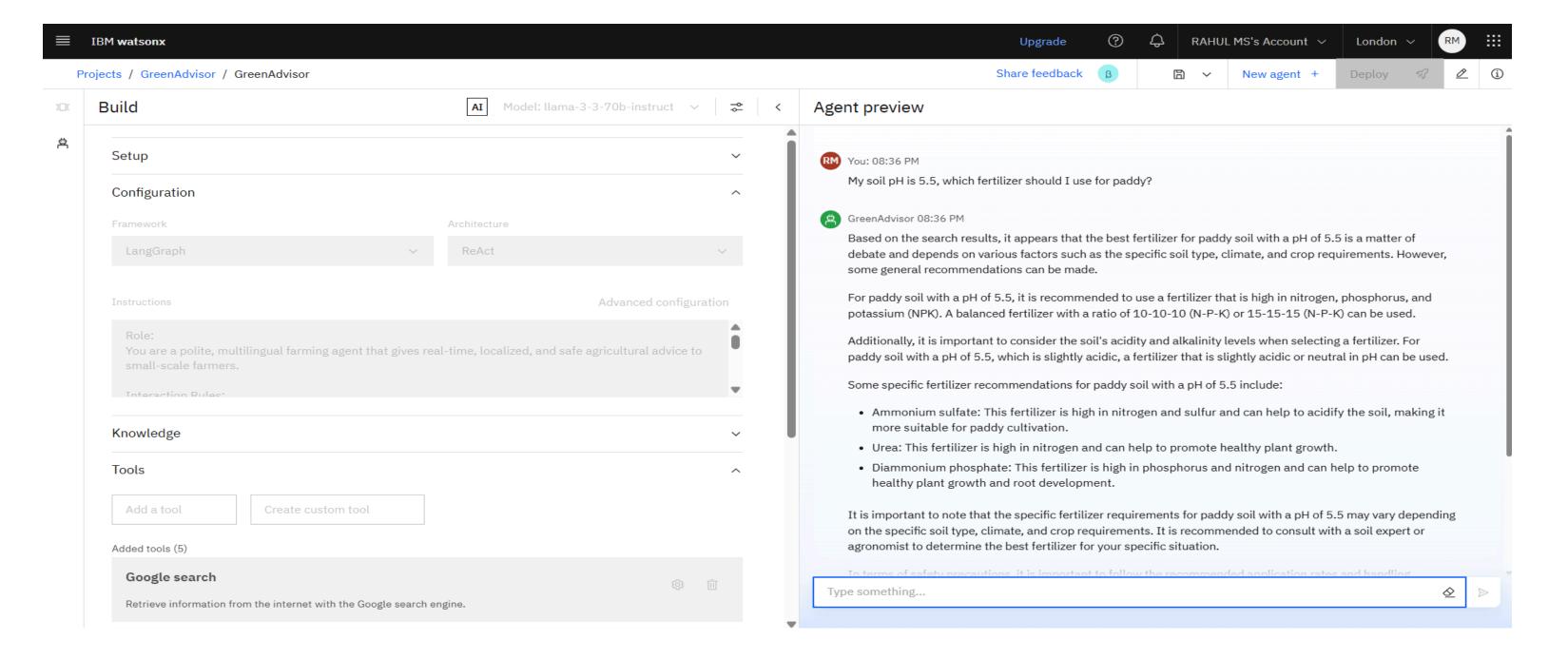


ALGORITHM & DEPLOYMENT

- Y Retrieval-Augmented Generation (RAG) combining retrieval of relevant data/documents with answer generation from a language model (using IBM Granite for multi-language support).
- Y Training Process: Fine-tune language model on agriculture-specific queries and responses Dialog management and language understanding via Watson Assistant Real-time data ingestion from APIs Deployment.
- Y Application deployed on IBM Cloud Lite Containerized backend for RAG and integration services REST APIs for mobile/web/voice interfaces

