
CAPSTONE PROJECT

SmartChef AI – Recipe Preparation Agent

Presented By:

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OUTLINE

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Problem Statement

Problem Statement No. 16- Recipe Preparation Agent

The Challenge - A Recipe Preparation Agent helps users cook meals using only the ingredients they have on hand.

By inputting available groceries, users receive tailored recipe suggestions using a RAG-based AI system.

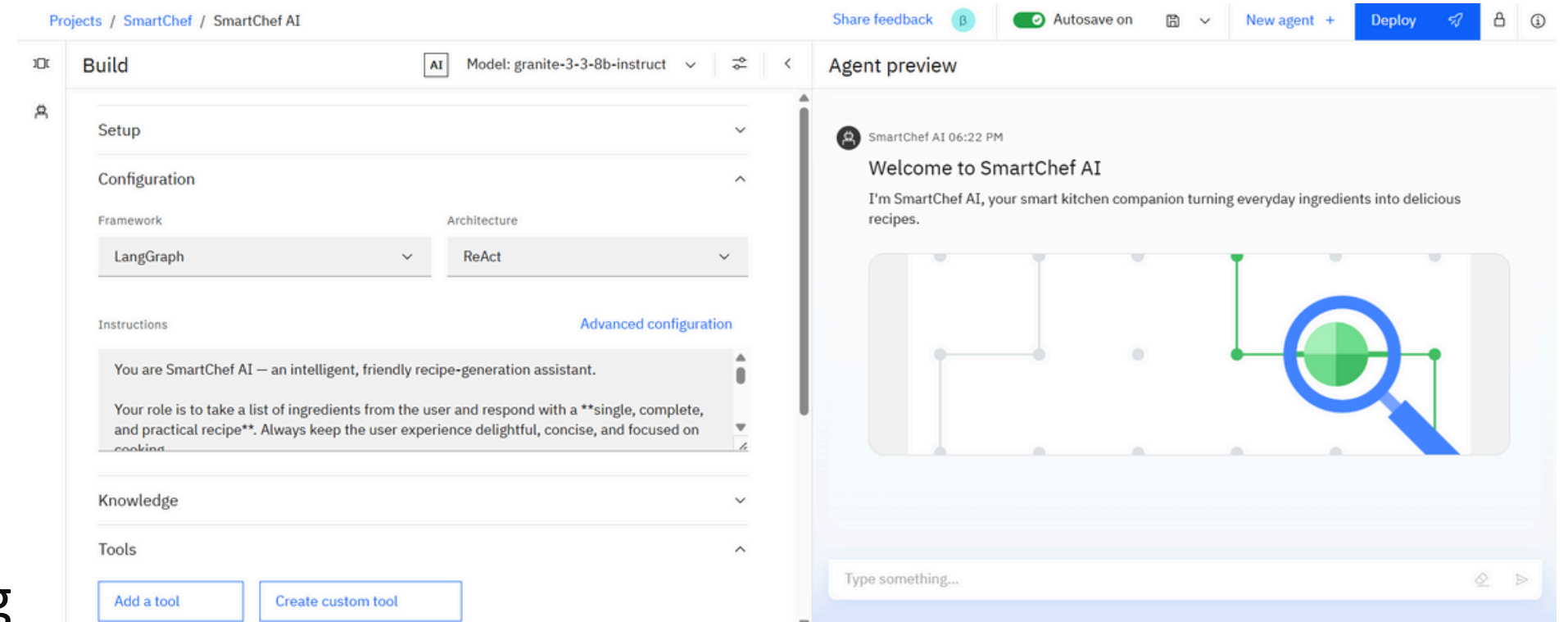
The agent retrieves relevant recipes and generates step-by-step instructions adapted to ingredient limitations.

It offers substitutions, cooking tips, and dietary adjustments based on user preferences or restrictions. Designed to reduce food waste and save time, it turns pantry items into practical meal solutions.

This AI assistant makes everyday cooking smarter, simpler, and more sustainable.

