CAPSTONE PROJECT

TITLE: LIBRARY AGENT

Presented By: Pradip Ganesh Kadam

IMS Institute

MCA Department

OUTLINE

- Problem Statement
- Proposed System
- System development Approach
- Algorithm & development
- Result(Output images)
- Conclusion
- Future Scope
- References

PROBLEM STATEMENT

- In academic institutions, students often face difficulty locating the most relevant learning materials from vast library collections. The traditional search methods can be time-consuming, inefficient, and lack personalization, especially when aligning resources with specific academic needs, study topics, or course syllabi.
- To address this, there is a need for an intelligent system that can autonomously understand student queries, analyze academic contexts, and recommend appropriate books and resources. The system must also check real-time book availability, manage reservations or waitlists, and prioritize high-demand materials to optimize access.
- **This project aims to develop a Library AI Agent that leverages natural language processing and intelligent data analysis to streamline the search and recommendation process, personalize learning resource discovery, and enhance student engagement with academic libraries.**

PROPOSED SOLUTION

To address the challenges students face in accessing relevant academic materials, we propose developing a **Library AI Agent**—an intelligent, interactive system that simplifies and personalizes the process of discovering, reserving, and utilizing library resources.

Key Components of the Solution:

- **Natural Language Processing (NLP):**The agent will interpret and process student queries in natural language (e.g., "I need books on machine learning for beginners") and extract intent, topic, and academic context.
- **User Profile & Academic Context Analysis:**

  Analyze individual student profiles (e.g., courses enrolled, academic level, learning history)
- **Smart Recommendation Engine**

  :Match student needs with relevant resources using machine learning and semantic search.

  Prioritize based on relevance, quality, and current academic goals.
- **Real-Time Library Integration:**

  Check book availability in the library database.

  Display status (available, checked out, waitlisted), and suggest alternatives if needed.
- **Reservation and Waitlist Management:**

  Allow users to reserve books directly through the interface.

  Manage waitlists and notify users when resources become available.
- **Feedback Loop:**

SYSTEM APPROACH

- User Interaction Layer:

  Chatbot for natural language queries

- NLP & Query Processing Module:

  Natural Language Understanding (NLU)

  Intent recognition and entity extraction

  Context analysis (course, topic, academic level)

