CAPSTONE PROJECT

PROJECT TITLE

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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

Library AI Agent

The Challenge – A Library AI Agent is an intelligent system designed to assist students in finding the right learning materials based on their academic needs. It can autonomously analyze user profiles, study topics, and course syllabi to suggest relevant books and resources. Using natural language processing, it understands student queries and matches them with the most suitable books in the library database. The agent can check real-time book availability, prioritize high-demand titles, and assist with reservation or waitlist actions. It saves time by streamlining the search process and offering personalized recommendations aligned with current academic work. Library AI Agents enhance access, engagement, and resource utilization in educational environments.

Technology – Use of IBM Cloud Lite services / IBM Granite is mandatory.

PROPOSED SOLUTION

- The Library AI Agent aims to streamline academic research by providing intelligent, personalized book recommendations.
  It enhances student access to relevant resources through natural language understanding and real-time library integration.**The solution will consist of the following components:**
- **User Profile Analysis:**
  - **Understand academic needs based on course syllabi, study topics, and user history.**
  - **Tailor recommendations based on semester, department, and learning goals.**
- **Natural Language Processing:**
  - **Use NLP techniques to understand student queries in plain language.**
  - **Match queries with relevant keywords and topics in the library database.**
- **Recommendation Engine:**
  - **Apply machine learning models to rank and suggest suitable resources.**
  - **Continuously improve recommendations based on user feedback and usage patterns.**
- **Deployment:**
  - **Deploy the system on a cloud platform like IBM Cloud for scalability and reliability.**
- **Evaluation:**
  - **Measure how well the suggested books align with the student'sacademic needs and queries.**
  - **Compare recommendations with actual selections made by users.**
  - Result:

SYSTEM APPROACH

The Library AI Agent is a smart assistant that helps students discover and reserve academic resources efficiently. It leverages **AI-powered recommendations**, **NLP-based query understanding**, and **real-time library data** to enhance user experience.

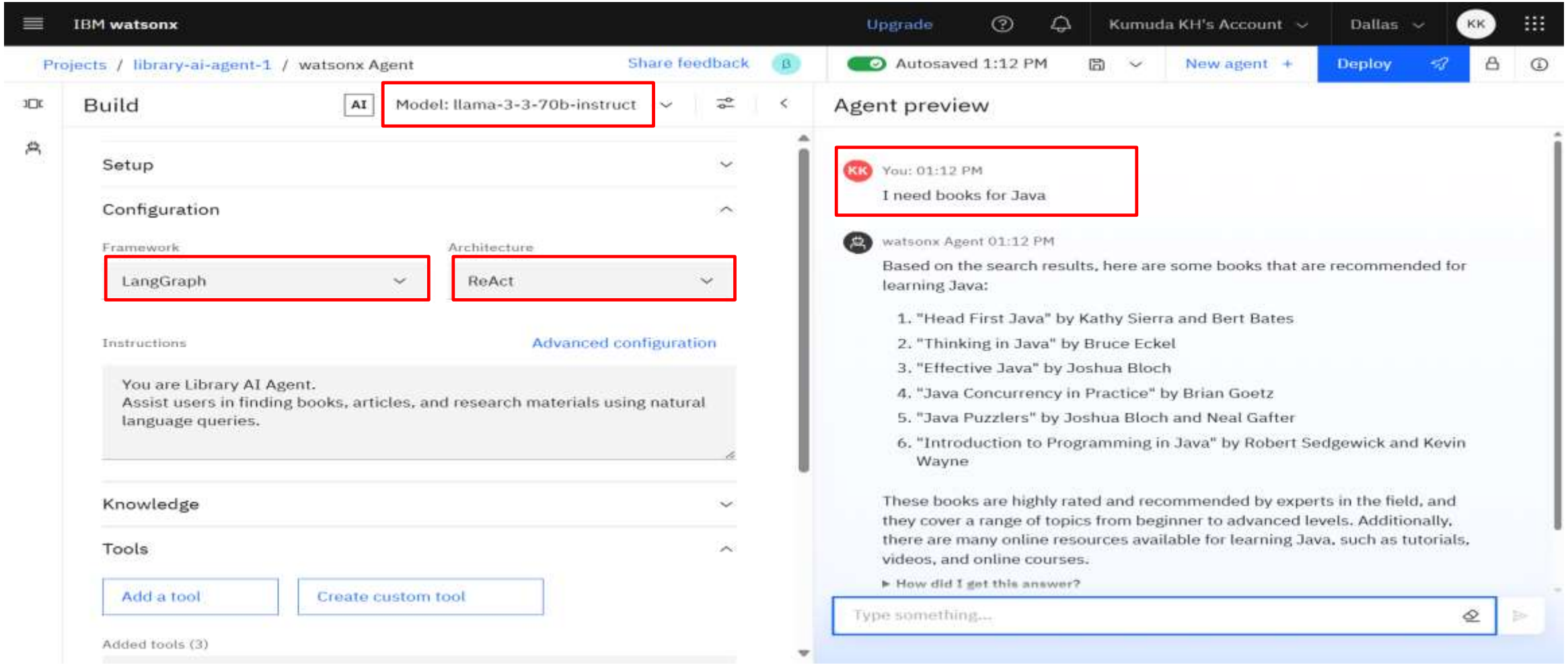
- System requirements
  - IBM watsonx.ai
  - IBM Watson studio

