CAPSTONE PROJECT

SMART FARMING AI AGENT FOR REAL-TIME AGRICULTURAL GUIDANCE

Presented By:
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OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result (Output Image)
- Conclusion
- Future Scope
- References

PROBLEM STATEMENT

Small-scale farmers in India often face challenges in making informed decisions due to lack of real-time, localized guidance on farming practices. These include uncertainties about crop suitability, pest outbreaks, weather impact, and fluctuating market prices. Without timely and trustworthy advice, their yields and incomes are at risk. There is a critical need for an AI-powered assistant that delivers contextual, region-specific farming advice in the farmer's local language.

PROPOSED SOLUTION

PROPOSED SOLUTION:

- The Smart Farming AI Agent aims to solve this problem using Retrieval-Augmented Generation (RAG) and IBM Watsonx. The system delivers real-time answers to the farmer queries.

Key Features:

- Retrieves trusted agricultural data from APIs and internal sources
- Interacts via chat interface to answer queries on crops, weather, pests, and market
- Built using IBM Granite LLM with tools like Google Search, Wikipedia, Weather

Components:

- RAG-based Agent Lab interface
- Agent Tools: Google, Weather, Wikipedia Search
- Deployed using Watsonx.ai deployment space

SYSTEM APPROACH

Technologies Used:

- IBM Watsonx.ai Studio
- Granite Foundation Model (`granite-3-3-8b-instruct`)
- IBM Agent Lab (to create and deploy the AI agent)
- IBM Cloud Object Storage
- Python and Streamlit for frontend development
- Requests library for API integration
- GitHub for version control and deployment reference

SYSTEM APPROACH

System Requirements:

- IBM Cloud Lite account with Watsonx runtime
- Deployed Agent via IBM Deployment Space
- Public or local hosting of Streamlit app (e.g., streamlit.app or localhost)
- Internet access to communicate with IBM's REST API
- Streamlit environment (Python 3.10+, `streamlit`, `requests`)

ALGORITHM & DEPLOYMENT

Model & Interaction:

- Agent model: IBM Granite-3-3-8b-Instruct
- AI Agent created using IBM Agent Lab
- Agent enhanced using tools: Google Search, Weather, Wikipedia

