
CAPSTONE PROJECT

RECIPE PREPARATION AGENT

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

Example: In daily life, individuals often struggle to prepare meals with limited ingredients available at home. Searching for suitable recipes manually wastes time and can result in food wastage or underutilization of ingredients. There's a need for an intelligent system that helps users find practical recipes using only what's already in their kitchen, accommodating dietary preferences or restrictions as well.

PROPOSED SOLUTION

- We propose a Watsonx-powered Recipe Preparation Agent that helps users find meals based on the ingredients they currently have at home. This AI assistant is designed using Retrieval-Augmented Generation (RAG) and leverages IBM Watsonx services to retrieve and generate cooking steps and suggestions.
- Step-by-step overview:
 1. User Input: The user enters a list of ingredients (e.g., "onions, rice, and tomatoes").
 2. Vector Search: Using IBM Watsonx Knowledge Base (vector index), the agent searches the uploaded `.txt` file for recipes that match or relate to the entered ingredients.
 3. Response Generation: The AI generates step-by-step instructions using the prompt logic tailored for cooking guidance.
 4. Smart Substitutions: If any ingredient is missing, the agent suggests possible replacements.
 5. Sustainability: This system helps reduce food waste by providing usable recipes from available pantry items.
- Key Highlights:
 - Uses IBM Watsonx RAG for intelligent recipe retrieval
 - Minimal setup using IBM Cloud Lite's free tier
 - Simple `.txt` file as the knowledge base for recipe storage
 - Custom prompt to deliver natural and human-like cooking suggestions

SYSTEM APPROACH

- Technologies Used:

- IBM Watsonx.ai (Agent Lab)
- IBM Watsonx Knowledge Base (Vector Index)
- Retrieval-Augmented Generation (RAG) Model
- IBM Cloud Lite Free Tier

- Tools & Files:

- Custom `.txt` file with recipe ingredients and steps
- No third-party libraries or external datasets used
- IBM-generated runtime and sandbox project

Process:

1. Project creation in IBM Cloud (Watsonx sandbox)
2. Upload `.txt` corpus into knowledge base
3. Configure RAG Agent with prompt and vector index
4. Test and deploy live AI Assistant

ALGORITHM & DEPLOYMENT

- Here's an example structure that gives the preview of our solution in this section:
- **Algorithm Selection:**
 - Retrieval-Augmented Generation (RAG) model. Embeds query and recipe text using vector embeddings. Searches indexed documents and generates tailored response.
- **Steps:**
 - User enters available ingredients. Agent retrieves closest recipe entries via vector search. Generates steps with substitutions if needed.
- **Deployment:**
 - Built and deployed within IBM Watsonx Agent Lab . Deployed as a chat-based assistant and can be reused in customer-facing interfaces or embedded Uis.


RESULT

This depicts the name of the project as well as the deployment space for the same.



| | | |
|-------------|-----------------------------------|--|
| Recent work | Projects + | Deployment spaces + |
| | Aastha's sandbox 2 h ago AP | recipe-agent-deploy-1 16 min ago recipe-agent-deploy 55 min ago |

RESULT


Presenting the instructions and introducing RAG lab factor here by adding txt file/pdf.

 IBM watsonx


Projects / Aastha's sandbox / watsonx Agent [Share feedback](#)

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

Framework

LangGraph 

Architecture

ReAct 


Instructions

[Advanced configuration](#)


You are a smart and friendly recipe assistant that helps users cook using only the ingredients they currently have.

Your goal is to:

1. Suggest a recipe that uses **only the provided ingredients**

Knowledge 

Vector index

Select or create vector index 

recipe-index

Drop data files or browse to upload

Add PPTX, DOCX, PDF, or TXT files or select from project.

Add up to 300 MB with PPTX files, 50 MB of PDF files, 50 MB of DOCX files, or 5 MB with TXT and other files.

Browse

Select from project

Name

recipe-index

Description (optional)

Recipe data for meal suggestions.

Cancel

Create

edunet
foundation

RESULT

Saving.

IBM watsonx

Upgrade ? 🔔

Aastha Pant's Account ▾ Dallas ▾

Projects / Aastha's sandbox / watsonx Agent

Share feedback β 🟢 Autosaved 9:46 PM 📁 ▾ New agent + Deploy 🚀

🖨

🤖

Save your work

Specify how to save your work by selecting an asset type and defining details.

Asset type

Agent ✓
Save as an editable agent asset that can be reopened in this tool.

Standard notebook
Save the current agent as a notebook.

Deployment notebook
Save a notebook that can deploy your agent as an AI service.

Define details

Name

watsonx Agent

Description (optional)

Change this description to reflect your particular agent

☒ View in project after saving ⓘ

Cancel

Save

RESULT

Deployment.