- Library required to build the model
  - IBM Granite Foundation Models (llama-3-3-70b-instruct)
  - Watson NLP Library

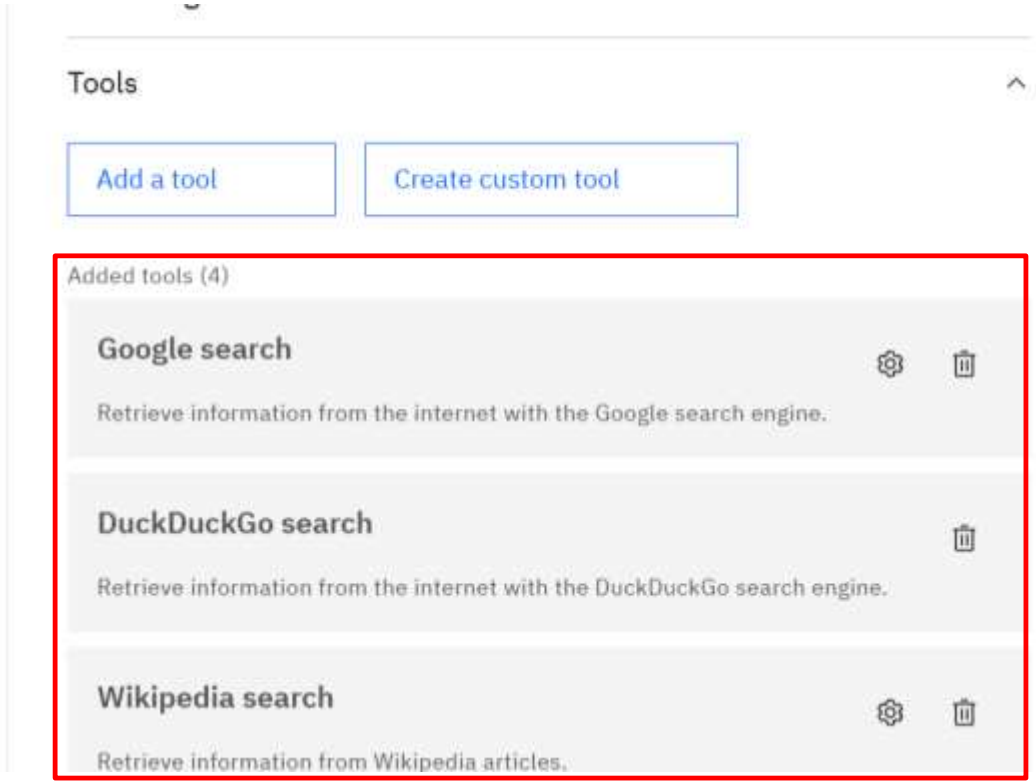
ALGORITHM & DEPLOYMENT

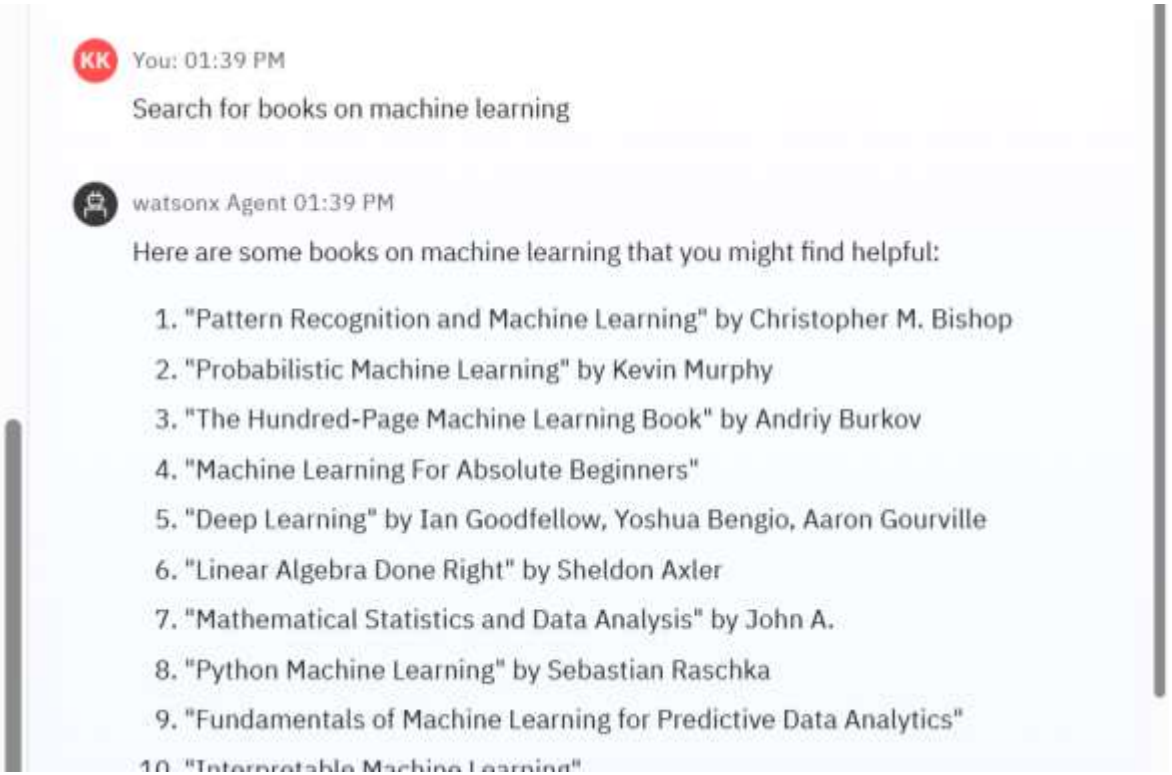
- For the Library AI Agent, we used **Natural Language Processing (NLP)** and **Recommendation System algorithms.** IBM Watsonx and Watson NLU were chosen for their strong capabilities in understanding and classifying user queries, while basic content-based filtering was used to suggest relevant books
- **Algorithm Selection**
  - We used IBM's **Watsonx.ai** platform, specifically the **Granite foundation models**, to power the natural language understanding of the Library AI Agent. These large language models help extract intent, topic, and key entities from user queries like *"Recommend books on operating systems."*
- **Input Data**
  - User inputs in natural language (e.g., *"I need DBMS books "*) are sent to Watsonx.ai via a deployed prompt or model. We designed the prompt in **Watsonx.ai Studio**, and customized it to return relevant keywords or direct book suggestions.
- **Training Process:**
  - Instead of training from scratch, we used **prompt engineering** to guide the Granite model's behavior. The prompts were fine-tuned within **Watsonx.ai Studio** to align with expected academic topics and book categories stored in the library database.
- **Prediction Process:**
  - The application is hosted on **IBM Cloud**. The AI model runs through Watsonx.ai, and the frontend/backend is connected using Watsonx.ai Studio's deployment tools.

RESULT


IBM watsonx
Upgrade
Kumuda KH's Account
Dallas
KK
Projects / library-ai-agent-1 / watsonx Agent
Share feedback
Autosaved 1:12 PM
New agent +
Deploy
Build
AI
Model: llama-3-3-70b-instruct
Setup
Configuration
Framework
LangGraph
Architecture
ReAct
Instructions
Advanced configuration
You are Library AI Agent.
Assist users in finding books, articles, and research materials using natural language queries.
Knowledge
Tools
Add a tool
Create custom tool
Added tools (3)
Agent preview
KK
You: 01:12 PM
I need books for Java
watsonx Agent 01:12 PM