Proposed Solution

- **SmartChef AI** is an AI-powered virtual cooking assistant that:
- Accepts user's available ingredients as input
- Suggests tailored recipes using a Retrieval-Augmented Generation (RAG) model
- Guides users through each step interactively
- Suggests alternative ingredients when something missing
- Adjusts cooking instructions based on preferences (e.g., vegan, low-salt)



System Approach

Platform: IBM Cloud Lite Services + IBM Watson Assistant + Agentic AI Framework

Technologies:

- IBM Granite foundation model for language understanding
- RAG pipeline for fetching relevant recipes
- IBM Cloud Deployment Space for hosting & integrating the agent

Data Sources: Recipes, cuisines, meals and countries

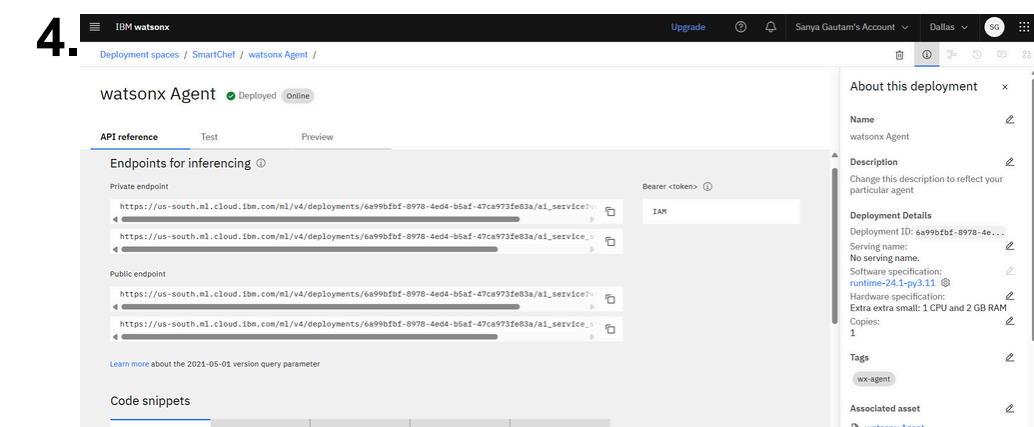
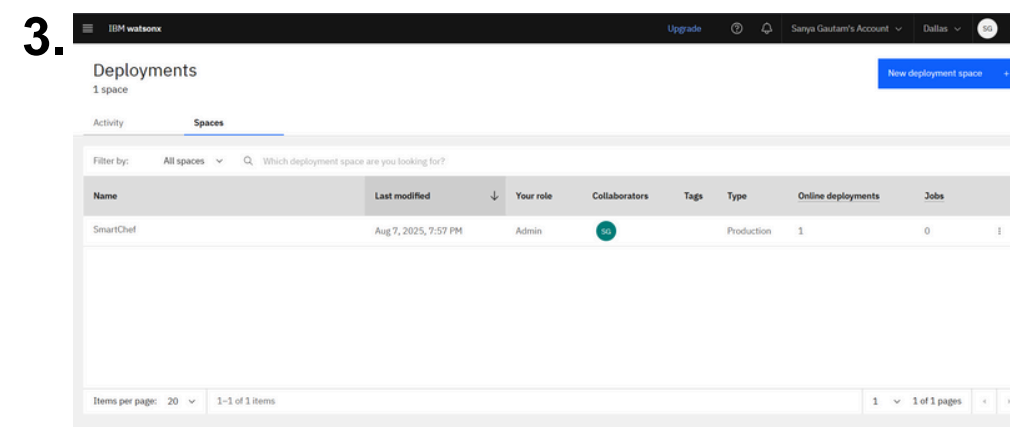
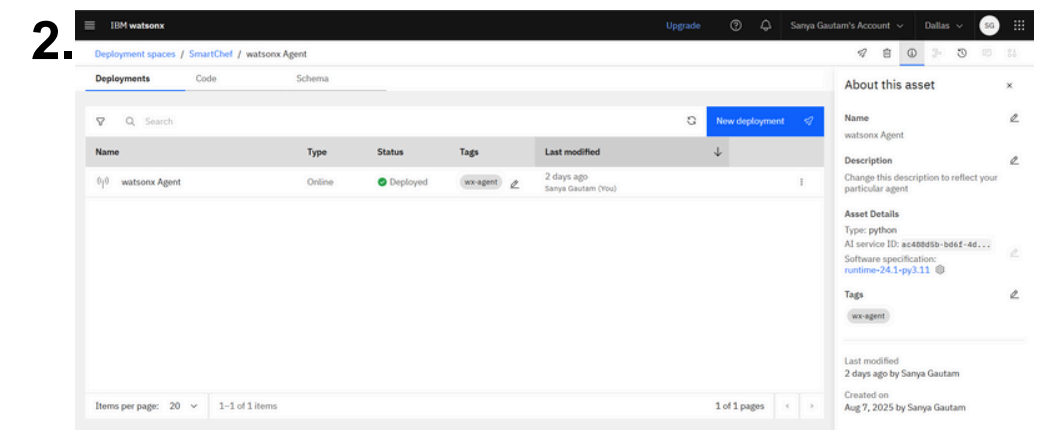
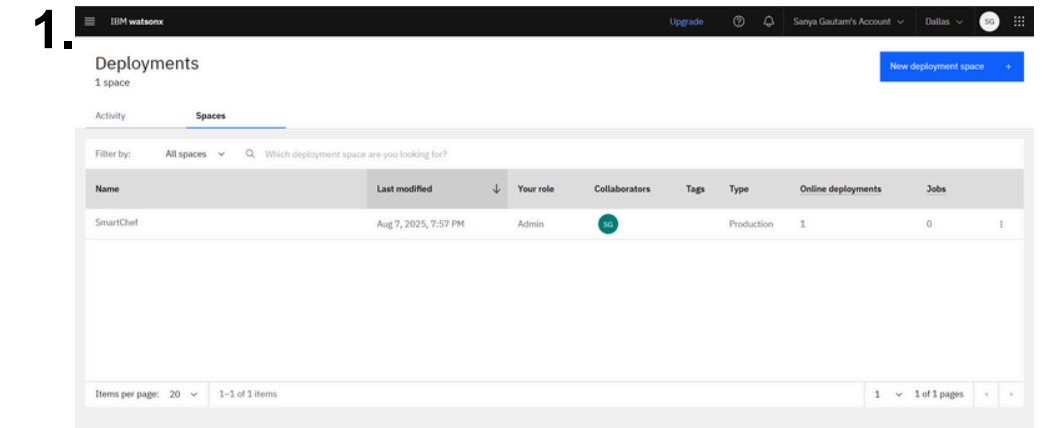
Algorithm & Deployment

