CAPSTONE PROJECT

NUTRITION AGENT

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OUTLINE

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- Wow factor
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- Future scope
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PROBLEM STATEMENT

- In today's health-conscious world, people seek personalized nutrition advice that aligns with their unique medical conditions, lifestyle, preferences, and goals. However, most diet apps offer generic meal plans, lack adaptability, ignore allergies or cultural habits, and fail to provide real-time, dynamic guidance.
- At the same time, dietitians and nutritionists face scalability issues in delivering truly personalized consultations.
- There is a pressing need for an intelligent, interactive, and adaptive virtual nutrition assistant that can:
  - Understand user needs via natural inputs (text, voice, image)
  - Generate tailored meal plans based on health data
  - Adapt suggestions dynamically with user feedback
  - Provide context-rich nutritional explanations

TECHNOLOGY USED

IBM Cloud Lite ServicesUtilized for hosting, AI agent configuration, vector indexing, and deployment within IBM's free-tier infrastructure.

Natural Language Processing (NLP)Enables the AI agent to understand and process user inputs in natural language (text/voice), and generate human-like responses.

Retrieval-Augmented Generation (RAG)Enhances response accuracy by grounding the AI's answers in vectorized knowledge documents (e.g., nutrition PDFs).

IBM Granite ModelA state-of-the-art generative AI language model used for personalized meal planning, health advice, and contextual nutrition explanations.

IBM CLOUD SERVICES USED

- **IBM Cloud Watsonx AI Studio**
  Used for designing, developing, and managing the nutrition agent using LangGraph and ReAct architectures.
- **IBM Cloud Watsonx AI Runtime**
  Executes and scales the generative AI models, managing inference for real-time responses and agent interaction.
- **IBM Cloud Agent Lab**
  Visual interface to build and test agent workflows, configure tools (like vector search), and manage multi-step reasoning logic.
- **IBM Granite Foundation Model**
  A powerful LLM used to generate personalized and grounded responses based on user queries and vectorized knowledge.

WOW FACTORS

- 🧠 **Generative AI + RAG Integration**

Combines the power of IBM Granite LLM with vectorized document grounding for highly personalized, accurate responses.

- 📄 **Real Nutrition Knowledge Base**

Uses domain-specific PDF documents for meal planning, dietary guidelines, and health conditions not generic
chatbot answers.

- 🎯 **Personalized Health Guidance**

Provides diet suggestions based on user-specific data (e.g., diabetes, anemia, hypertension, weight goals).

- 🗣️ **Multimodal Input Ready**

Designed to support voice, text, and image inputs like food photos or grocery labels — future-ready interface.

- 💉 **Built Using IBM Watsonx Stack**

Leverages cutting-edge IBM Cloud services: Watsonx Studio, Granite Models, Vector Indexing, and Agent Lab.

- 📈 **Scalable and Adaptable**

Can easily be extended for fitness tracking, medical integration, or multilingual support using Watson APIs.

END USERS

- 👩‍🔬 **Academic Researchers**

Can explore diet-health interactions, test AI reasoning, and generate personalized nutrition scenarios for studies.

- 🏫 **Research Institutions & Universities**

Use it as a research tool or integrate into health-tech and AI curriculum for real-world application learning.