- User Profile & Academic Context Analyzer

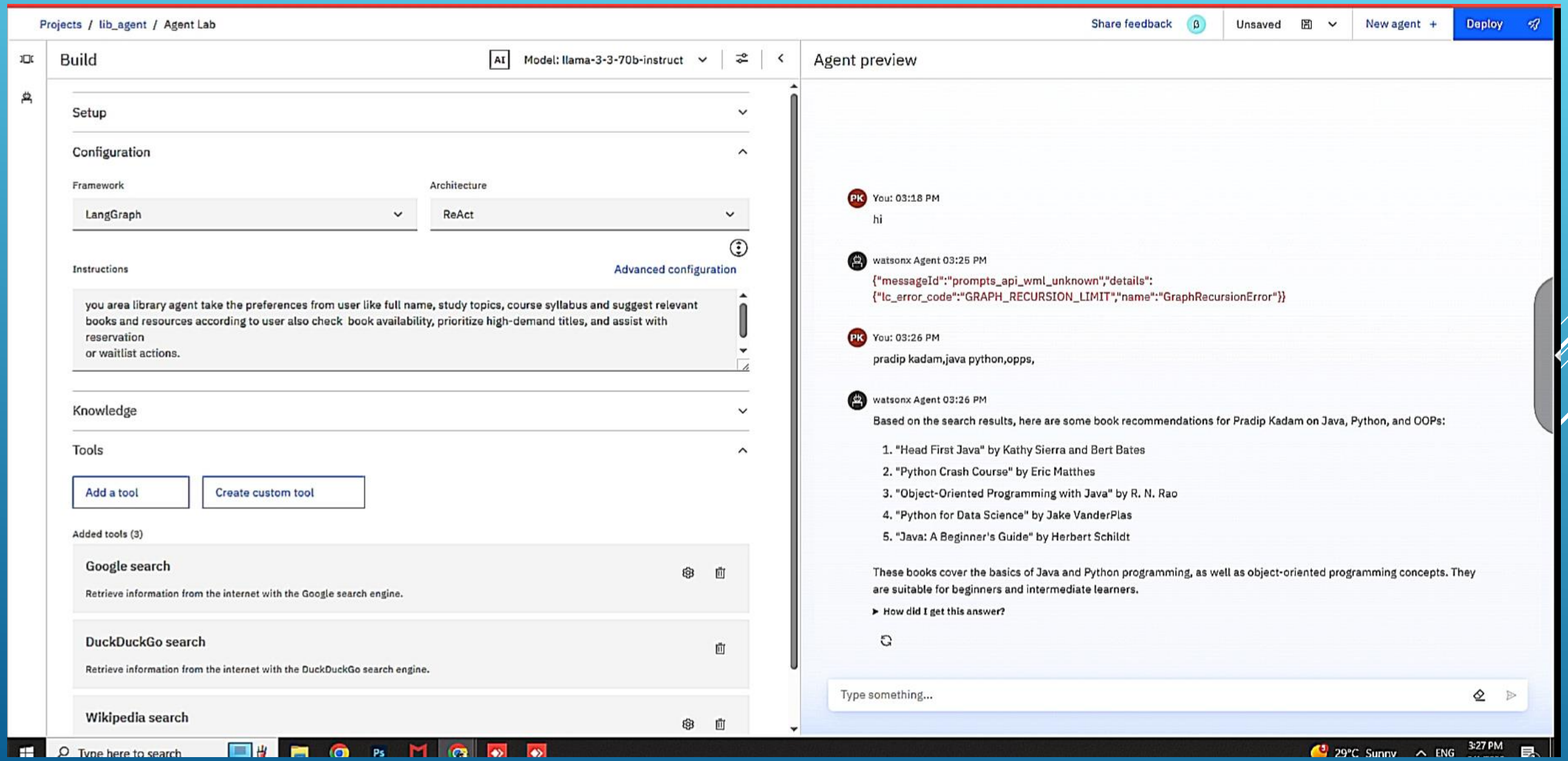
  Inputs: course enrollments, user preferences, syllabi

  Learns from past queries and behavior

ALGORITHM

- 1. Receive user query and profile data.
- 2. Use NLP to extract key topics and intent from the query.
- 3. Match extracted topics with course syllabi and student context.
- 4. Search library database for relevant resources using semantic search.
- 5. Filter results by availability, relevance, and format.
- 6. Display recommended books and allow reservation or waitlist.
- 7. Log interaction and collect feedback for future improvements.