Based on the search results, here are some books that are recommended for learning Java:
1. "Head First Java" by Kathy Sierra and Bert Bates
2. "Thinking in Java" by Bruce Eckel
3. "Effective Java" by Joshua Bloch
4. "Java Concurrency in Practice" by Brian Goetz
5. "Java Puzzlers" by Joshua Bloch and Neal Gafter
6. "Introduction to Programming in Java" by Robert Sedgewick and Kevin Wayne
These books are highly rated and recommended by experts in the field, and they cover a range of topics from beginner to advanced levels. Additionally, there are many online resources available for learning Java, such as tutorials, videos, and online courses.
How did I get this answer?
Type something...

CONCLUSION





The Library AI Agent effectively leverages **IBM Watsonx.ai** and **Watsonx.ai Studio** to provide intelligent, real-time book recommendations based on user queries. By combining the power of **large language models** with **prompt engineering**, the system understands academic needs and suggests relevant learning materials from the library.

- **Tools Added:**

Google search , DuckDuckGo search , Wikipedia search , Webcrawler

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FUTURE SCOPE

- Integrate voice-based queries and Watsonx Assistant for a conversational experience.
- Add semester-wise and personalized recommendations using user prompts.
- Enable feedback-based learning to improve suggestions over time

REFERENCES

- IBM Watsonx.ai Documentation – https://www.ibm.com/products/watsonx-ai
- IBM Watsonx.ai Studio – https://dataplatform.cloud.ibm.com
- IBM Cloud Documentation – https://cloud.ibm.com/docs
- IBM Granite Foundation Models – https://www.ibm.com/blog/watsonx-granite-models

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Completion Certificate

This certificate is presented to

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for the completion of

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(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 23 Jul 2025 (GMT)

Learning hours: 20 mins

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THANK YOU

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