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# CAPSTONE PROJECT

## SMARTFARM\_AGENT:AN AI AGENT FOR SMART FARMING ADVICE USING IBM WATSONX

**Presented By:**

**Student name:Kundam Yaswanth Chandra Gupta-College:Saveetha College of Liberal  
Arts and Sciences(SIMATS)-Department:BCA**

# OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

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# PROBLEM STATEMENT

- Small-scale farmers often lack access to timely, reliable agricultural information in their local language. This results in poor decisions related to crop selection, weather preparedness, pest control, and market pricing leading to reduced productivity and income. There is a need for an AI-based solution that provides real-time, localized, and easy-to-understand farming advice to support informed decision-making and sustainable agriculture.

# PROPOSED SOLUTION

- The proposed system provides smart, real-time agricultural guidance to farmers using Retrieval-Augmented Generation (RAG) and language models. The AI agent helps answer farming-related queries accurately by leveraging trusted external data sources
- **Data Collection:**
  - Retrieve real-time data on weather,soil,crop suitability,pests alerts,and many prices.
  - Sources include meterological APIs,agri-tech platforms,and agricultural databases.
- **Data Preprocessing:**
  - Clean and filter retrieved data for relevance and accuraccy
  - Translate or simplify technical terms into farmer-friendly language.
- **AI Agent(RAG+LLM):**
  - Use a large language model integrated with retrieval tools.
  - Architecture:LangGraph + ReAct,enabling reasoning and tool-based search.
  - Tool integration:tools like Google Search,Wheather,Wikipedia and Webcrawler are used to fetch accurate,updated answers.
- **Deployment:**
  - Agent is built using IBM watsonx Agent Lab.
  - User can interact with the agent through a simple chatbot interface.
- **Expected Outcome:**
  - Personalized advice based on user queries like:
  - What crop should I grow this season?