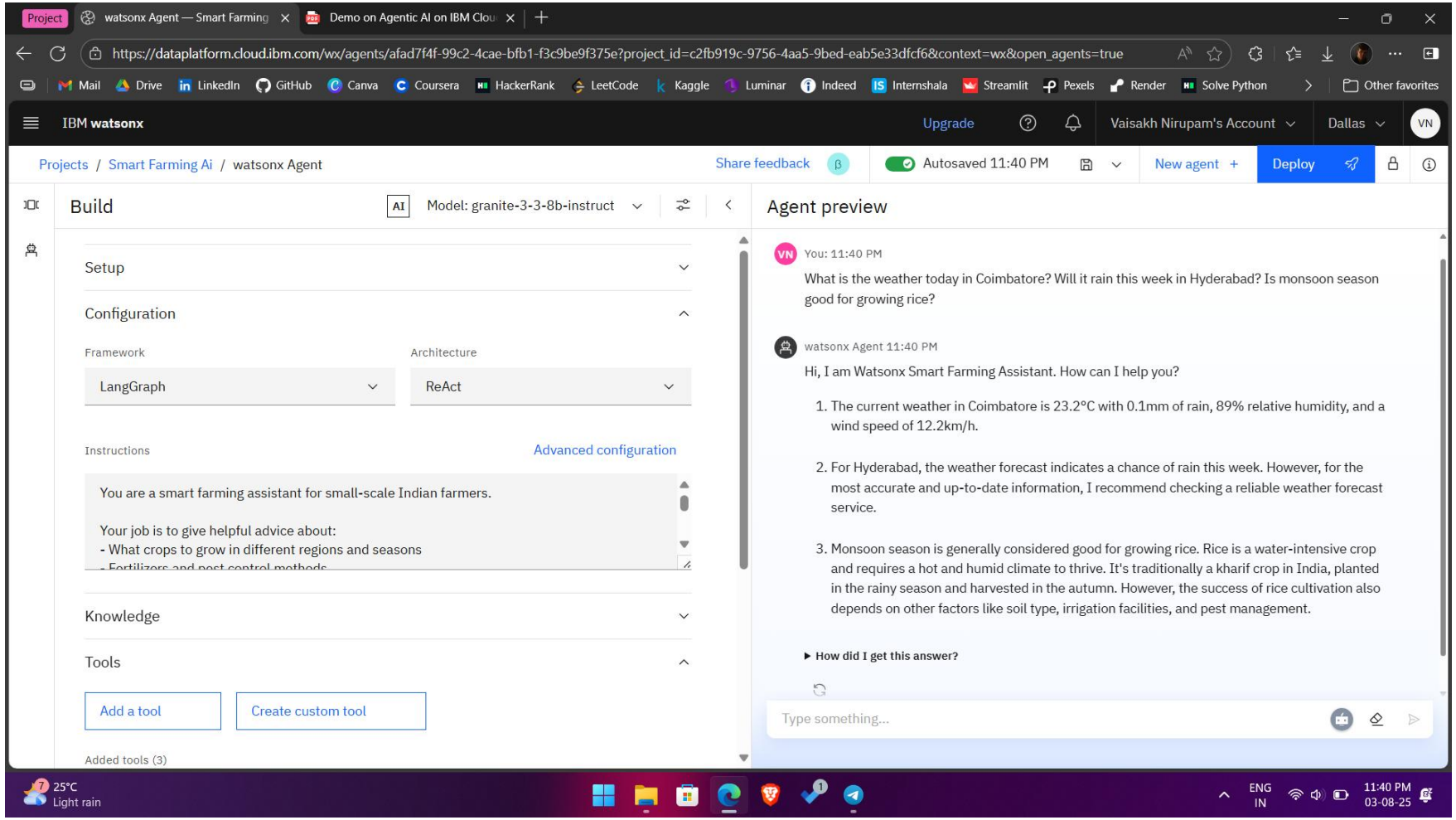
Streamlit Deployment:

- Streamlit used to build custom front-end UI for the agent
- User inputs are sent to IBM Watsonx AI via REST API
- Access token dynamically fetched using IBM API key
- Answers are streamed back and shown in real-time on the app

Deployment URL:

