CAPSTONE PROJECT Research agent

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OUTLINE

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Problem Statement

Problem Statement No.1 - Research Agent

The Challenge- A Research Agent is an AI system designed to assist with academic and scientific research tasks. It can autonomously search for literature, summarize papers, and organize references. Using natural language processing, it understands research questions and retrieves relevant information.

The agent can generate reports, suggest hypotheses, and even draft sections of research papers.

It saves time by automating repetitive tasks like citation management and data extraction.

Research Agents enhance efficiency, accuracy, and innovation in both academic and industrial R&D.



Technology used

Framework : LangGraph

Architecture : ReAct

IBM cloud lite services

Natural Language Processing (NLP)

Retrieval Augmented Generation (RAG)

IBM Granite model



IBM cloud services used

- ► IBM Cloud Watsonx AI Studio
- ► IBM Cloud Watsonx AI runtime
- ► IBM Cloud Agent Lab
- ► IBM Granite foundation model



Wow factors

Al Research Assistant: Revolutionizing Academic Discovery and Collaboration

This intelligent research assistant dramatically shortens the time spent on literature reviews, elevates the quality of academic insights, and guides early-stage researchers toward promising directions. By making scholarly knowledge more discoverable, contextual, and actionable, it also encourages meaningful interdisciplinary collaboration.

Key Features

Semantic Search

Intuitively searches across research papers, journals, and datasets using meaning-based queries rather than simple keywords.

Automatic Summarization

Instantly generates concise summaries of selected papers to help users grasp key findings without reading full texts.

Citation and Influence Analysis

Tracks citations to map the influence and evolution of ideas over time.

Smart Paper Recommendations

Suggests relevant research papers tailored to a user's current topic or area of interest.

Trend Analysis

Analyzes historical data to uncover emerging trends, keyword growth, and shifts in research focus.

Collaboration Mapping

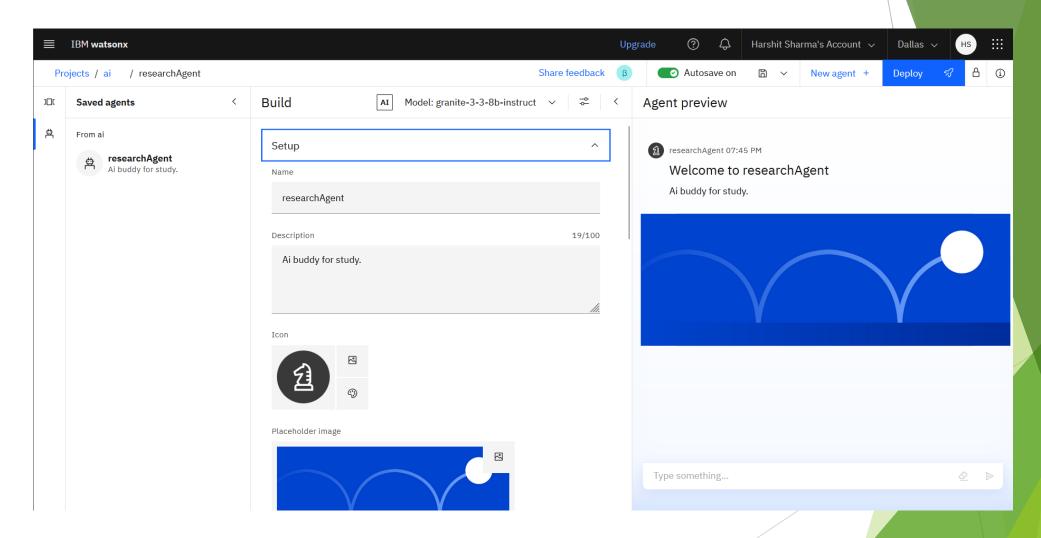
Identifies potential collaborators, co-authors, or institutions working on similar topics to foster academic partnerships.