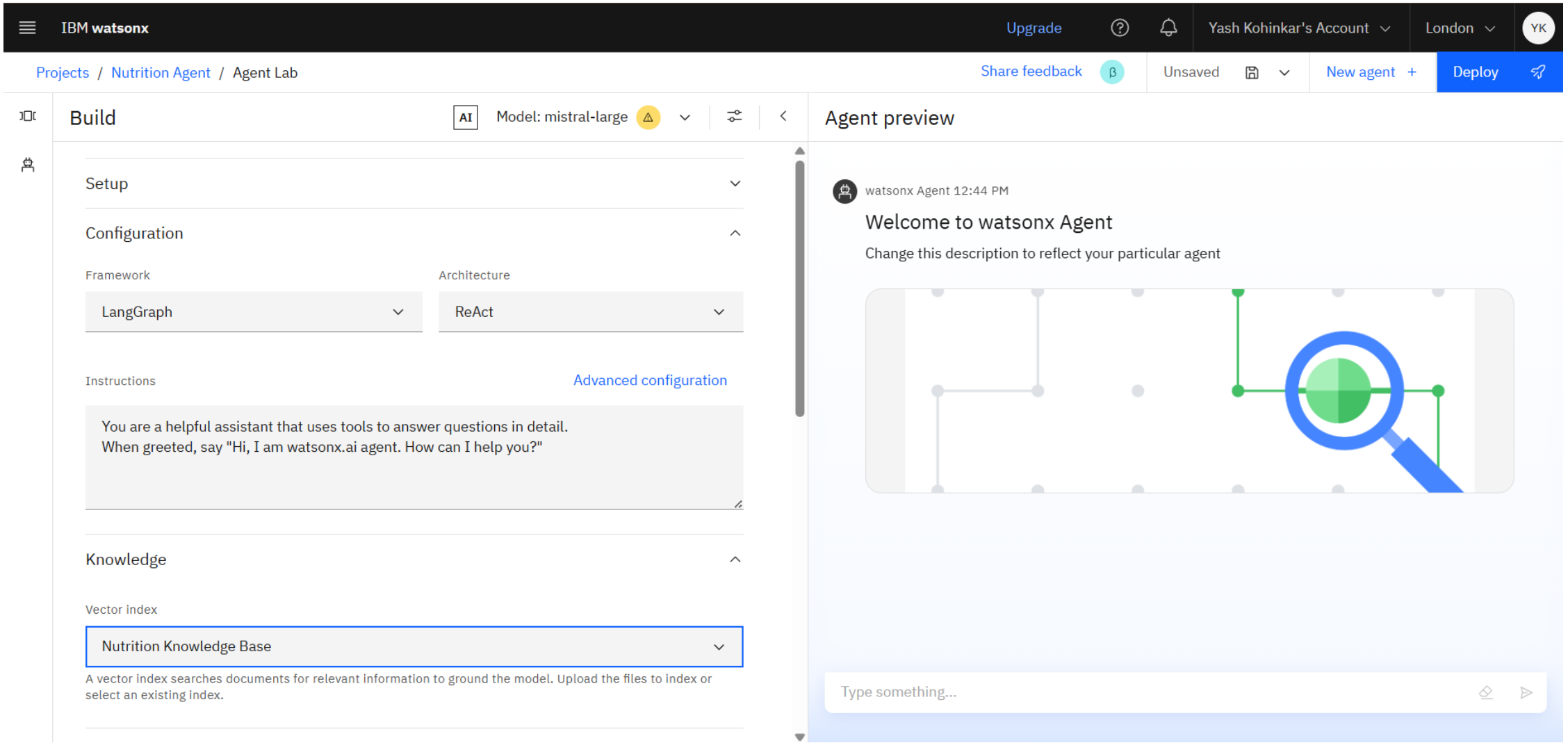
- 🏢 **Industry R&D Teams**

Ideal for companies developing personalized health and wellness platforms, food-tech innovation, or fitness apps.

- 👩‍🏫 **Educators & Trainers**

Demonstrates applied AI concepts like RAG, NLP, and LLMs for hands-on teaching in AI, nutrition, or data science courses.