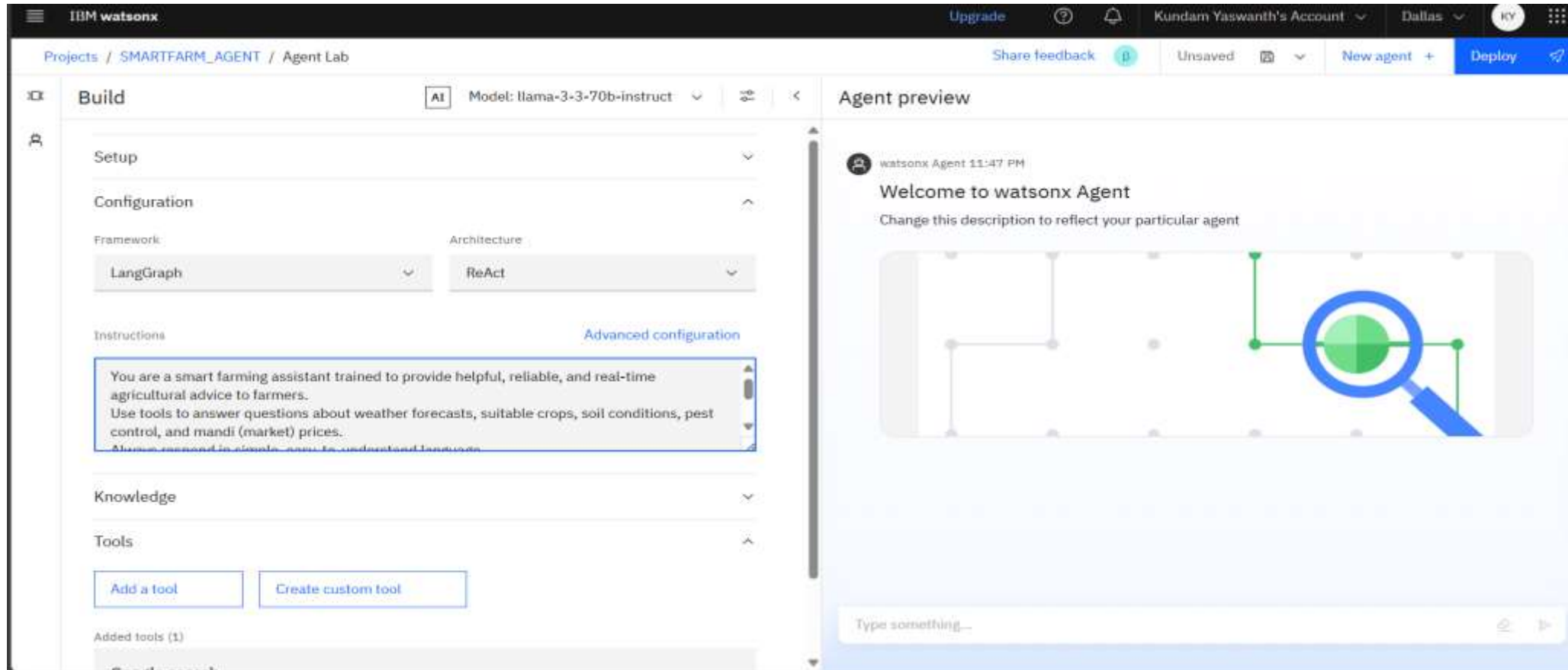
# SYSTEM APPROACH

- This section outlines the overall strategy and components used to build the Smart Farming Agent powered by Retrieval-Augmented Generation (RAG).
- ◆ **System Requirements:**
- IBM watsonx.ai – For agent creation and deployment
- Web Browser – To access the agent
- Internet Connection – To retrieve real-time agricultural data
- ◆ **Libraries / Tools Used:**
- LangGraph – To create a reasoning framework for the agent
- ReAct Architecture – To handle retrieval + reasoning steps
- Google Search Tool – For live data search
- Weather Tool – For climate-based crop suggestions

# DEPLOYMENT

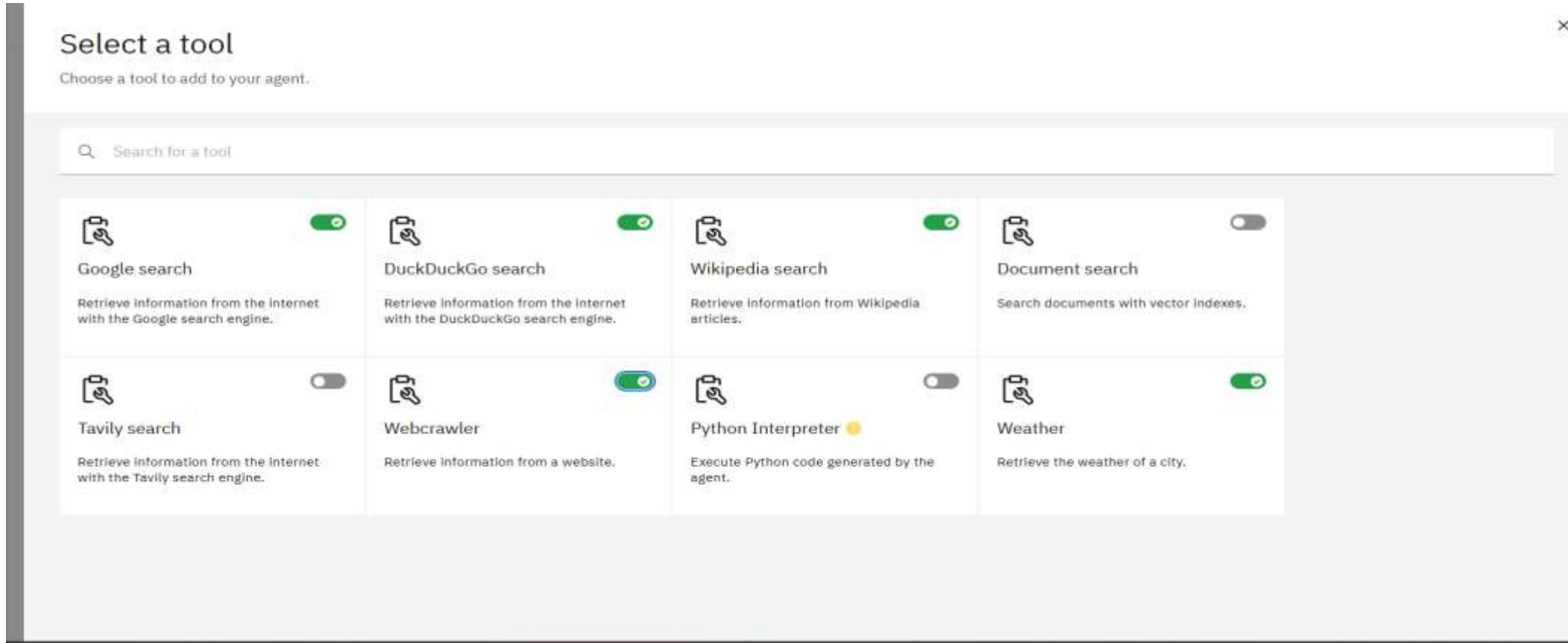
- The SmartFarm\_Agent is deployed using **IBM watsonx.ai Agent Lab**, a cloud-based environment that allows easy development and execution of AI agents without the need for manual server setup.
- ♦ **Deployment Highlights:**
- **Platform:** IBM watsonx.ai (cloud-hosted)
- **Interface:** Web-based agent interface for real-time user interaction
- **Tools Integrated:** Google Search, Weather API, Wikipedia, etc.
- **Always Live:** The system responds to user queries instantly using Retrieval-Augmented Generation (RAG)
- This deployment approach ensures high availability, low maintenance, and accessibility from anywhere with internet access.