RESULTS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Share feedback
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New agent +
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Model: llama-3-3-70b-instruct
Setup
Configuration
Framework
LangGraph
Architecture
ReAct
Instructions
Advanced configuration
you area library agent take the preferences from user like full name, study topics, course syllabus and suggest relevant books and resources according to user also check book availability, prioritize high-demand titles, and assist with reservation
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Knowledge
Tools
Add a tool
Create custom tool
Added tools (3)
Google search
Retrieve information from the internet with the Google search engine.
DuckDuckGo search
Retrieve information from the internet with the DuckDuckGo search engine.
Wikipedia search
Agent preview
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watsonx Agent 03:25 PM
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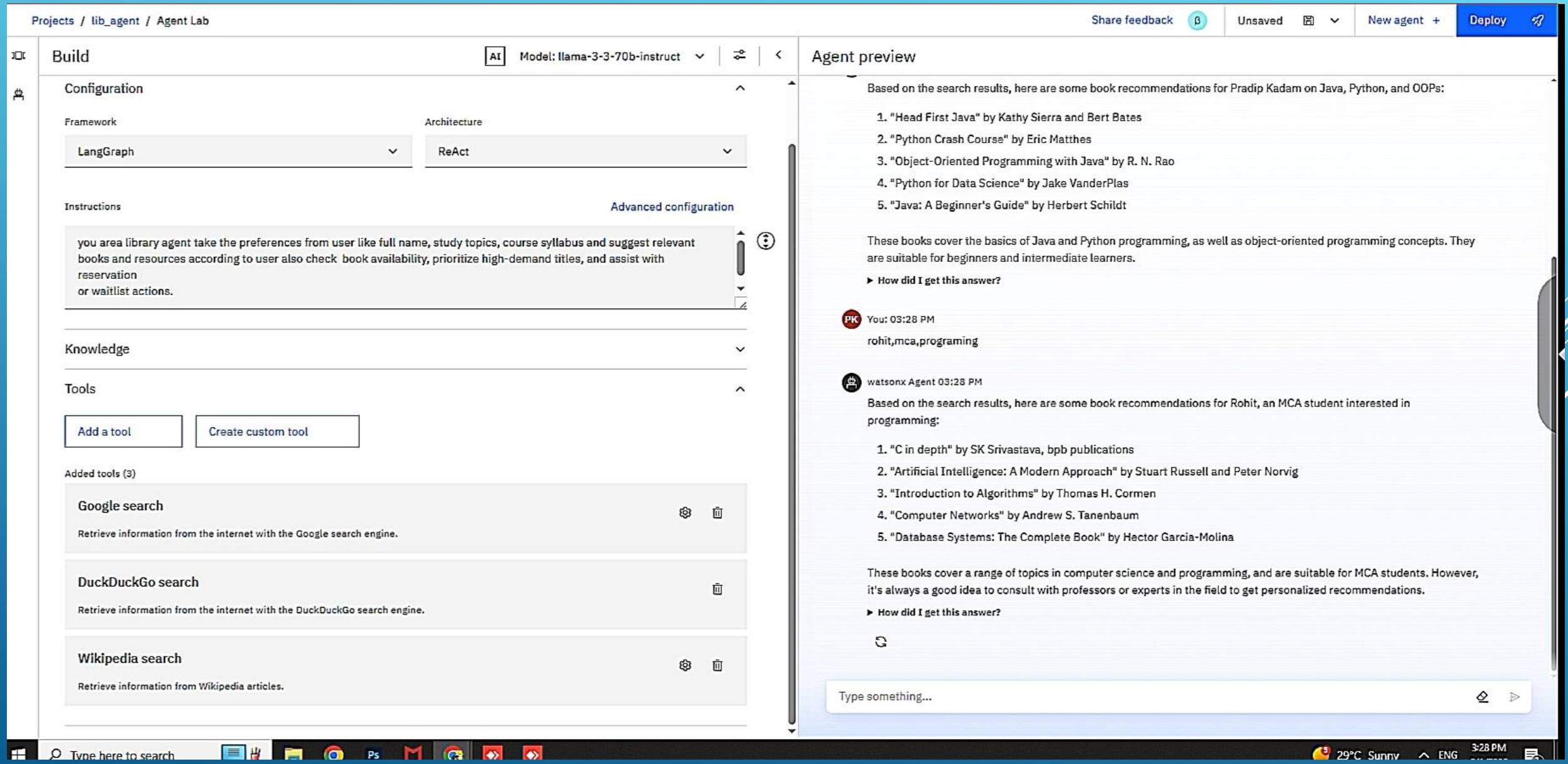
pradip kadam,java python,opps,
watsonx Agent 03:26 PM
Based on the search results, here are some book recommendations for Pradip Kadam on Java, Python, and OOPs:
1. "Head First Java" by Kathy Sierra and Bert Bates
2. "Python Crash Course" by Eric Matthes
3. "Object-Oriented Programming with Java" by R. N. Rao
4. "Python for Data Science" by Jake VanderPlas
5. "Java: A Beginner's Guide" by Herbert Schildt
These books cover the basics of Java and Python programming, as well as object-oriented programming concepts. They are suitable for beginners and intermediate learners.
How did I get this answer?
Type something...
Type here to search
29°C Sunny
ENG
3:27 PM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or waitlist actions.
Knowledge
Tools
Add a tool
Create custom tool
Added tools (3)
Google search
Retrieve information from the internet with the Google search engine.
DuckDuckGo search
Retrieve information from the internet with the DuckDuckGo search engine.
Wikipedia search
Retrieve information from Wikipedia articles.
Agent preview
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How did I get this answer?
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You: 03:28 PM
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watsonx Agent 03:28 PM
Based on the search results, here are some book recommendations for Rohit, an MCA student interested in programming:
1. "C in depth" by SK Srivastava, bpb publications
2. "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig
3. "Introduction to Algorithms" by Thomas H. Cormen
4. "Computer Networks" by Andrew S. Tanenbaum
5. "Database Systems: The Complete Book" by Hector Garcia-Molina
These books cover a range of topics in computer science and programming, and are suitable for MCA students. However, it's always a good idea to consult with professors or experts in the field to get personalized recommendations.
How did I get this answer?
Type something...
Type here to search
29°C Sunny
ENG
3:28 PM