RESULTS



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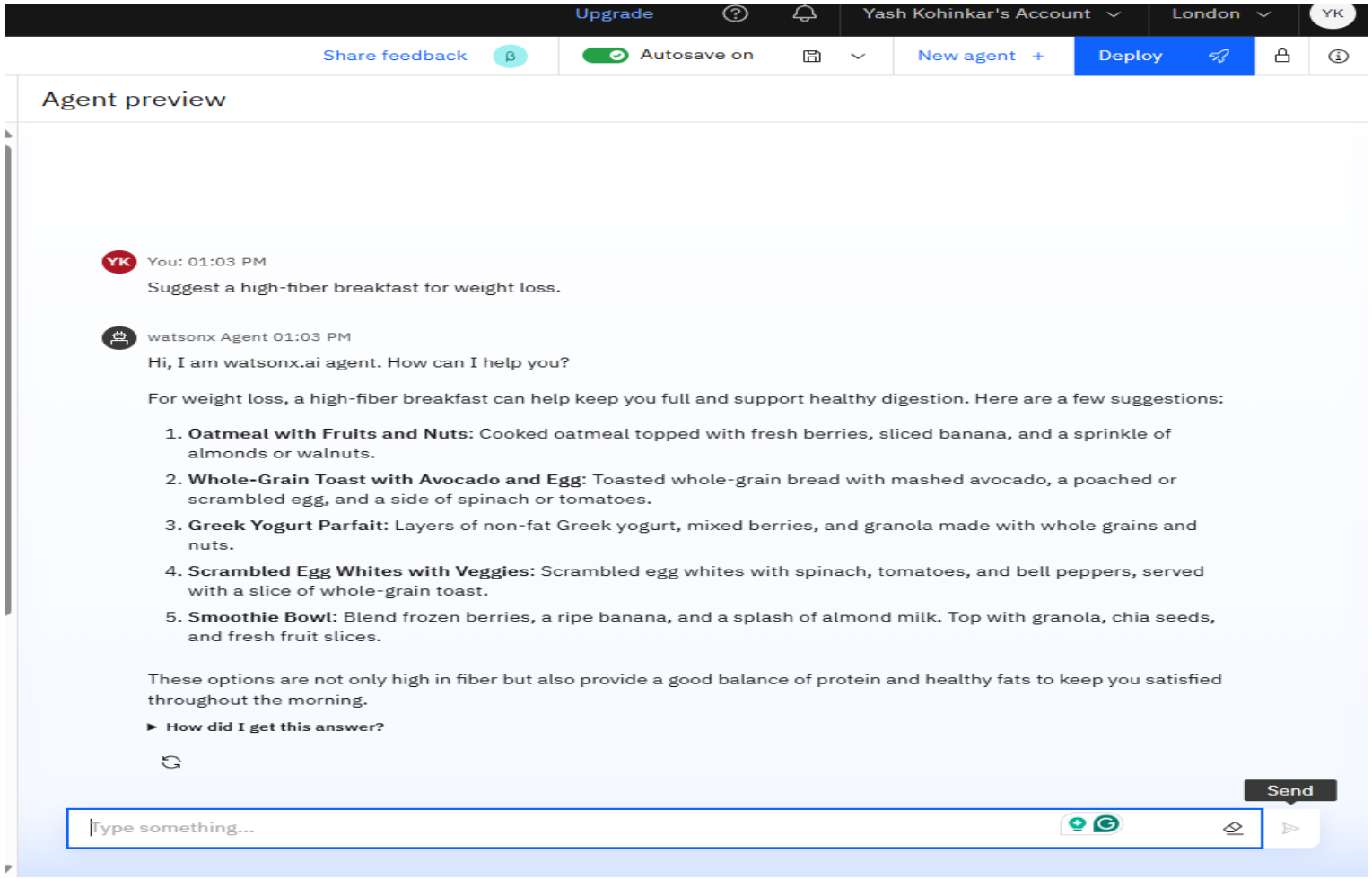
RESULTS