https://chz-smart-farm.streamlit.app

RESULT



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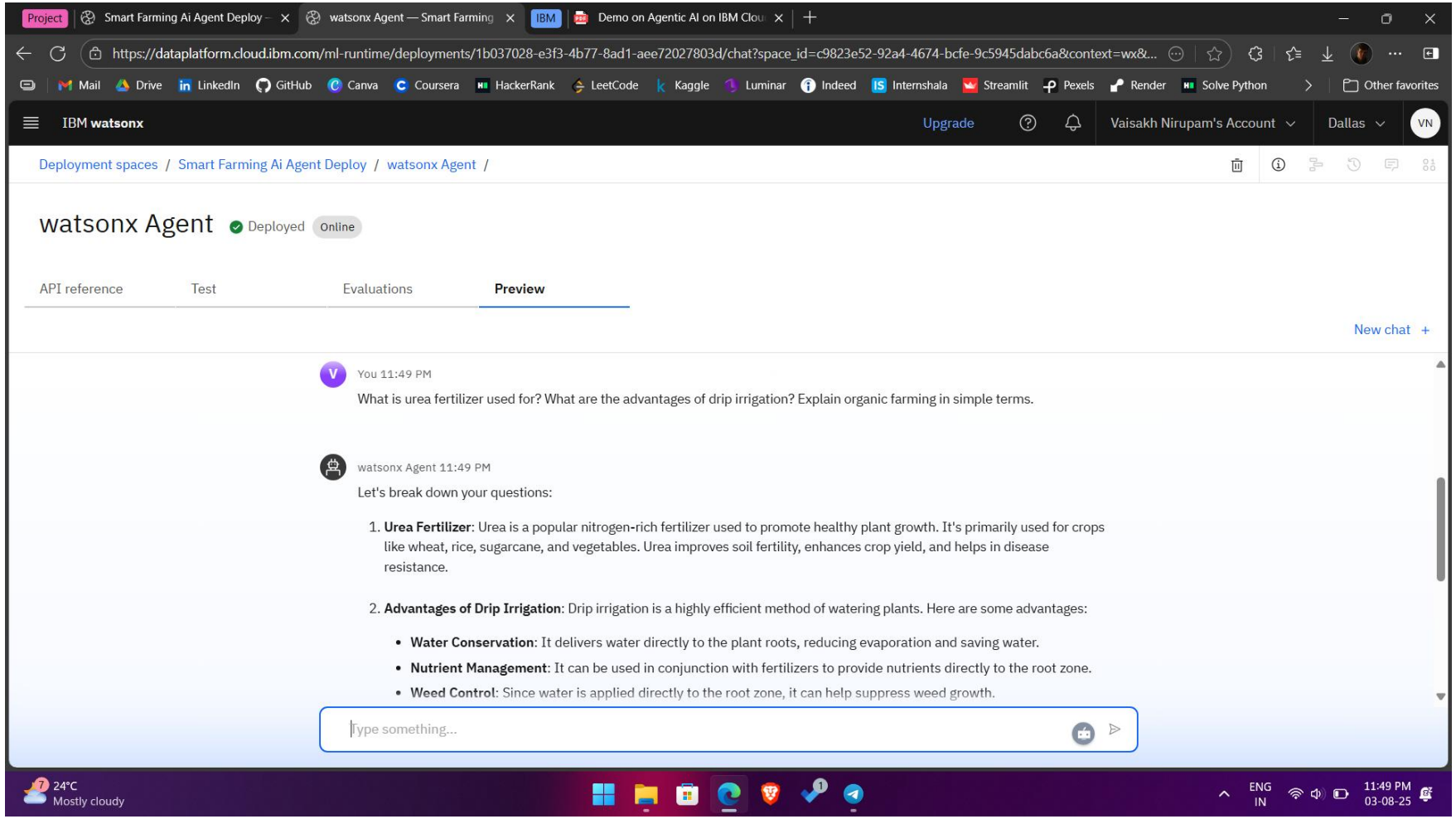
RESULT



