
CAPSTONE PROJECT

RECIPE PREPARATION AGENT

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OUTLINE

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



PROBLEM STATEMENT

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

- The proposed system is a Recipe Preparation Agent that interacts with users via chat and helps them cook meals using only the ingredients they have.
- The AI agent uses IBM's Watsonx with [Granite models](#) and a [Retrieval-Augmented Generation \(RAG\)](#) approach to:
- Understand user inputs (ingredients):
 - It understands user [inputs](#) such as available [ingredients](#).
- Retrieve suitable recipes:
 - It [retrieves suitable recipes](#) from a predefined dataset or API.
- Generate clear, step-by-step instructions:
 - It generates clear, step-by-step [cooking instructions](#).
- Offer ingredient substitutions and dietary advice:
 - It offers ingredient substitutions and dietary suggestions.



SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing the Recipe Preparation Agent.

- Platform: *IBM Cloud Lite*
- Model: *IBM Granite (LLM)*
- Framework: *Watsonx Agent Builder*
- Architecture: *LangGraph with ReAct*
- Data: *Recipe Preparation (RAG)*
- Mode: *Chat-based interaction (AI Agent)*



MODEL CHOOSING & INSTRUCTIONS

The screenshot displays the IBM watsonx AI interface for configuring an agent. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, the user name 'SELVADHARSHINI SELVAT...', the location 'Dallas', and a session status icon. The main breadcrumb path is 'Projects / Recipe_Preparation_Agent / watsonx Agent'. The interface is divided into two main sections: 'Build' on the left and 'Agent preview' on the right.

Build Section:

- Model:** A dropdown menu is open, showing 'granite-3-3-8b-instruct' as the selected model. Other options include 'Recents' and 'View all foundation models'.
- Framework:** Two dropdown menus are visible: 'LangGraph' and 'ReAct'.
- Instructions:** A text area contains the following text: 'You are a friendly and knowledgeable virtual chef. Your role is to help users prepare meals using the ingredients they currently have. When a user provides a list of ingredients, suggest one or more recipe ideas they can make. For each recipe, provide: - The name of the dish.' A link for 'Advanced configuration' is present.
- Tools:** Two buttons are available: 'Add a tool' and 'Create custom tool'.

Agent preview Section:

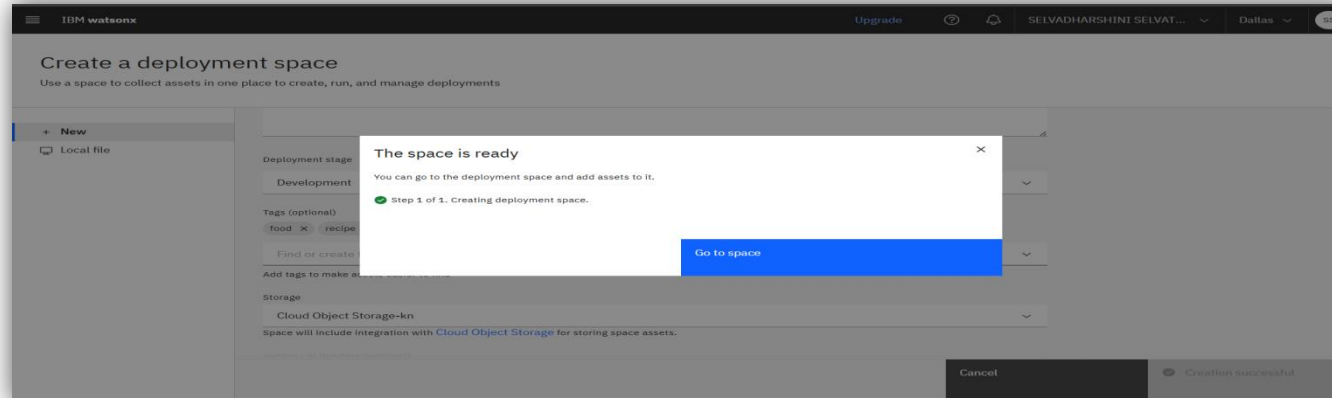
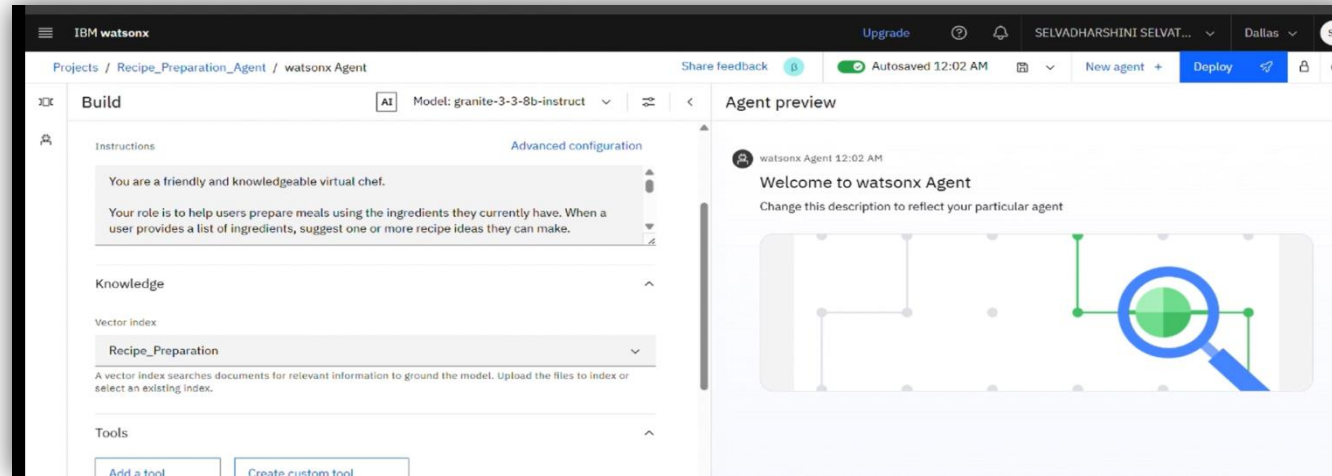
- Header:** 'watsonx Agent 12:38 AM' and 'Welcome to watsonx Agent'.
- Description:** 'Change this description to reflect your particular agent'.
- Diagram:** A flowchart with a central green circle and a blue magnifying glass icon.
- Input:** A text input field with the placeholder 'Type something...' and a 'Send' button.

ALGORITHM & DEPLOYMENT

- Algorithm: Retrieval-Augmented Generation (**RAG**)
- Input: User-provided ingredients (e.g., “I have onion and rice”)
- Retriever: Searches recipes from static dataset or public API
- Generator: **IBM Granite model** creates recipe steps, substitutes, and tips
- Deployment: Hosted on **IBM Cloud Lite** using Watsonx Agent UI
- Interaction: Users ask questions via text interface.



RAG KNOWLEDGE & DEPLOYMENT



RESULT

User : I have curd, rice, and mustard seeds.

Agent : Great! With those ingredients, we can make a simple and tasty One-Pot Chicken and Rice dish. However, it seems like we're missing chicken and some seasonings. If you're open to vegetarian options, we can create a flavorful Carrot and Rice Pilaf. Here's how:

Carrot and Rice Pilaf

A comforting and aromatic rice dish with carrots, perfect for a light meal or side.

Ingredients:

- 1 cup long-grain rice, 2 cups vegetable broth (or water), 1 large onion, chopped, 2 medium carrots, peeled and diced, 1 tablespoon olive oil, Salt and pepper to taste, Optional: 1/2 teaspoon turmeric for color and earthy flavor.