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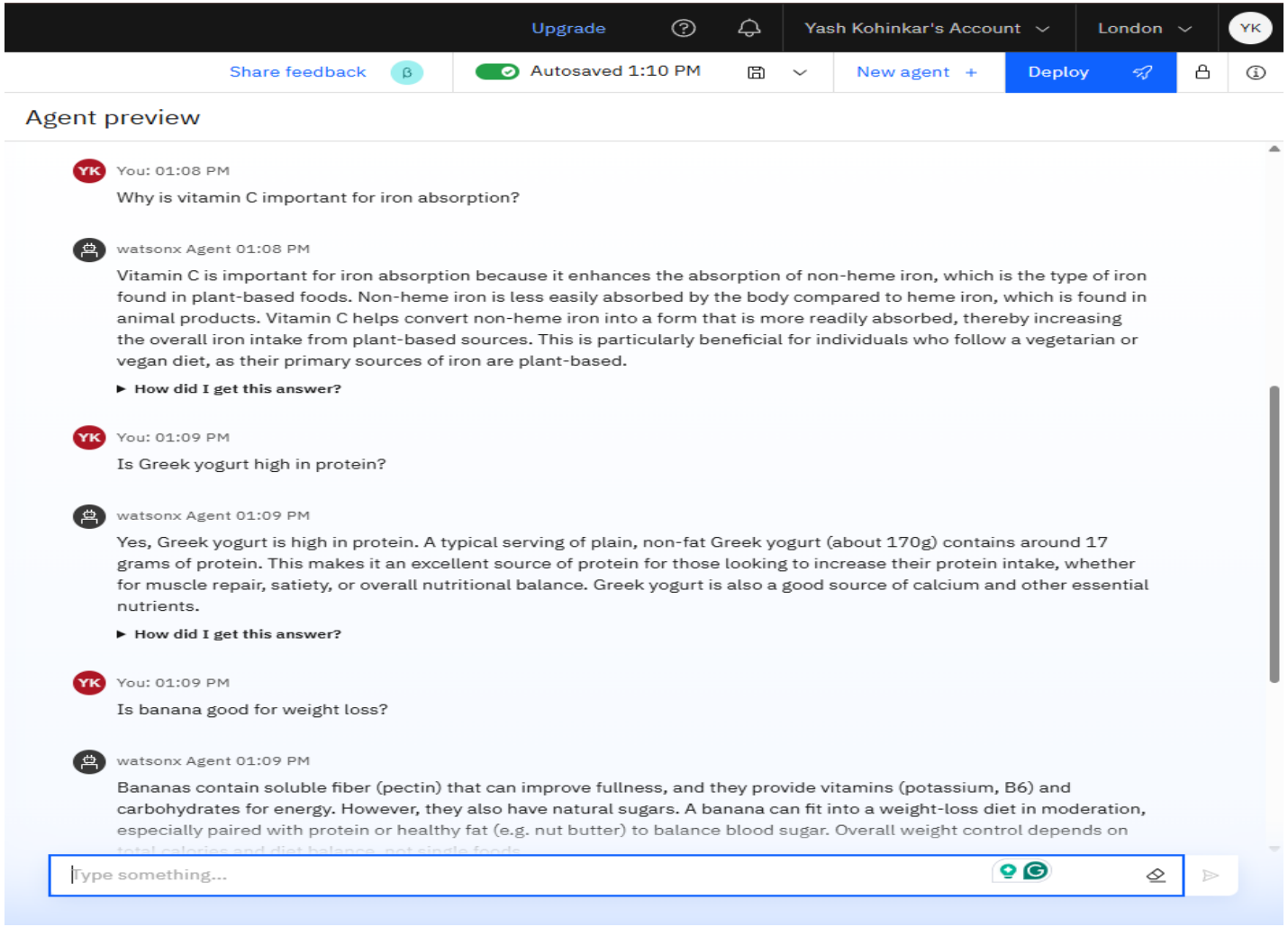
RESULTS