Projects / Aastha's sandbox / watsonx Agent

Share feedback β Autosave on New agent + Deploy

Deploy as an AI service

Create an online deployment. If you want to edit code in notebook format before deploying, save as a deployment notebook. [Learn more.](#)

Define details

Deployment name

watsonx Agent

Target deployment space

recipe-agent-deploy-1

Why don't I see all of my deployment spaces?

Description (optional)

Cancel

Deploying

RESULT

Successful Deployment.

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Dallas ▾

AP

Deployment spaces /

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recipe-agent-deploy-1

Overview

Assets

Deployments

Jobs

Manage

Jump back in

📄

watsonx Agent

11 minutes ago

📄

recipe-index

11 minutes ago

⚙

expanded_recipe_knowledge.txt

11 minutes ago

View all (3)

Deployments

All ▾

✅ Deployed

1

❌ Failed

0

View deployments

Job runs

🔄 Active

0

❌ Failed last 24 hours ▾

0

Space history

🔄

⚠ No notifications

You will see your most recent notifications here.

RESULT

Final giving Prompt and testing.

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Autosaved 9:45 PM

New agent +

Deploy

🔒

📘

Build

AI

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

<

I have milk, oats, and banana.

- "Suggest a spicy dish using capsicum and egg."

- "What can I cook with tomato and rice?"

Knowledge

Vector index

Select or create vector index

Clear chat

If you want to add a vector index to the agent, clear the agent preview chat.

Tools

Add a tool

Create custom tool

Added tools (2)

Google search

Agent preview

Honey (optional)

Steps:

1. Peel and slice the banana.

2. Add banana, oats, and milk into a blender.

3. Add honey if you want it sweeter.

4. Blend until the mixture is smooth and creamy.

5. Pour into a glass and serve chilled.

Helpful tip: Use frozen banana for a thicker smoothie, or soak oats for 10 minutes for a smoother texture.

► How did I get this answer?

🔄

i have chickpeas , what can be made out of it , which is rich in protein?

RESULT

Solution.

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⚙️

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watsonx Agent 09:45 PM

Here's a high protein recipe using chickpeas:

Chickpea and Spinach Curry

Ingredients:

- 1 cup chickpeas
- 2 cups spinach
- 1 onion
- 2 cloves garlic
- 1 teaspoon cumin
- 1 teaspoon coriander
- 1/2 teaspoon turmeric

Type something...

RESULT

Solution.

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New agent +

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Google search

Agent preview

- 1 teaspoon cumin
- 1 teaspoon coriander
- 1/2 teaspoon turmeric
- 1/2 teaspoon cayenne pepper (optional)
- Salt and pepper to taste
- 2 tablespoons olive oil

Steps:

- Heat oil in a pan, add cumin, coriander, turmeric, and cayenne pepper. Cook for 1 minute.
- Add chopped onion and cook until translucent.
- Add garlic and cook for another minute.
- Add chickpeas and cook for 5 minutes.
- Add spinach and cook until wilted.
- Season with salt and pepper to taste.

Type something...

RESULT

Successful.

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Cook for 1 minute.

2. Add chopped onion and cook until translucent.

3. Add garlic and cook for another minute.

4. Add chickpeas and cook for 5 minutes.

5. Add spinach and cook until wilted.

6. Season with salt and pepper to taste.

7. Serve hot over rice or with naan bread.

Helpful tip: You can also add other protein sources like tofu or tempeh to increase the protein content of the dish.

► How did I get this answer?

Type something...

CONCLUSION

- The Recipe Preparation Agent successfully demonstrates how AI can simplify cooking with limited ingredients. By using IBM Watsonx and a well-structured prompt with RAG, it delivers accurate and personalized recipe suggestions. This reduces food waste, saves time, and supports sustainable living practices. The agent works smoothly post-deployment and responds accurately to ingredient-based queries.

FUTURE SCOPE

- Future scope:
 - Expand dataset to include international and regional cuisines.
 - Add voice input and speech-based instructions.
 - Integrate calorie calculation and nutritional facts.
 - Connect with grocery APIs for missing ingredient suggestions.
 - Multi-language recipe support for broader audience.

REFERENCES

- IBM Watsonx Documentation
- IBM Knowledge Base: Vector Indexing
- RAG model principles from Meta AI
- Dataset: Custom recipe `.txt` file
- <https://www.ibm.com/cloud/watsonx>
- Skillsbuild courses (AI & Cloud)

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professional excellence



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Getting Started with Artificial Intelligence



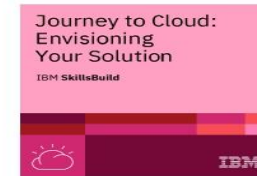
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7/24/25, 10:27 PM

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Completion Certificate



This certificate is presented to

Aastha Pant

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