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# **CAPSTONE PROJECT**

## **RESEARCH AGENT**

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**Department**

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## OUTLINE

- Problem Statement
- Technology used
- Wow factor
- End users
- Result
- Conclusion
- Git-hub Link
- Future scope
- IBM Certifications

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# PROBLEM STATEMENT

- 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.

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# TECHNOLOGY USED

- IBM cloud lite services
- IBM Granite model

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## IBM CLOUD SERVICES USED

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

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## WOW FACTORS

The Research Agent impresses with its AI-powered ability to search, summarize, and organize academic content. It uses IBM Granite models for intelligent text generation and automation. This tool boosts research productivity by handling complex tasks like hypothesis generation, citation management, and report drafting—all within IBM Cloud Lite's free, scalable environment.

### Key Highlights Factors Are:

- Smart, autonomous research powered by IBM Granite AI.
- Instant paper summarization and auto-generated citations.
- Fully deployable on IBM Cloud Lite.

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## END USERS

- Academic Researchers
- Students
- Data Scientists & AI Engineers
- Research Institutions and Universities
- Industry R&D Teams
- Educators


# RESULTS

[Share feedback](#) β Unsaved New agent + Deploy

### Agent preview

 You: 07:59 PM

what are the key difference bw java and python

 watsonx Agent 07:59 PM

Hi, I am watsonx.ai agent. How can I help you?

Here are some key differences between Java and Python:


- Syntax:** Python's syntax is simpler and more readable compared to Java. Python uses indentation to define blocks of code, while Java uses curly braces.
- Typing:** Python is dynamically typed, meaning you don't have to declare the data type of a variable when you create one. Java, on the other hand, is statically typed, requiring explicit declaration of variable types.
- Speed:** Java is generally faster than Python because it's a compiled language, while Python is an interpreted language.
- Use Cases:** Java is often used for larger, more complex projects, including Android app development and enterprise-level applications. Python is popular for data analysis, machine learning, AI, and scripting.

Type something...

Upgrade ? manish shukla's Account Frankfurt MS

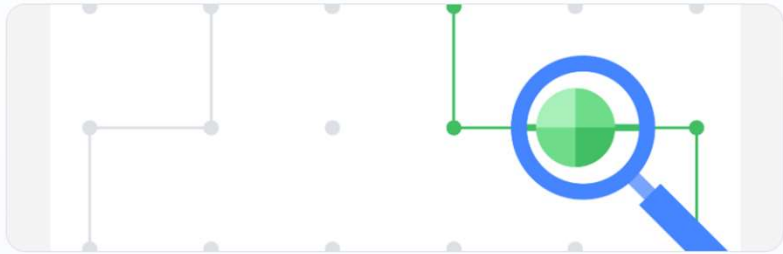
[Share feedback](#) β Unsaved New agent + Deploy

### Agent preview


 watsonx Agent 07:58 PM

Welcome to watsonx Agent

Change this description to reflect your particular agent



Type something...





# RESULTS

The space is being prepared...

The space "Gen\_Ai" is being created.

Step 1 of 1. Creating deployment space.

IBM watsonx






Upgrade ⓘ 🔔 manish shukla's Account Frankfurt MS

Deployment spaces /

Gen\_Aiii

Overview Assets **Deployments** Jobs Manage

🔍 Search

Name	Type	Status	Asset	Asset type	Tags	Last modified	↓
 watsonx Agent	Online	 Initializing	watsonx Agent	Ai service	 wx-agent 	6 seconds ago manish shukla (You)	

Items per page: 20 1-1 of 1 items 1 of 1 pages

# RESULTS

IBM watsonx

Upgrade ?

manish shukla's Account

Frankfurt

MS

[Deployment spaces](#) / [Gen\\_Aiii](#) / [watsonx Agent](#) /

watsonx Agent

Deployed Online

API reference

Test

Evaluations


Preview

New chat +

watsonx Agent 08:31 PM

Welcome to watsonx Agent

Change this description to reflect your particular agent



Type something...

# RESULTS

## Deployed AI Agent

The screenshot displays the IBM watsonx web interface. At the top, a navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and user account information for 'manish shukla's Account' in the 'Frankfurt' region. Below the navigation bar, a breadcrumb trail shows 'Deployment spaces / Gen\_Ai / watsonx Agent'. The main content area features the 'watsonx Agent' title with a green 'Deployed' status and an 'Online' indicator. A tabbed interface at the bottom of this section includes 'API reference', 'Test', 'Evaluations', and 'Preview', with 'Preview' currently selected. The chat interface shows a conversation where the user asks 'what is python' at 08:32 PM. The watsonx Agent responds at the same time, providing a detailed explanation of Python as a high-level, interpreted programming language, its history (created by Guido van Rossum in 1991), and its various applications. The agent also offers to perform a search for more detailed information, listing two search results: 'GoogleSearch: "What is Python programming language"' and 'DuckDuckGo: "Python programming language"'. At the bottom of the chat window, there is a text input field with the placeholder 'Type something...' and a send button.