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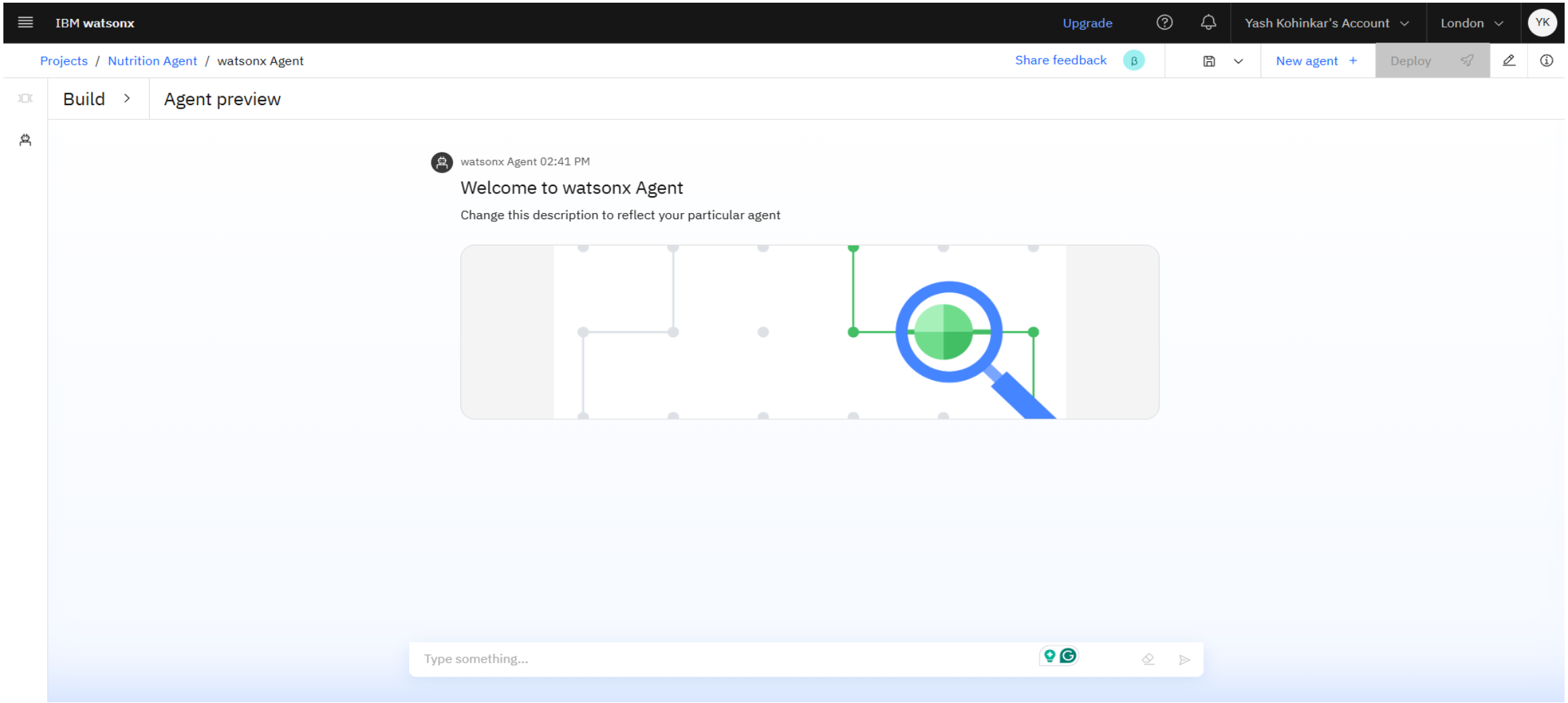
RESULTS