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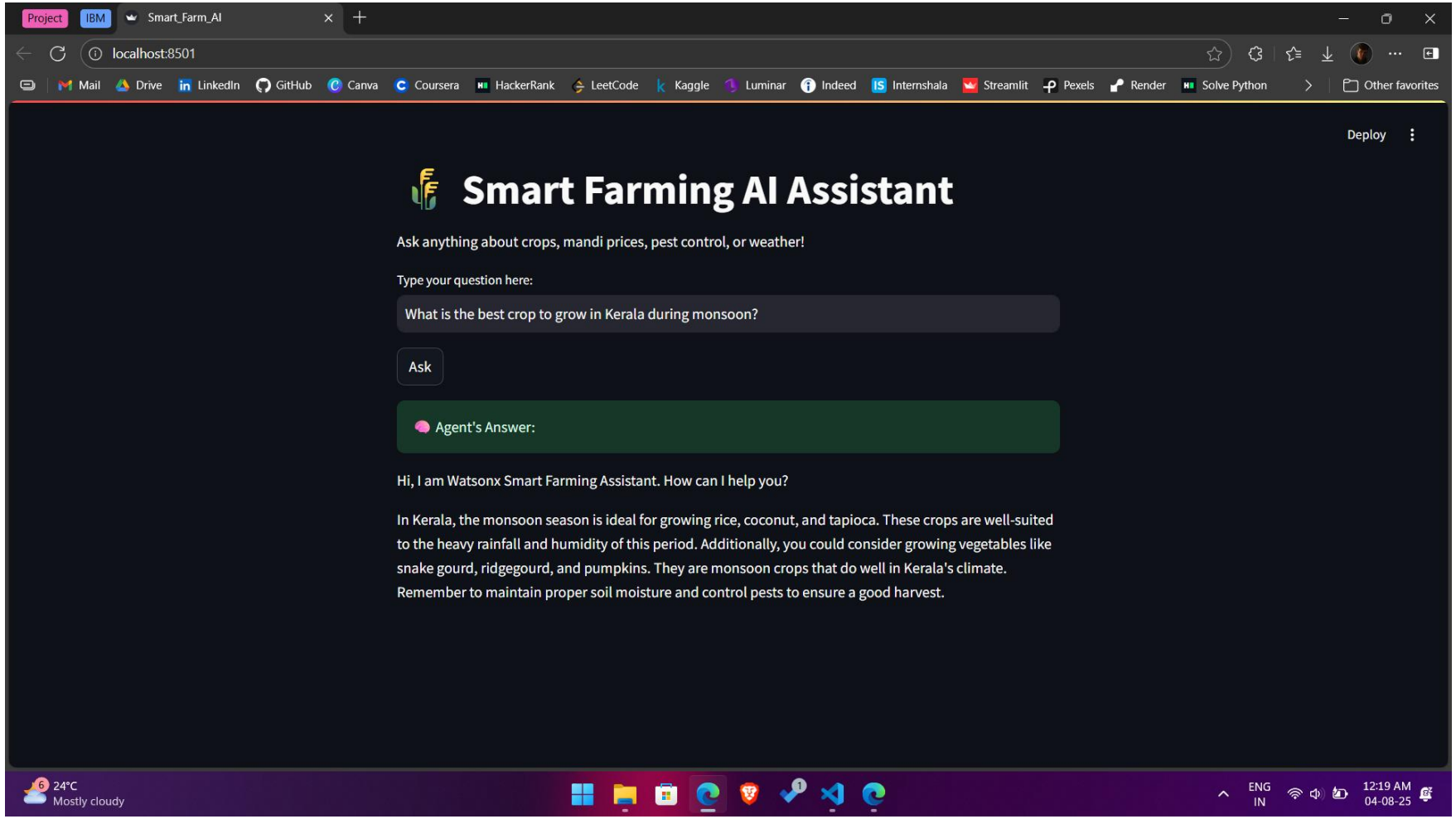
RESULT


Project
IBM
Smart_Farm_AI
localhost:8501
Mail
Drive
LinkedIn
GitHub
Canva
Coursera
HackerRank
LeetCode
Kaggle
Luminar
Indeed
Internshala
Streamlit
Pexels
Render
Solve Python
Other favorites
Deploy
Smart Farming AI Assistant
Ask anything about crops, mandi prices, pest control, or weather!
Type your question here:
What is the best crop to grow in Kerala during monsoon?
Ask
Agent's Answer:
Hi, I am Watsonx Smart Farming Assistant. How can I help you?
In Kerala, the monsoon season is ideal for growing rice, coconut, and tapioca. These crops are well-suited to the heavy rainfall and humidity of this period. Additionally, you could consider growing vegetables like snake gourd, ridgegourd, and pumpkins. They are monsoon crops that do well in Kerala's climate. Remember to maintain proper soil moisture and control pests to ensure a good harvest.
24°C
Mostly cloudy
ENG
IN
12:19 AM
04-08-25

CONCLUSION

The Smart Farming AI Agent effectively bridges the knowledge gap for small-scale Indian farmers. It provides contextual and multilingual answers powered by IBM Watsonx AI, increasing farming accuracy and reducing guesswork. The platform demonstrates how retrieval-augmented generation can improve agricultural decision-making in real-time.

