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# IBM HACKATHON PROJECT

## LIBRARY AI AGENT

**Presented By:**

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Technology**

# OUTLINE

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

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# PROBLEM STATEMENT

In traditional library systems, students often face difficulty in finding the right academic resources aligned with their coursework. Searching through extensive catalogs manually is time-consuming and inefficient, especially when students are unaware of exact titles or authors. Additionally, most libraries lack intelligent systems to personalize recommendations based on the student's syllabus, learning progress, or preferences. Real-time book availability, reservation handling, and predictive suggestions are typically missing, leading to underutilized resources and decreased student engagement.

There is a clear need for an AI-driven solution that can understand natural language queries and offer personalized, syllabus-based, and real-time resource recommendations.

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# TECHNOLOGY USED

- 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

The top 3 major wow factors of Library AI Agent are :

## 1. Personalized Academic Recommendations

The agent intelligently analyzes a student's syllabus, academic level, and preferences to suggest the most relevant books.

It ensures students get exactly what they need without knowing specific titles or authors.

This personalization enhances learning efficiency and student satisfaction.

## 2. Natural Language Query Support

Students can search using plain English queries like "books on machine learning for beginners."

The system uses NLP to understand intent and fetch matching results from the library database.

This removes the friction of using rigid keywords or catalog numbers.

## 3. Real-Time Book Availability & Reservation

The agent checks book availability instantly and offers reservation or waitlist options when needed.

It helps avoid wasted trips to the library and manages high-demand titles more effectively.

Smart alerts notify students when a book becomes available.

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## END USERS

End Users of the Library AI Agent are :

- Students
- Faculty Members / Professors
- Librarians
- Academic Institutions

# PREVIEW

IBM watsonx

Upgrade ⓘ 🔔 karishma dahale's Account ▾ Dallas ▾ KD

Projects / Agentic\_AI / Agent Lab

Share feedback ⓘ Unsaved 📁 ▾ New agent + Deploy 🔊

Build

AI Model: granite-3-3-8b-instruct ⌵ ⚙️ ⏪

Setup

Name

library agent


Description

76/100

The Library AI Agent is an intelligent assistant designed to help students

Icon

Placeholder image



Quick start questions

Add up to 4 quick start questions that your users can select.

Configuration

Framework Architecture

Agent preview

KD You: 06:05 PM

suggest me the best books for aptitude

library agent 06:05 PM

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

For aptitude, I would recommend the following books based on their popularity and reviews:

1. "How to Prepare for Quantitative Aptitude for CAT" by Arun Sharma
2. "A Modern Approach to Aptitude Materials" by R.S. Aggarwal
3. "Quantitative Aptitude for CAT" by M.K. Gupta
4. "Arihant's Aptitude Test" by R.K. Bansal
5. "Speed Labs: Quantitative Aptitude for Competitive Examinations" by R.K. Bansal

These books cover a wide range of topics in aptitude and are highly recommended by students and educators alike. However, if you have a specific area of interest or a particular exam in mind, I can provide more tailored suggestions.

Would you like information on books for a specific exam or topic within aptitude?

▶ How did I get this answer?

🔄

🔊



# RESULTS

## Agent preview



You: 06:17 PM

give me the best authors name in the history of mathematicians?



library agent 06:17 PM

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

There have been numerous influential mathematicians throughout history, and the concept of a "best" can be subjective based on the area of mathematics one is interested in. However, here are a few mathematicians who have made groundbreaking contributions to the field:

1. Euclid: Known as the "Father of Geometry," his work "Elements" is one of the most influential texts in the history of mathematics.
2. Isaac Newton: Along with Gottfried Wilhelm Leibniz, he developed calculus, revolutionizing mathematics and physics.
3. Leonhard Euler: He made significant contributions to many fields of mathematics and science, including graph theory, analysis, and number theory.
4. Carl Friedrich Gauss: Often referred to as the "Prince of Mathematicians," his work has been fundamental in many areas, including number theory, algebra, statistics, analysis, differential geometry, geodesy, geophysics, mechanics, electrostatics, magnetic fields, astronomy, matrix theory, and optics.
5. Georg Cantor: He founded the set theory, which has become a fundamental language of mathematics.
6. Sophus Lie: He founded the theory of continuous transformation groups, now called Lie groups, which have important applications in physics.
7. John von Neumann: His work has contributed to a wide range of fields, including mathematics (set theory, functional analysis, ergodic theory, game theory, and numerical analysis), physics (quantum mechanics, hydrodynamics, and

Type something...