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watsonx Agent

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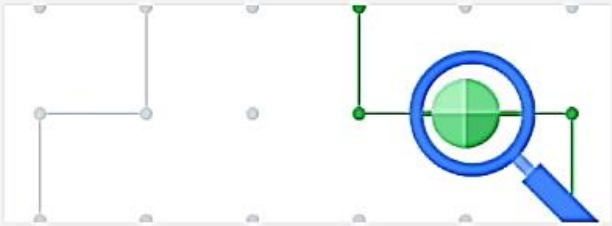
watsonx Agent 03:49 PM

Welcome to watsonx Agent

Change this description to reflect your particular agent



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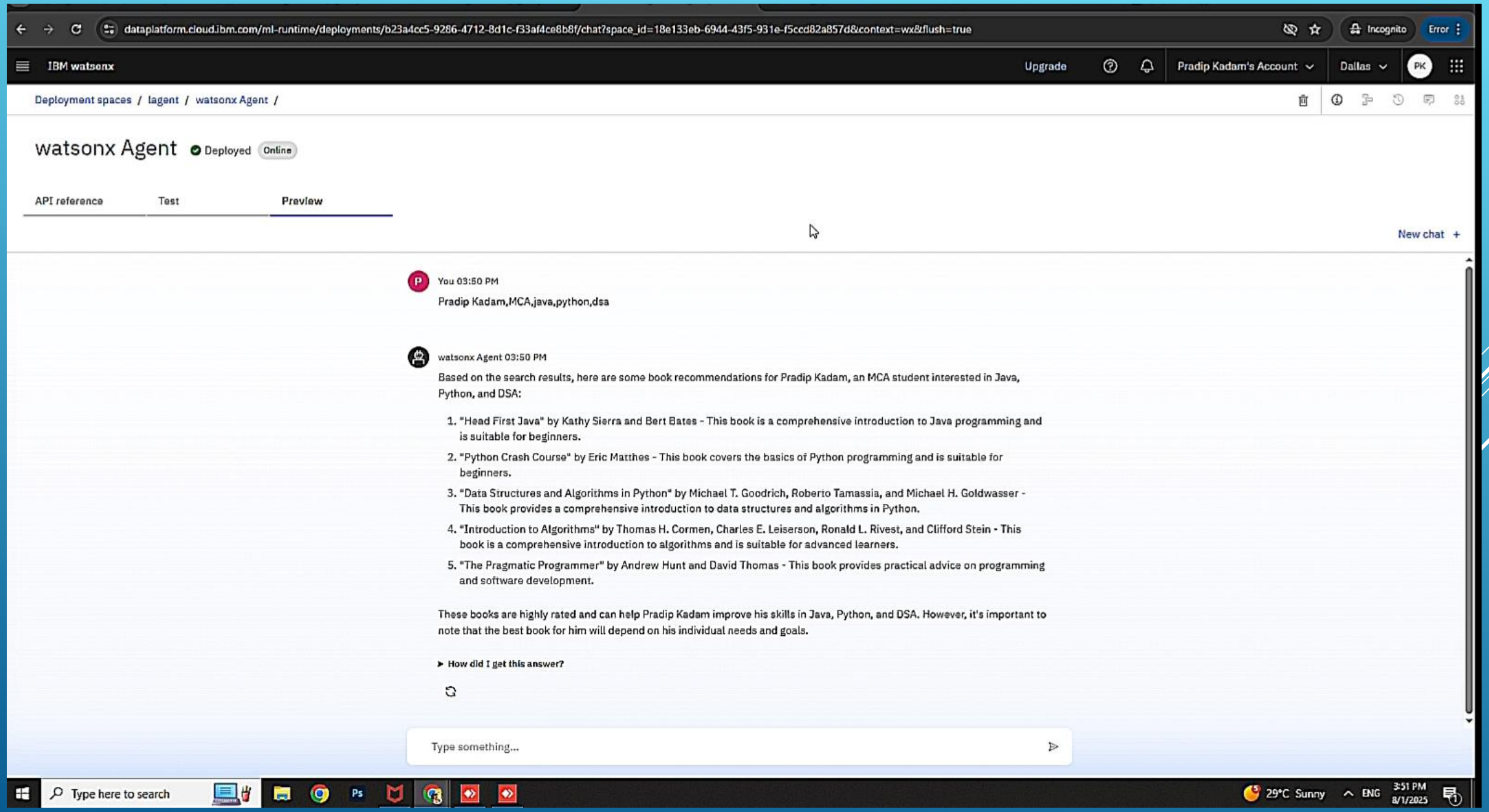
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Pradip Kadam,MCA,java,python,dsa
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Based on the search results, here are some book recommendations for Pradip Kadam, an MCA student interested in Java, Python, and DSA:
1. "Head First Java" by Kathy Sierra and Bert Bates - This book is a comprehensive introduction to Java programming and is suitable for beginners.
2. "Python Crash Course" by Eric Matthes - This book covers the basics of Python programming and is suitable for beginners.
3. "Data Structures and Algorithms in Python" by Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser - This book provides a comprehensive introduction to data structures and algorithms in Python.
4. "Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein - This book is a comprehensive introduction to algorithms and is suitable for advanced learners.
5. "The Pragmatic Programmer" by Andrew Hunt and David Thomas - This book provides practical advice on programming and software development.
These books are highly rated and can help Pradip Kadam improve his skills in Java, Python, and DSA. However, it's important to note that the best book for him will depend on his individual needs and goals.
How did I get this answer?
Type something...
Type here to search
29°C Sunny
ENG
3:51 PM
8/1/2025