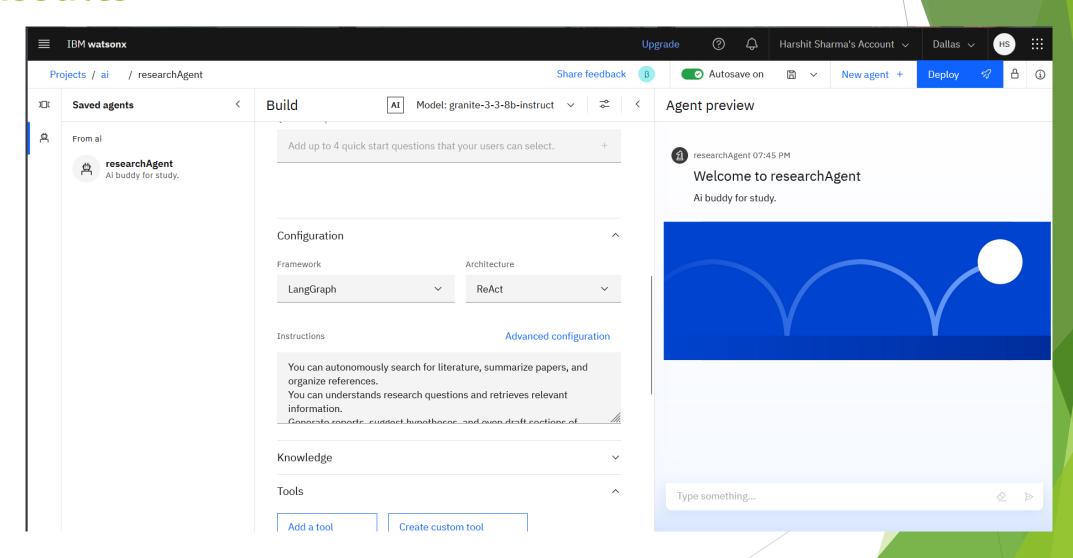
End users

- ► Academic Researchers
- ► Research Institutions and Universities
- ► Industry R&D Teams
- **Educators**