# RESULTS

## Agent preview



You: 02:56 PM

Help me write an introduction for a paper on electric vehicles.



Research Agent 02:56 PM

Here are some recent research articles and news on artificial intelligence:

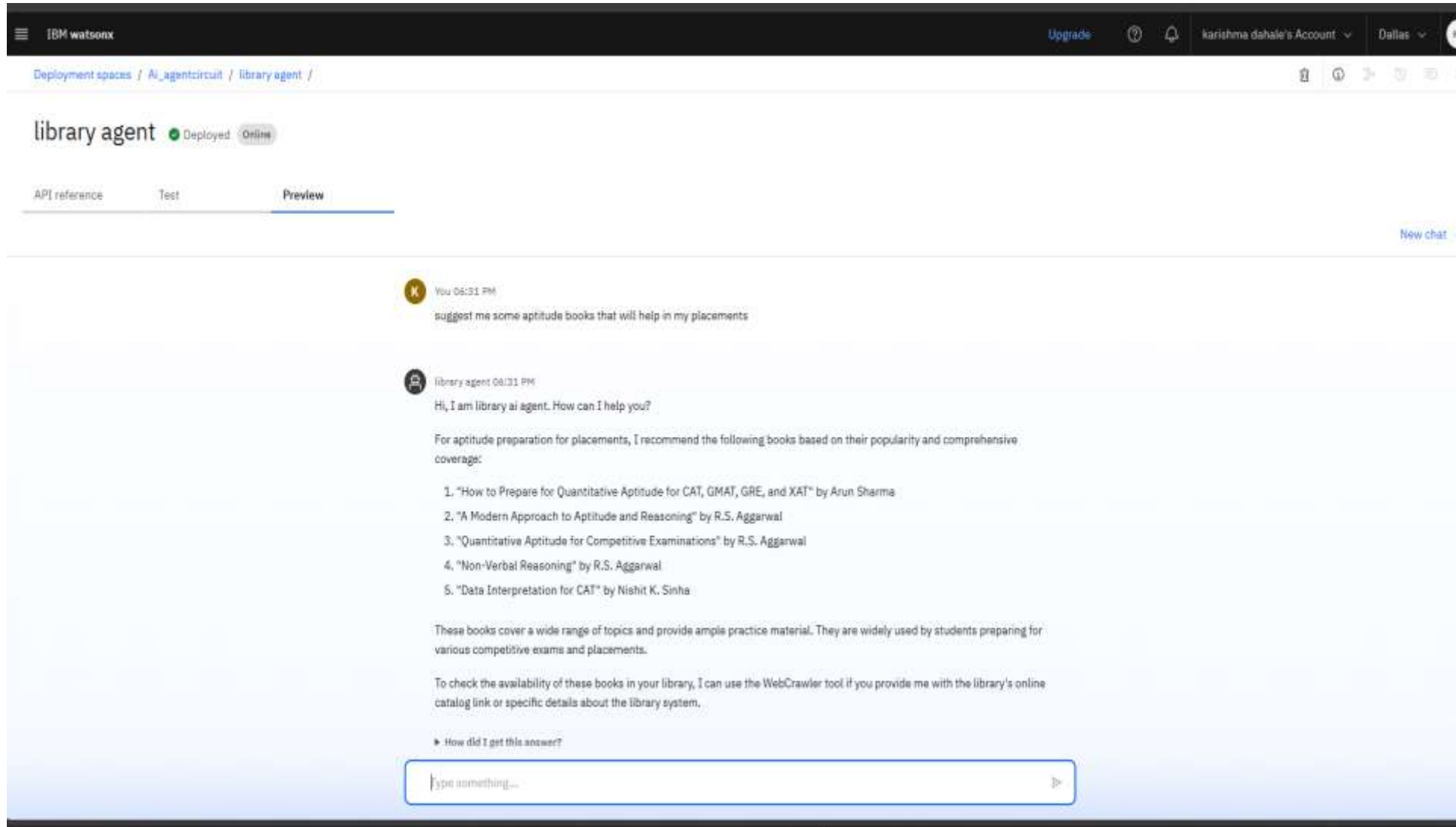
1. **MIT News:** In a new study, researchers discover the root cause of a type of bias in LLMs, paving the way for more accurate and reliable AI systems. [Read more](#)
2. **arXiv:** Harnessing AI Agents to Advance Research on Refugee Child Mental Health. [Read more](#)
3. **Stanford HAI:** News on how artificial intelligence improves patient care and expands research capacity. [Read more](#)
4. **Journal of Artificial Intelligence Research:** Current Issue on machine learning, natural language, planning and scheduling, robotics and vision, and uncertainty in AI. [Read more](#)
5. **ScienceDaily:** A team of researchers has shown that even small-scale quantum computers can enhance machine learning performance. [Read more](#)
6. **McKinsey:** The latest McKinsey Global Survey on AI finds that organizations are beginning to take steps that drive bottom-line impact. [Read more](#)
7. **Apple Machine Learning Research:** Overview of the latest advancements in machine learning and artificial intelligence. [Read more](#)