Deployment spaces / lagent / watsonx Agent /

watsonx Agent

Deployed Online

API reference Test Preview

New chat +

3. "Data Structures and Algorithms in Python" by Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser - This book provides a comprehensive introduction to data structures and algorithms in Python.
4. "Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein - This book is a comprehensive introduction to algorithms and is suitable for advanced learners.
5. "The Pragmatic Programmer" by Andrew Hunt and David Thomas - This book provides practical advice on programming and software development.

These books are highly rated and can help Pradip Kadam improve his skills in Java, Python, and DSA. However, it's important to note that the best book for him will depend on his individual needs and goals.

P You 03:51 PM

suggest another book

watsonx Agent 03:51 PM

Another book that I would recommend for Pradip Kadam, an MCA student interested in Java, Python, and DSA, is "Introduction to Data Structures and Algorithms" by Sartaj Sahni. This book provides a comprehensive introduction to data structures and algorithms, covering topics such as arrays, linked lists, stacks, queues, trees, and graphs. It also includes examples in Java and Python, making it a great resource for students who want to learn about data structures and algorithms in a programming context.

▶ How did I get this answer?

CONCLUSION

- The Library AI Agent project successfully demonstrates how artificial intelligence, particularly natural language processing and intelligent search algorithms, can transform the way students interact with academic libraries. By understanding user queries, analyzing academic context, and providing personalized recommendations, the system streamlines the process of finding and accessing relevant learning materials.
- This intelligent agent enhances efficiency, improves user satisfaction, and promotes better utilization of library resources. It not only saves time but also supports academic success by aligning recommendations with course requirements and individual learning needs.
- Future improvements can include deeper integration with learning management systems (LMS), multi-language support, and adaptive learning for even more accurate recommendations.

FUTURE SCOPE

- The future scope of the Library AI Agent includes integration with learning management systems for real-time academic context, voice-based and multilingual support for accessibility, and mobile app development for ease of use. Advanced features like predictive recommendations, collaborative filtering, and AI-powered chat enhancements can further personalize the user experience. Additionally, analytics tools can help librarians and educators understand usage patterns and optimize resource management.