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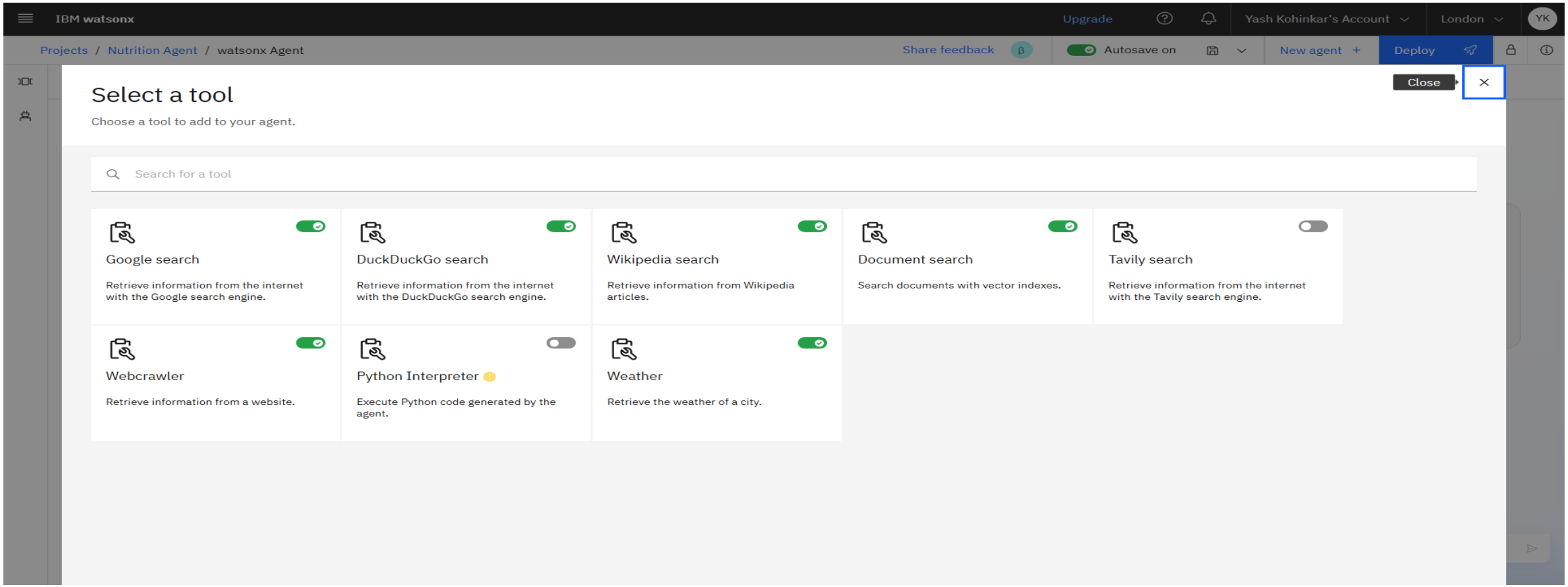