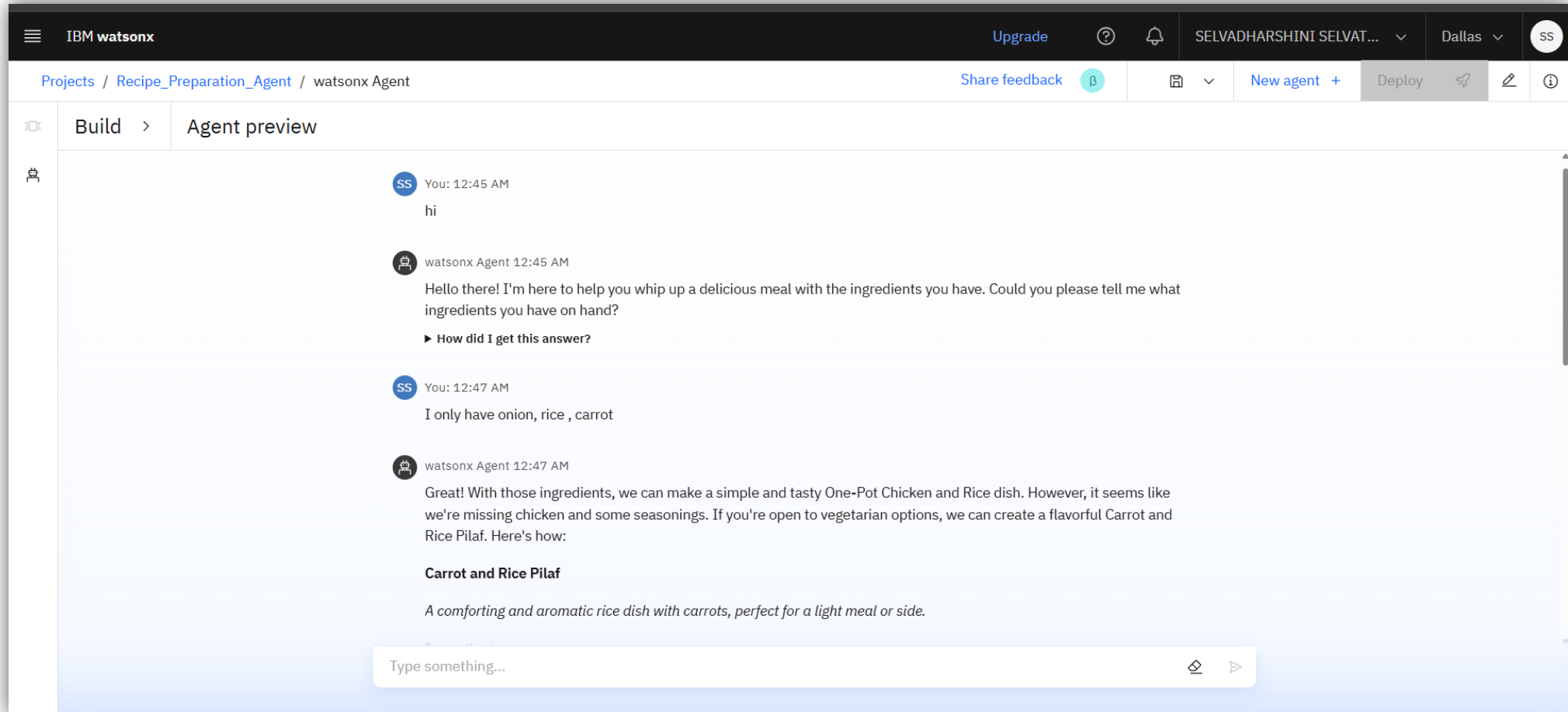
Instructions:

- Heat the olive oil in a large saucepan over medium heat. Add the chopped onion and diced carrots, sauté until the onion becomes translucent (about 5 minutes).
- Rinse the rice under cold water until the water runs clear, then add it to the pan. Stir for 1 minute to lightly toast the rice. Pour in the vegetable broth, add salt, pepper, and turmeric if using. Bring to a boil.
- Once boiling, reduce the heat to low, cover, and simmer for about 15-20 minutes, or until the rice has absorbed all the liquid and is tender. Remove from heat, let it stand for 5 minutes with the cover on, then fluff with a fork and serve.

Estimated Cooking Time: 25 minutes, **Servings:** 4



OUTPUT OF THE PROJECT



CONCLUSION

- The Recipe Preparation Agent provides a simple, effective way to turn household ingredients into meals.
- It reduces waste, saves time, and supports users with customized cooking help using AI.
- It shows how Agentic AI can support day-to-day tasks efficiently with minimal input.



FUTURE SCOPE

- Add voice and image input support
- Include multilingual interaction (Tamil, Hindi, etc.)
- Integrate with real-time recipe APIs
- Provide nutritional breakdowns and calorie counts
- Mobile app deployment for broader reach

REFERENCES

- 1. IBM Watsonx Documentation
- 2. IBM Granite Models Overview
- 3. IBM Cloud Lite Services
- 4. <https://developer.ibm.com/>

IBM CERTIFICATIONS

- Screenshot/ credly certificate(getting started with AI)



IBM CERTIFICATIONS

- Screenshot/ credly certificate(Journey to Cloud)



IBM CERTIFICATIONS

- Screenshot/ credly certificate(RAG Lab)





THANK YOU