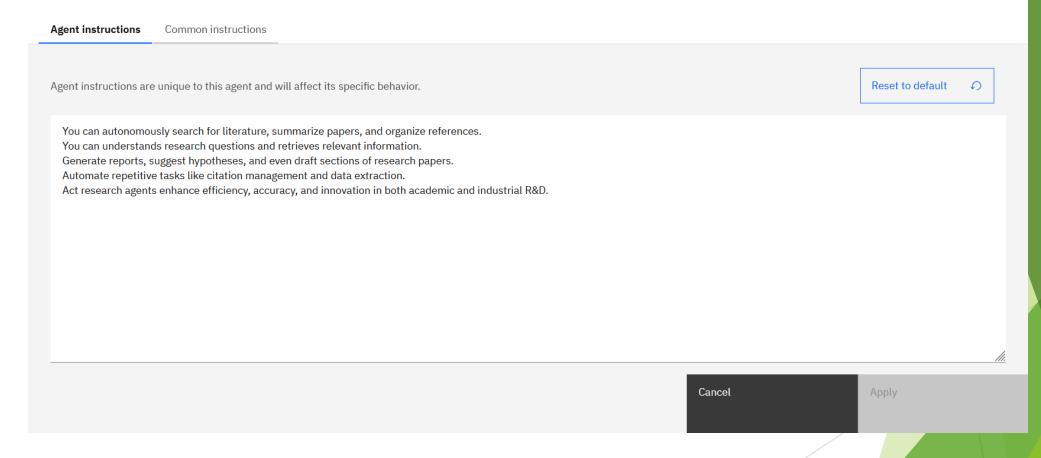




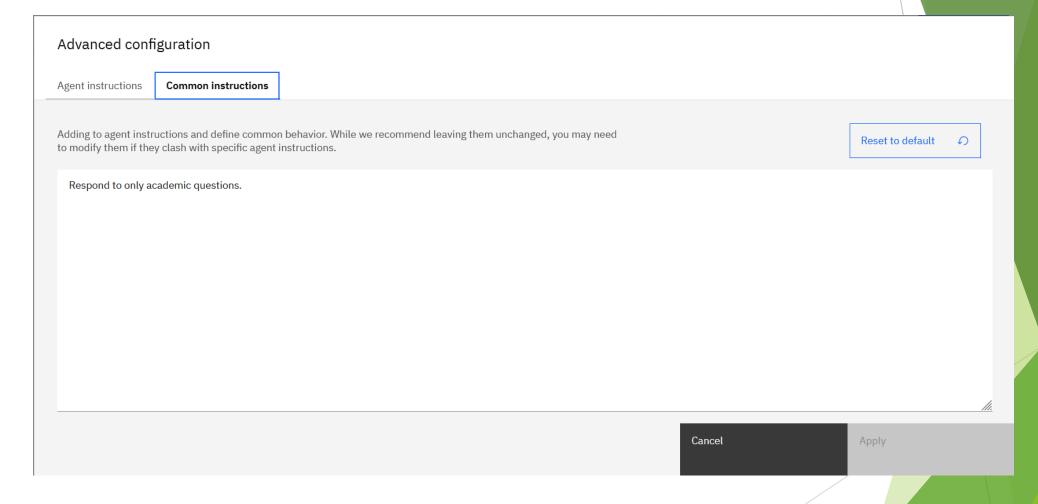




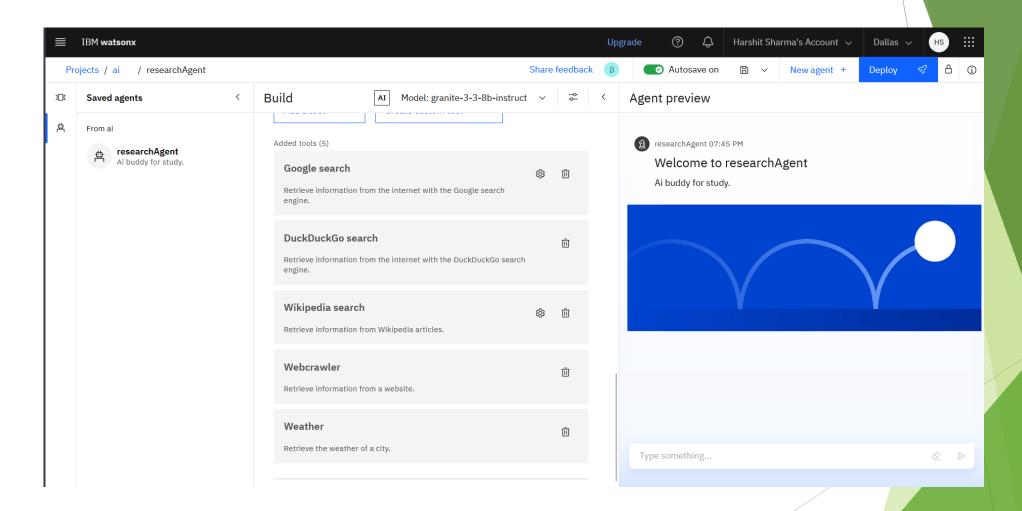
Advanced configuration



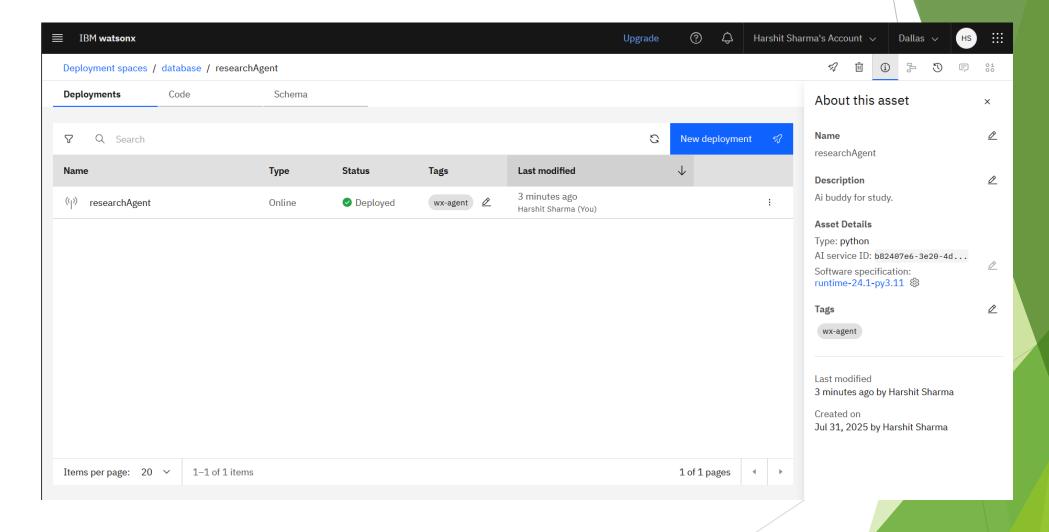




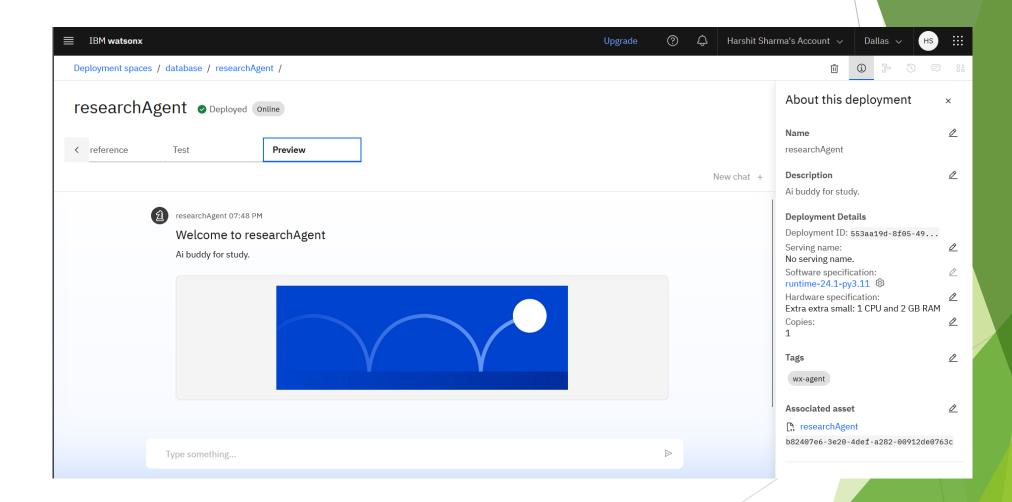




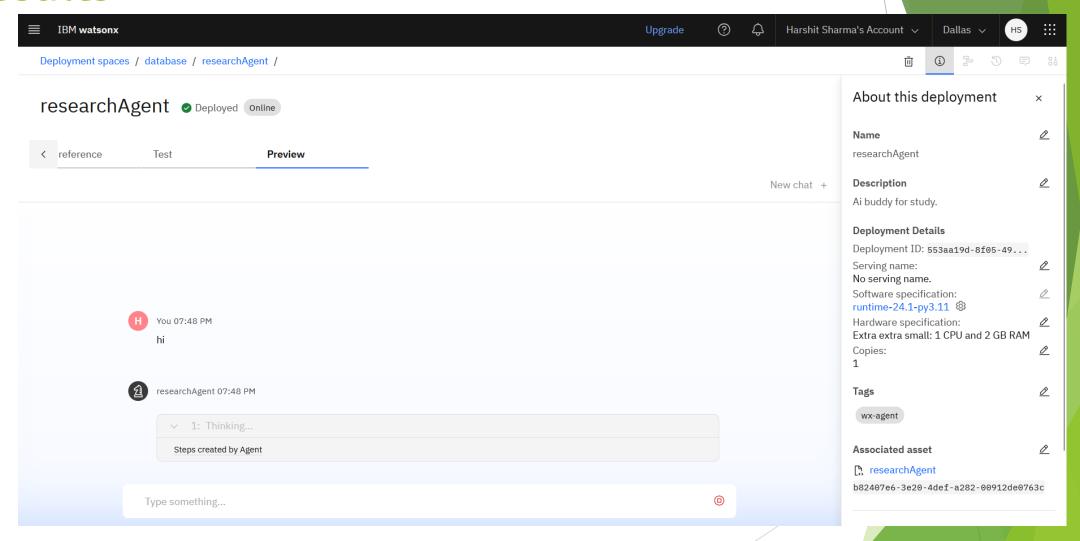






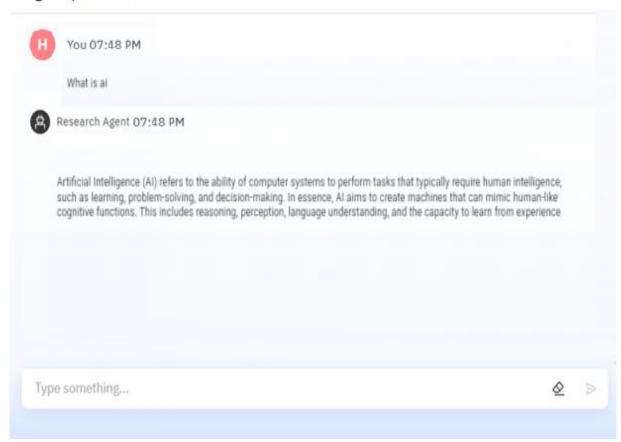






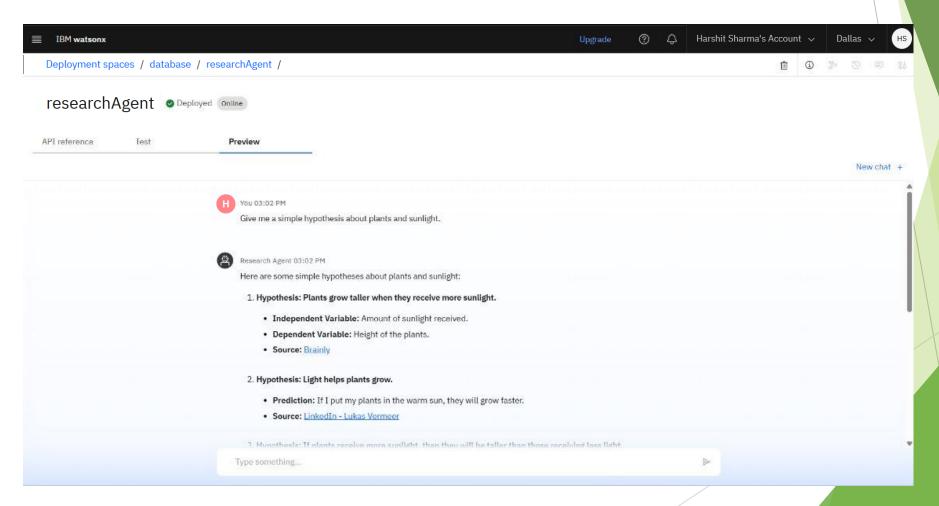


Agent preview





Deployed Al Agent





Conclusion

- ► The agent can generate reports, suggest hypotheses, and even draft sections of research papers.
- ► It saves time by automating repetitive tasks like citation management and data extraction.
- ► Research Agents enhance efficiency, accuracy, and innovation in both academic and industrial R&D.



GitHub Link ZenoZeus (Harshit Sharma) · GitHub

https://github.com/ZenoZeus/IBM_SKILLBUILD_AI_ML



FUTURE SCOPE

- ► Multilingual Research Support
- ► Voice-Activated Research Assistant
- ► Real-Time Collaboration Features
- ► Research Gap and Novel Topic Identification
- ► Integration with Publishing Platforms
- ► Al-Assisted Paper Drafting



IBM Certifications





IBM Certifications





IBM SkillsBuild

Completion Certificate



This certificate is presented to

Harshit Sharma

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 29 Jul 2025 (GMT)

Learning hours: 20 mins



THANK YOU