FUTURE SCOPE

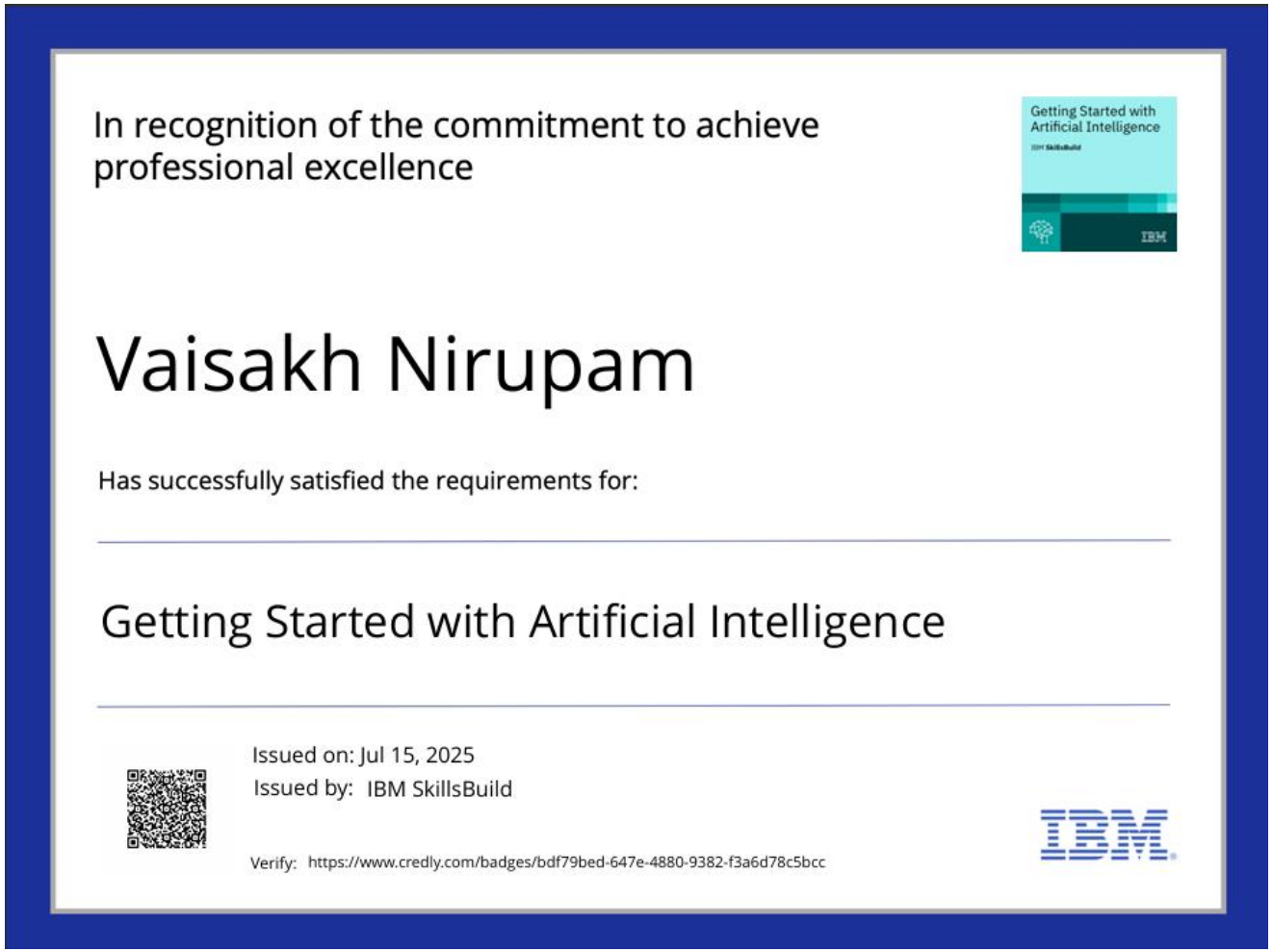
FUTURE SCOPE:

- Add voice-based support for farmers with low literacy
- Integrate crop disease detection via image input
- Expand to multilingual support using translation APIs
- Include financial advice based on crop cycles and subsidy availability
- Train the model on Indian agricultural datasets for hyperlocal accuracy

REFERENCES

- IBM Watsonx Documentation
- RAG-based Agent Lab - IBM Official Guide
- Edunet Foundation IBM Internship Program -Instructor led sessions
- Demo on Agentic AI on IBM Cloud -Internship Guide PDF provided via Edunet Group

IBM CERTIFICATIONS



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IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Vaisakh Nirupam

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 29 Jul 2025 (GMT) **Learning hours:** 20 mins

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THANK YOU

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