Algorithm Flow:

1. User Input: Ingredients list provided by user
2. Recipe Retrieval: RAG model searches for recipes using available ingredients
3. Ingredient Validation: Missing ingredients flagged → substitutions suggested
4. Interactive Cooking: Step-by-step guidance provided
5. Follow-up Queries: Natural language queries answered during cooking

Deployment Process:

- Create deployment space in IBM Cloud
- Select IBM Granite model and configure
- Deploy
- Test API endpoints



Result

Example User Interaction:

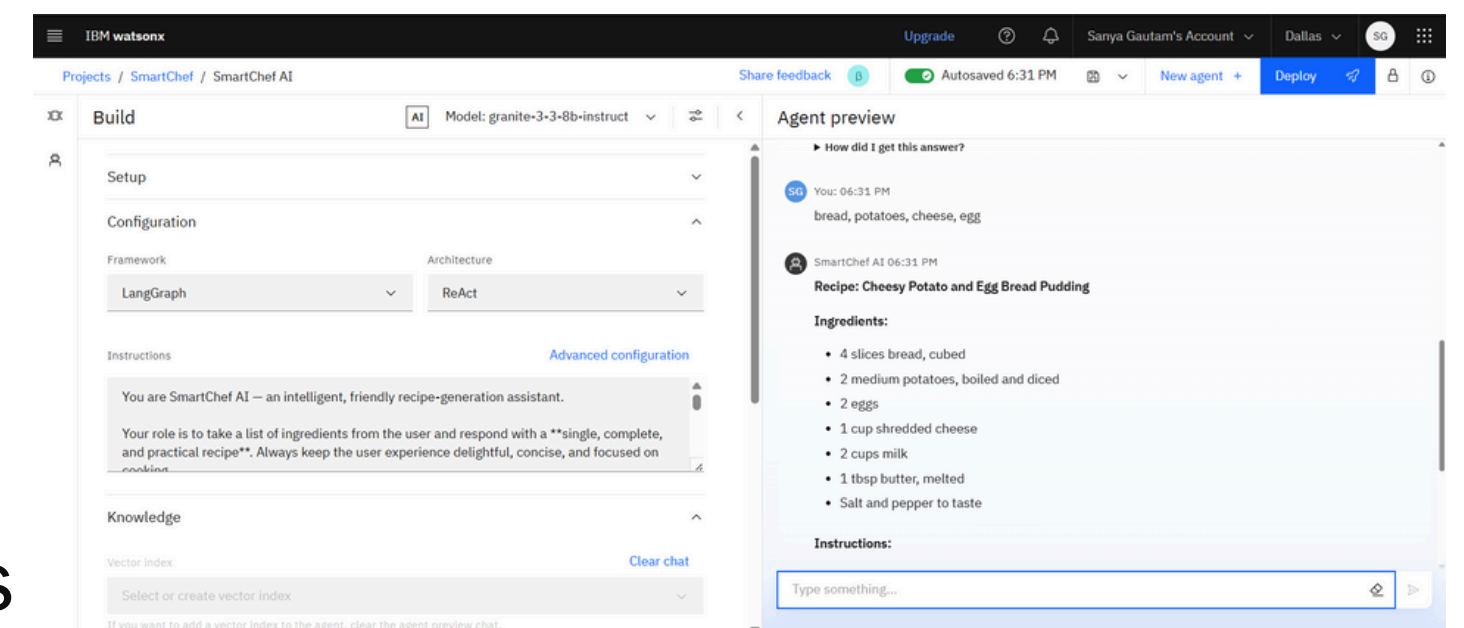
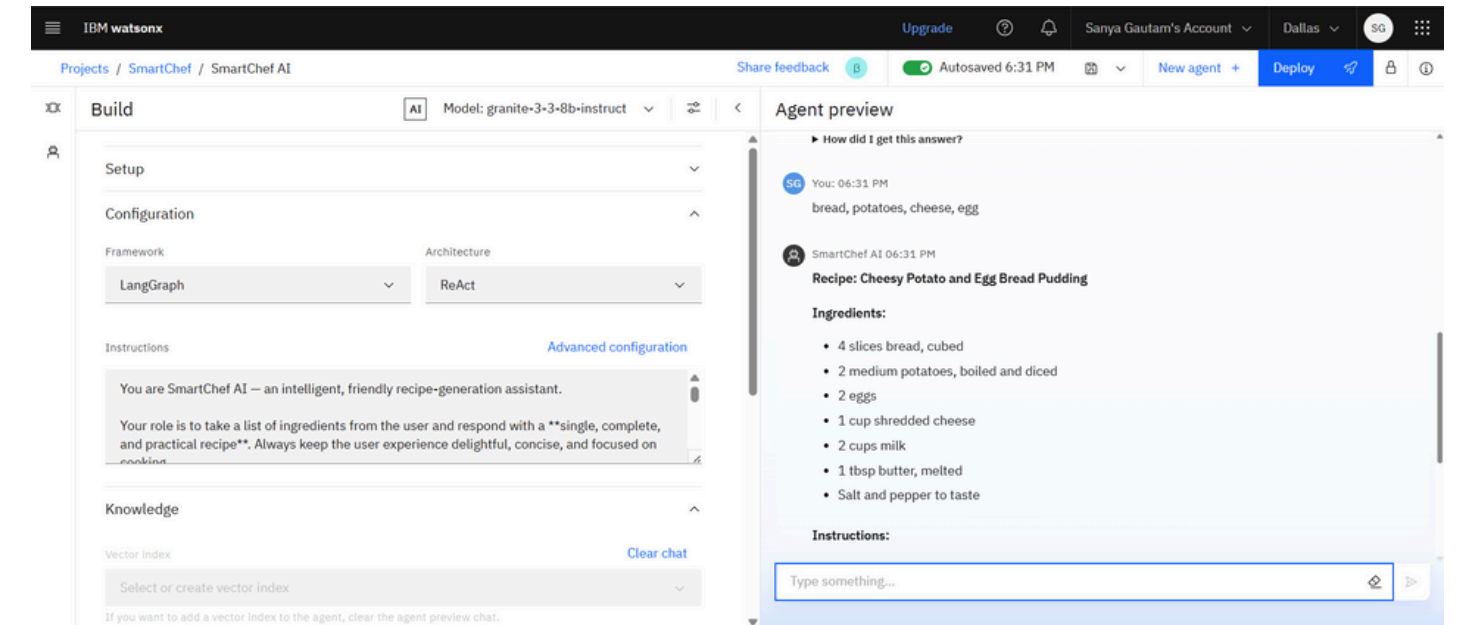
User: "bread, potatoes, cheese, egg"

SmartChef AI:

- Retrieved recipe "Cheesy Potato and Egg Bread Pudding"
- Listed exact ingredient quantities
- Provided clear, step-by-step cooking instructions

Key Outputs:

- Generates recipe tailored to available ingredients
- Includes precise measurements and cooking steps
- Offers a complete, ready-to-cook solution instantly



Conclusion

SmartChef AI makes cooking:

- Faster - no need to search multiple sites
- Smarter - adapts recipes to what's on hand
- More sustainable - reduces food waste
- More beginner-friendly - step-by-step guidance ensures success

Future scope

- Voice-only cooking mode for hands-free operation
- Integration with smart kitchen appliances
- Multi-language recipe support
- Nutrition tracking & meal planning
- Automatic pantry tracking via barcode scanning

References

- IBM Watson Assistant Documentation
- IBM Granite Model Guides
- Recipe datasets & culinary substitution resources