# RESULT



This image shows the configuration of an AI agent using LangGraph and ReAct in Watsonx. The agent is trained to assist farmers with real-time advice on weather, crops, soil, pests, and mandi prices.

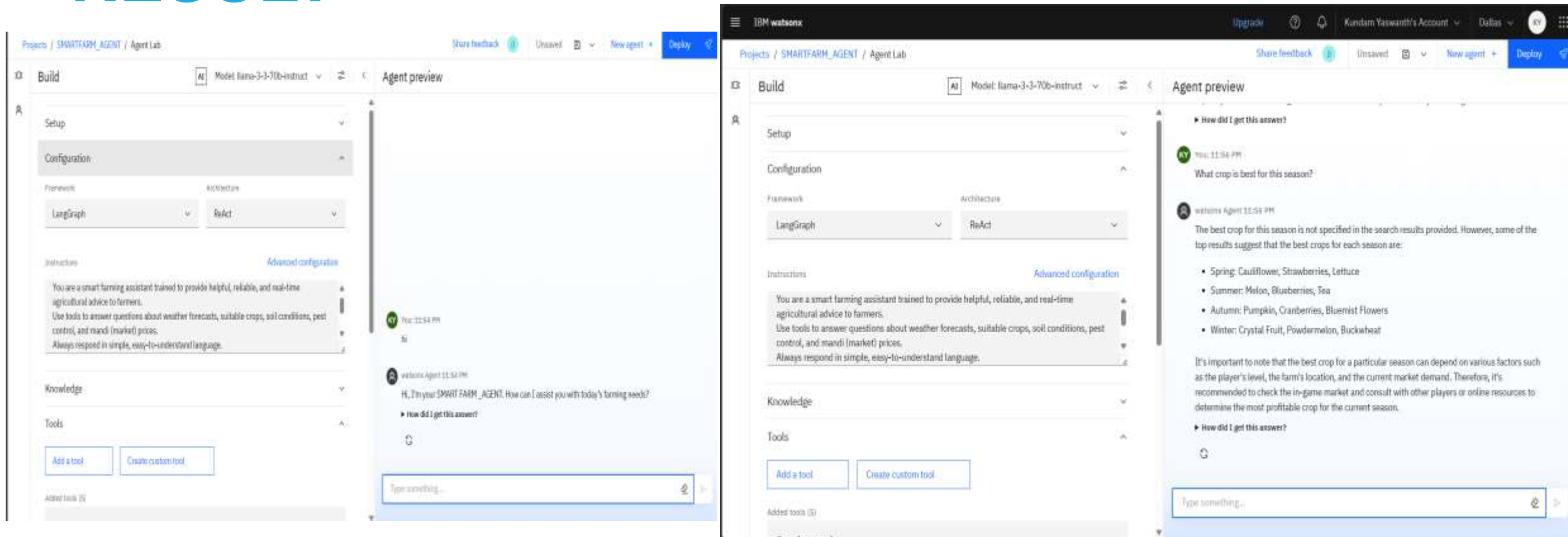
# RESULT



The agent is equipped with tools like **Google Search**, **Wikipedia**, **Weather**, and **Webcrawler** to provide real-time agricultural information and decision support for farmers.



# RESULT



The above images shows that the ai agent has given answers according to our instructions.

# RESULT

Projects / SMARTFARM\_AGENT / Agent Lab

Share feedback 0 Unsaved New agent + Deploy

Build

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

Setup

Configuration

Framework LangGraph Architecture ReAct

Instructions [Advanced configuration](#)

You are a smart farming assistant trained to provide helpful, reliable, and real-time agricultural advice to farmers.  
Use tools to answer questions about weather forecasts, suitable crops, soil conditions, pest control, and mandi (market) prices.  
Always respond in simple, easy-to-understand language.

Knowledge

Tools

Add a tool Create custom tool

Added tools (5)

Google search

Agent preview

- Autumn: Pumpkin, Cranberries, Bluemist Flowers
- Winter: Crystal Fruit, Powdermelon, Buckwheat

It's important to note that the best crop for a particular season can depend on various factors such as the player's level, the farm's location, and the current market demand. Therefore, it's recommended to check the in-game market and consult with other players or online resources to determine the most profitable crop for the current season.

► How did I get this answer?

KY You: 12:00 AM

what is todays mandi rate for tomatoes?

watsonx Agent 12:00 AM

The current mandi rate for tomatoes is ₹36.8 per kilogram in Punjab, ₹2283.33 per quintal in Madhya Pradesh, and ₹20.25 per kilogram in Uttar Pradesh. The retail market rate in Uttar Pradesh is ₹29 per kilogram. The average tomato price is ₹2025 per quintal, with the lowest market price being ₹1400 per quintal and the costliest market price being ₹3548.86 per quintal in Haryana.

► How did I get this answer?

🔄

Type something...

# CONCLUSION

- The Smart Farming AI Agent, powered by Retrieval-Augmented Generation (RAG), effectively addresses the information gap faced by small-scale farmers. By providing real-time, localized, and reliable agricultural advice, the agent empowers farmers to make informed decisions about crop selection, pest control, weather preparedness, and market pricing.
- This AI-driven solution enhances productivity, reduces risk, and improves income, bringing the benefits of smart farming to the grassroots.  
With multi-language support and easy access, it stands as a powerful step toward sustainable and inclusive agricultural development.

# FUTURE SCOPE

## **Voice-Based Interaction**

Add support for voice queries in local languages to improve accessibility for non-tech-savvy farmers.

### **•Mobile Application**

Develop a mobile app version to ensure on-the-go access for farmers in remote areas.

### **•Expansion to Livestock and Fisheries**

Extend the AI agent's capabilities to provide guidance for animal husbandry and aquaculture.

### **•Offline Capabilities**

Build offline support where limited internet connectivity exists, using periodic data syncing.

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# REFERENCES

- IBM watsonx.ai Documentation
- IBM watsonx.ai Agent Lab Tutorials
- FAO:Smart Farming Techniques.

# IBM CERTIFICATIONS

In recognition of the commitment to achieve  
professional excellence



Kundam Yaswanth chandra gupta

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



Issued on: Jul 20, 2025

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# IBM CERTIFICATIONS

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Yaswanth chandra gupta Kundam

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**