IBM watsonx Upgrade ? manish shukla's Account Frankfurt MS

Deployment spaces / Gen\_Ai / watsonx Agent /

watsonx Agent ✓ Deployed Online

API reference Test Evaluations **Preview**

New chat +

**M** You 08:32 PM  
what is python

**watsonx Agent** 08:32 PM  
Hi, I am watsonx.ai agent. How can I help you?

You're asking about Python, which is a high-level, interpreted programming language known for its readability and simplicity. It was created by Guido van Rossum and first released in 1991. Python supports multiple programming paradigms, including procedural, object-oriented, and functional programming. It's widely used for web development, data analysis, machine learning, artificial intelligence, and scientific computing.

For more detailed information, I can perform a search:

1. GoogleSearch: "What is Python programming language"
2. DuckDuckGo: "Python programming language"

Type something...

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## CONCLUSION

- Automates key research tasks like literature search, summarization, and citation management..
- Leverages IBM Granite AI for intelligent content generation and hypothesis creation..
- Cost-effective and scalable using IBM Cloud Lite's free-tier infrastructure.
- Empowers students, researchers, and professionals to work faster, smarter, and more efficiently

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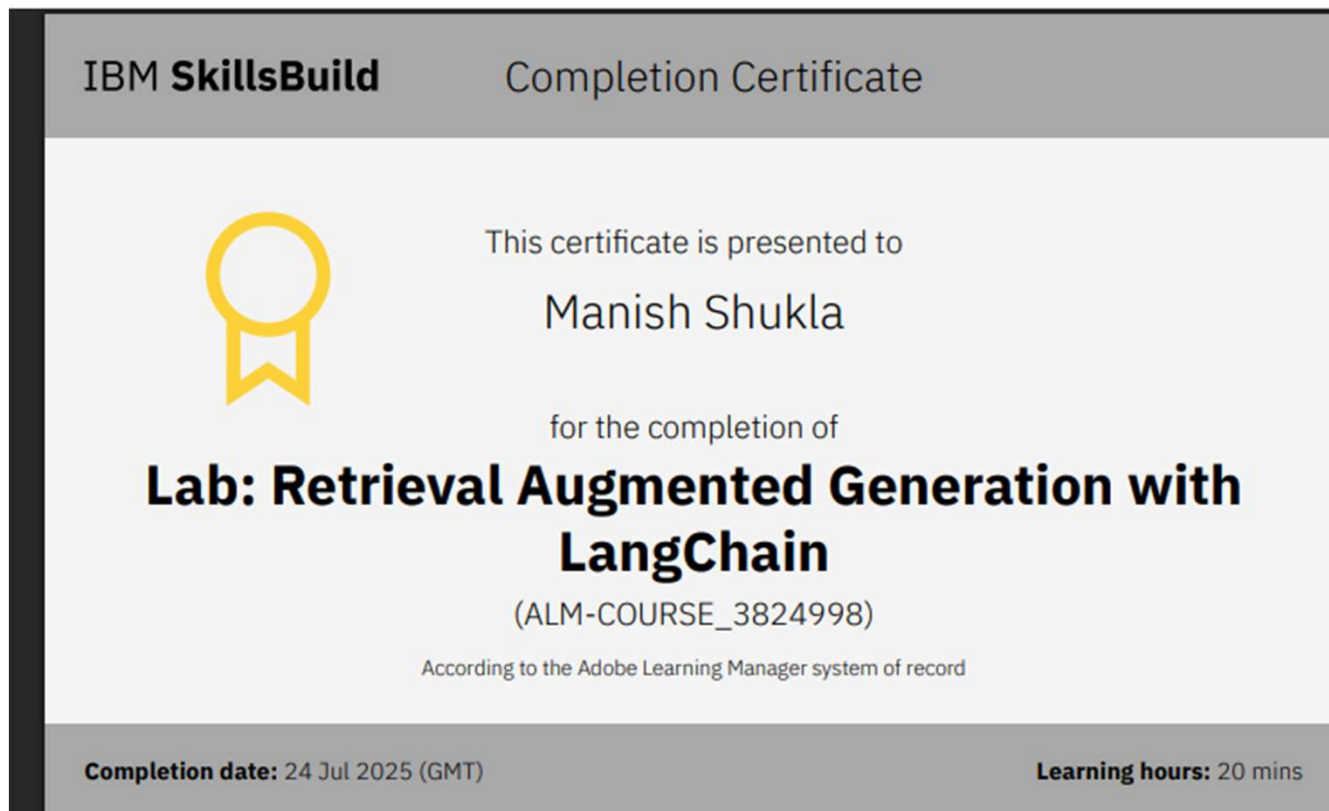
## FUTURE SCOPE

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

# IBM CERTIFICATIONS



# RAG CERTIFICATIONS





Github Link: [https://github.com/Manish3Shukla/project\\_ai](https://github.com/Manish3Shukla/project_ai)



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## GITHUB LINK

- Make sure that there should be readme file
- Link: [https://github.com/Manish3Shukla/project\\_ai/blob/main/README.md](https://github.com/Manish3Shukla/project_ai/blob/main/README.md)

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**THANK YOU**