CERTIFICATE: GETTING STARTED WITH AI

In recognition of the commitment to achieve professional excellence

Getting Started with Artificial Intelligence
IBM SkillsBuild

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Pradip Kadam

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Getting Started with Artificial Intelligence

Issued on: Jul 20, 2025
Issued by: IBM SkillsBuild

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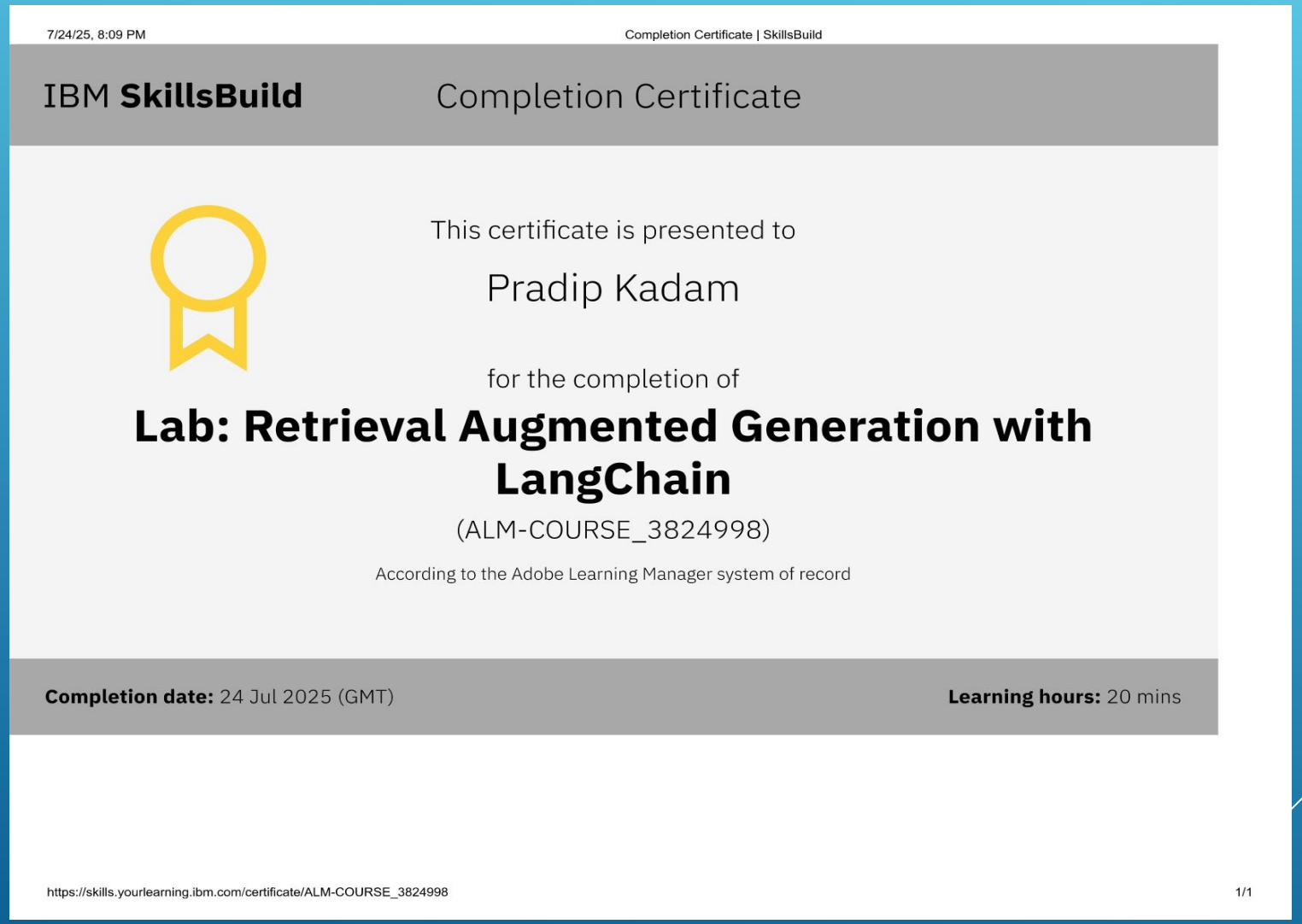

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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Pradip Kadam

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

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THANK YOU