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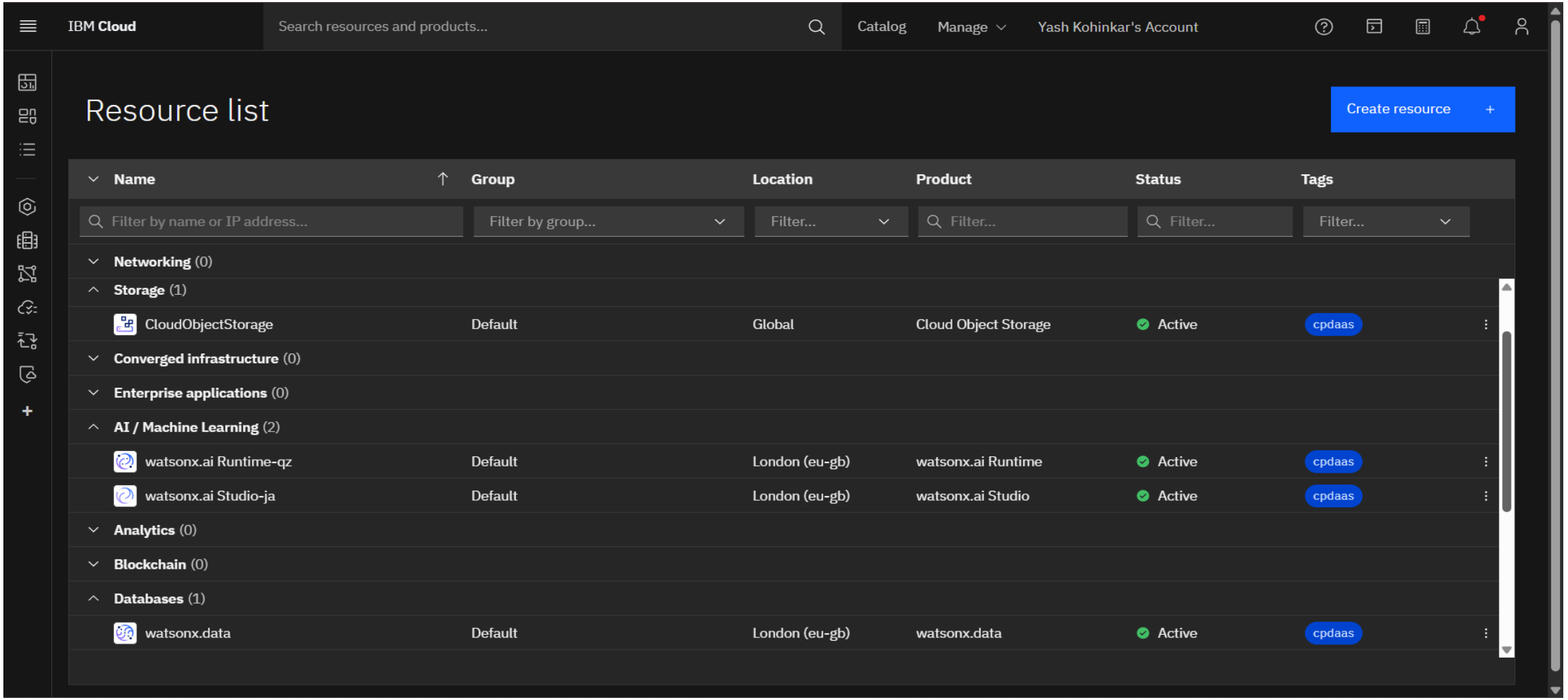
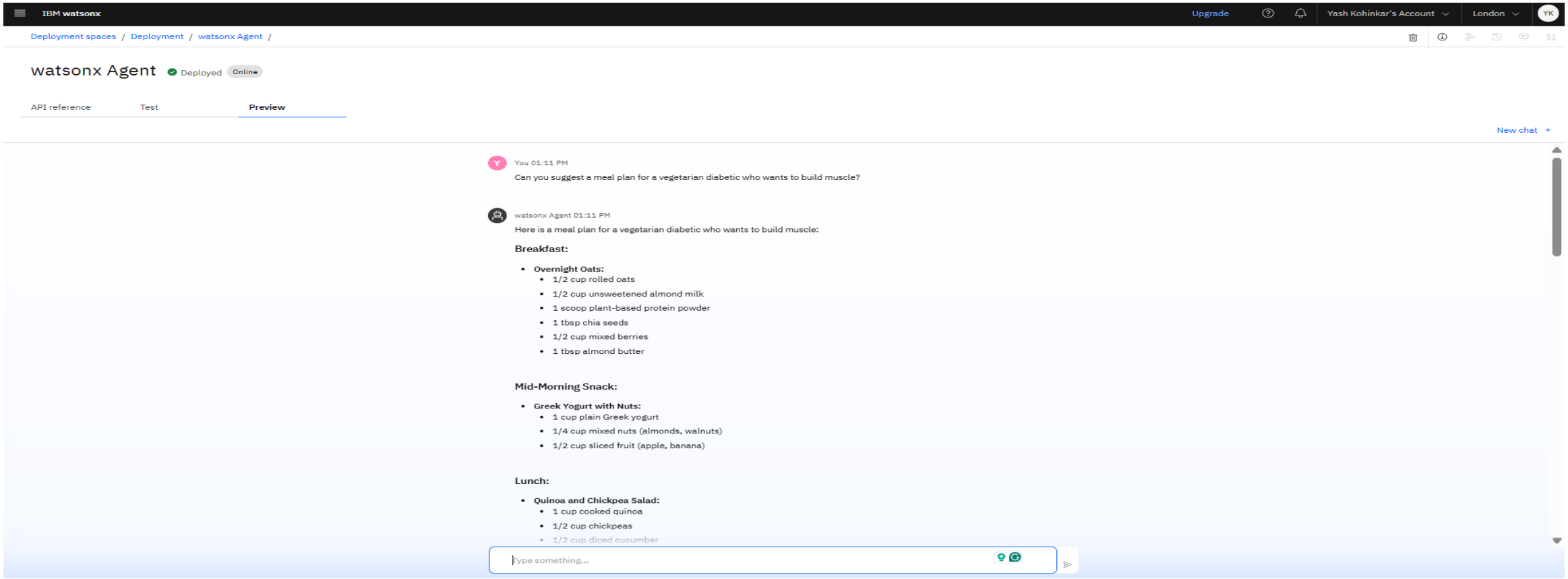
RESULTS