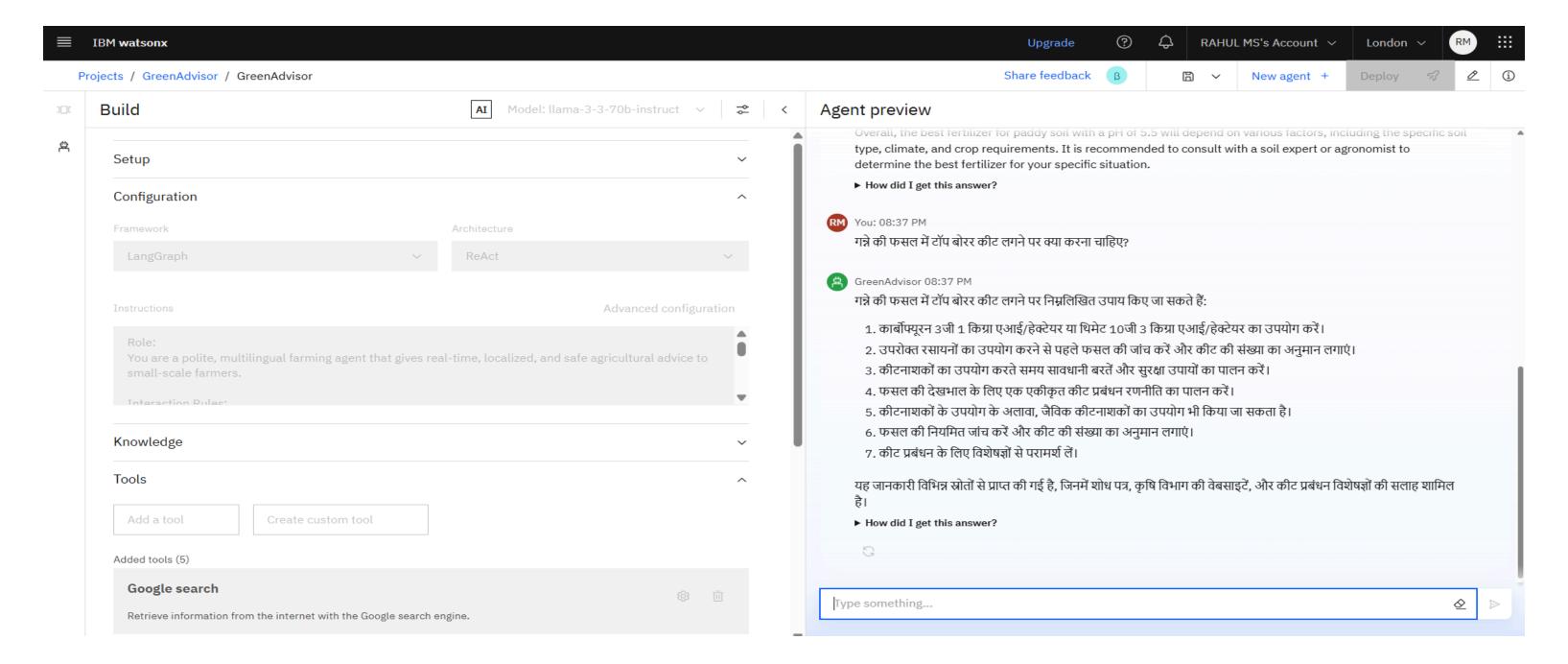


RESULT



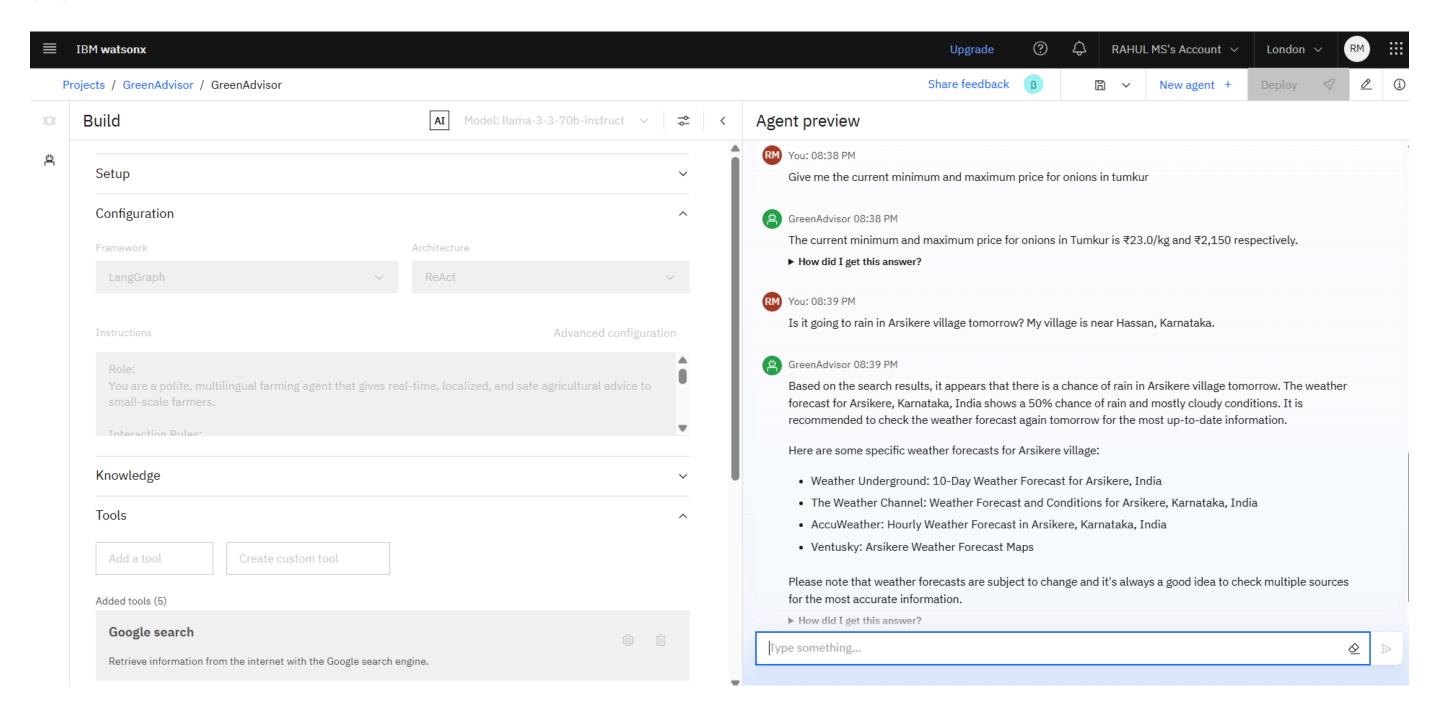


RESULT

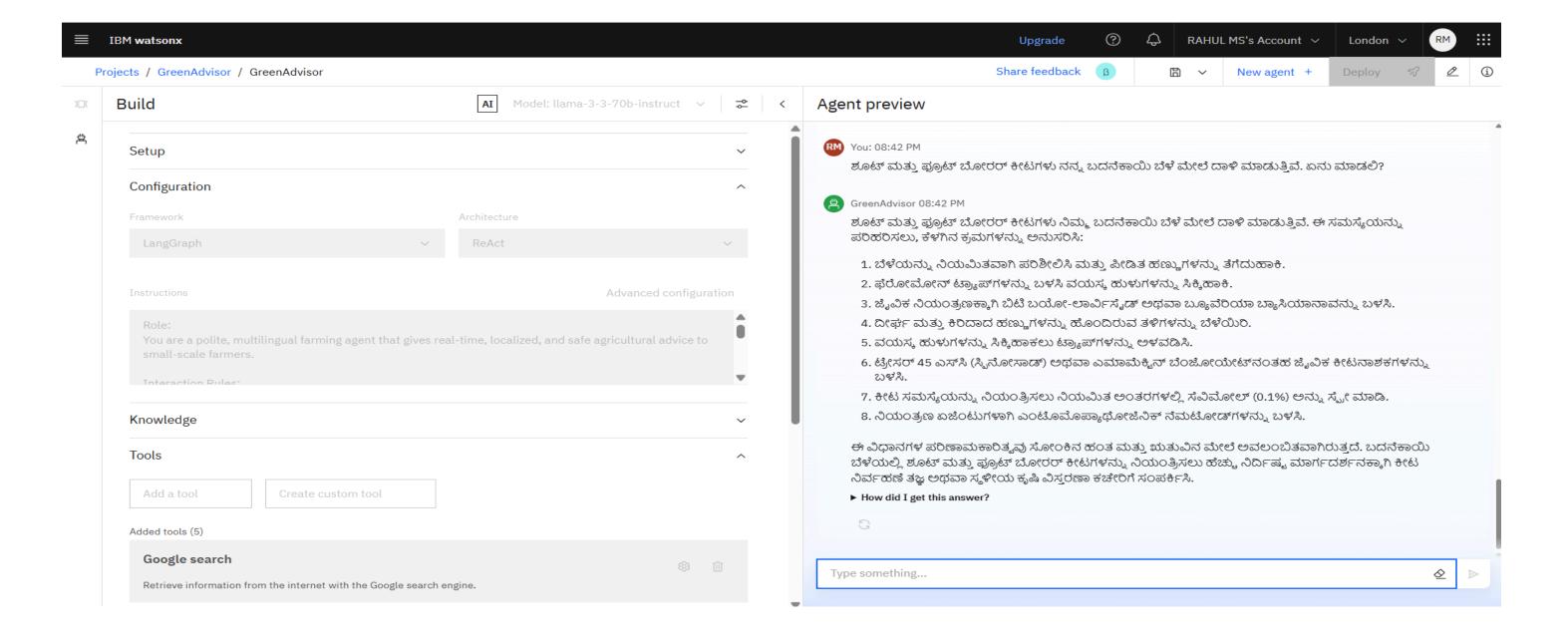




RESULT









CONCLUSION

The deployed AI Agent for Smart Farming Advice leverages IBM Cloud and advanced AI methods to provide timely, trusted, and localized agricultural guidance. This bridges the information gap for rural farmers, enabling better crop decisions, optimized resource use, and improved income, ultimately empowering the agricultural community at the grassroots.



FUTURE SCOPE

- Y Expand support for more Indian regional languages.
- Y Integrate satellite imagery for advanced crop/soil diagnostics.
- Y Personalized alerts (e.g., weather warnings, pest outbreaks, market price trends).
- Y Edge deployment for offline support. Integration with agricultural IoT devices.



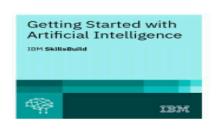
REFERENCES

- Y Indian Meteorological Department (IMD) API/portal
- Y State government agriculture portals & bulletins
- Y IBM Cloud / Watson Assistant / Granite documentation
- Y Major Agritech platforms (e.g., Agmarknet, eNAM)
- Y Research: Data-driven AI in Smart Farming (IEEE, Springer)



IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence



RAHUL MS

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



Issued on: Jul 22, 2025 Issued by: IBM SkillsBuild







IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence



RAHUL MS

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



Issued on: Jul 23, 2025 Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/6ae9f95f-fce3-4deb-96c7-7d9d92b89caf





IBM CERTIFICATIONS

IBM SkillsBuild

Completion Certificate



This certificate is presented to

RAHUL MS

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



THANK YOU