IBM Certifications

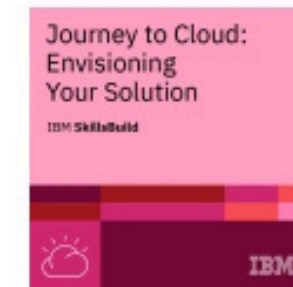
credly certificate(getting started with AI)



IBM Certifications

credly certificate(Journey to Cloud)

In recognition of the commitment to achieve
professional excellence



Sanya Gautam

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



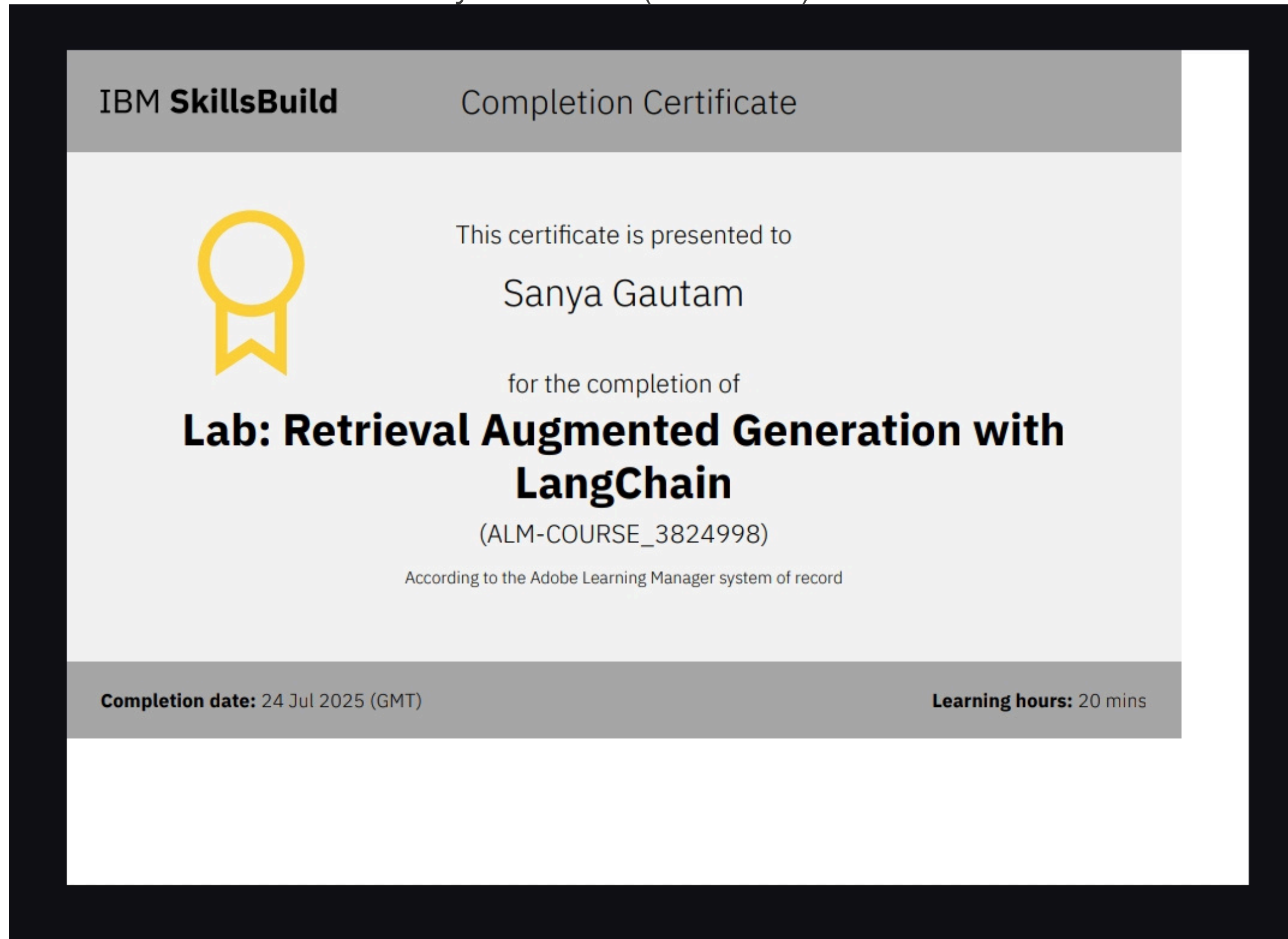
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IBM Certifications

Credly certificate(RAG Lab)



GITHUB REPOSITORY LINK

Github Repo link



THANK YOU