RESULTS

Deployed AI Agent



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CONCLUSION

- The Smartest AI Nutrition Assistant bridges the gap between generic diet apps and personalized health consultations by combining IBM's powerful generative AI (Granite model) with Retrieval-Augmented Generation (RAG).
  It delivers dynamic, grounded, and context-aware nutritional guidance tailored to individual user needs.
- By leveraging IBM Watsonx Cloud Services and integrating multimodal capabilities, this solution not only addresses a real-world problem but also showcases the future of intelligent, scalable virtual health assistants.

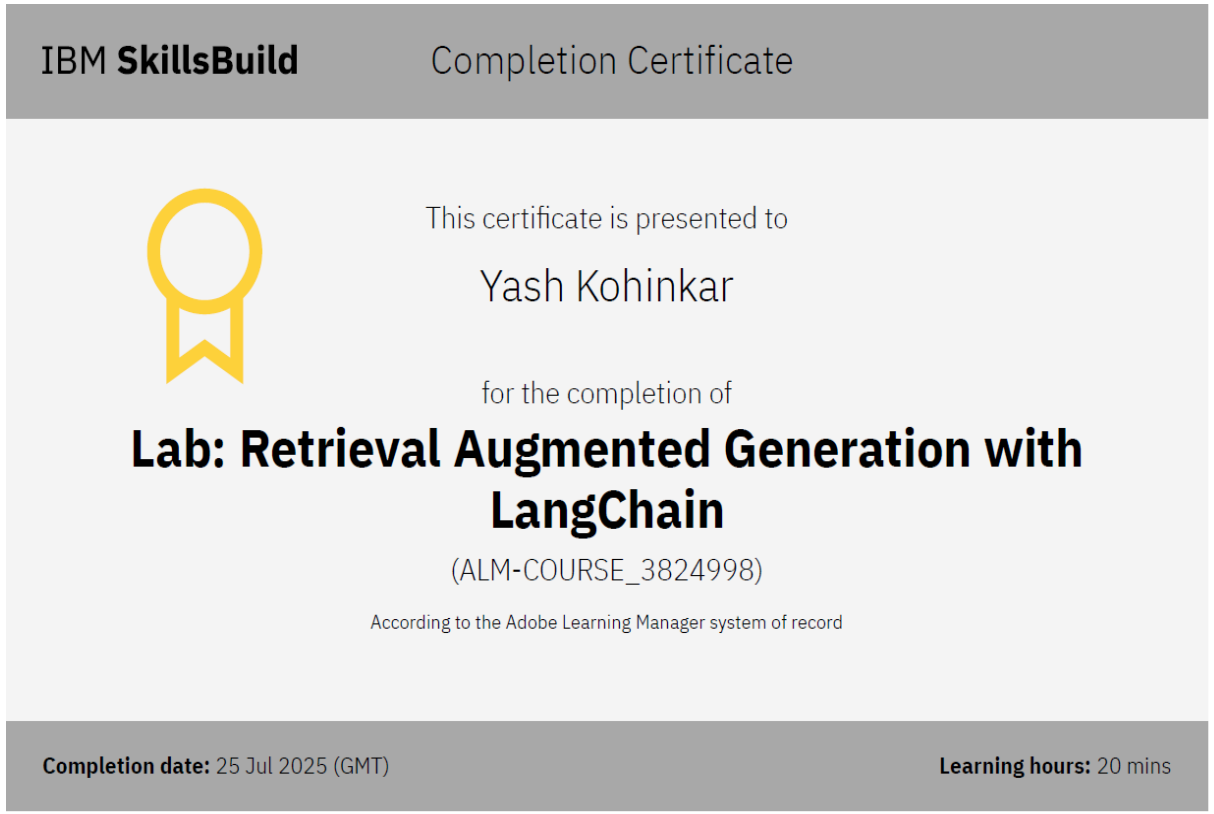
FUTURE SCOPE

- 🌐 Multilingual SupportEnable the assistant to understand and respond in multiple languages to reach a broader and diverse user base.
- 🎙️ Voice-Activated InteractionImplement speech-to-text and voice commands to allow hands-free, accessible usage for busy professionals and researchers.
- 🤝 Real-Time CollaborationIntegrate shared workspaces where teams can interact with the assistant collaboratively for research and nutrition planning.
- 🔍 Research Gap & Topic DiscoveryUse AI to identify unexplored areas in nutrition and health domains, supporting innovation and new study development.
- 📝 AI-Assisted Report & Paper DraftingExtend capabilities to help users write research papers or health reports using grounded knowledge and user prompts.
- 📤 Integration with Publishing PlatformsAllow direct export or submission of drafts to academic journals, repositories, or nutrition content platforms.

IBM CERTIFICATIONS

IBM CERTIFICATIONS

RAG CERTIFICATION



IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Yash Kohinkar

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 25 Jul 2025 (GMT) **Learning hours:** 20 mins

GITHUB LINK

https://github.com/yashkohinkar/Nutrition_Agent

THANK YOU

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