Type something...



# RESULTS

## Deployed AI Agent



The screenshot displays the IBM Watsonx user interface. At the top, a dark navigation bar includes the 'IBM watsonx' logo, an 'Upgrade' button, and user account information for 'karishma dahale's Account' in 'Dallas'. Below this, a breadcrumb trail shows the path: 'Deployment spaces / AI\_agentscircuit / library agent'. The main content area features the 'library agent' name with 'Deployed' and 'Online' status indicators. A tabbed interface at the bottom of this section includes 'API reference', 'Test', and 'Preview', with 'Preview' being the active tab. On the right side of the preview tab, there is a 'New chat +' button. The chat interface shows a conversation where the user asks for book recommendations, and the 'library agent' responds with a list of five books and additional information about their availability and a WebCrawler tool.

IBM watsonx Upgrade karishma dahale's Account Dallas KD

Deployment spaces / AI\_agentscircuit / library agent /

library agent Deployed Online

API reference Test **Preview**

New chat +

You 06:31 PM

suggest me some aptitude books that will help in my placements

library agent 06:31 PM

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

For aptitude preparation for placements, I recommend the following books based on their popularity and comprehensive coverage:

1. "How to Prepare for Quantitative Aptitude for CAT, GMAT, GRE, and XAT" by Arun Sharma
2. "A Modern Approach to Aptitude and Reasoning" by R.S. Aggarwal
3. "Quantitative Aptitude for Competitive Examinations" by R.S. Aggarwal
4. "Non-Verbal Reasoning" by R.S. Aggarwal
5. "Data Interpretation for CAT" by Nishit K. Sinha

These books cover a wide range of topics and provide ample practice material. They are widely used by students preparing for various competitive exams and placements.

To check the availability of these books in your library, I can use the WebCrawler tool if you provide me with the library's online catalog link or specific details about the library system.

► How did I get this answer?

Type something...

# CONCLUSION

- Conclusion – Key Takeaways
- Smarter Resource Discovery : The AI agent streamlines the search process by understanding natural language queries and offering personalized book recommendations aligned with academic needs.
- Enhanced Student Engagement : Real-time availability checks, reservations, and syllabus-based suggestions improve access and encourage students to use library resources more effectively.
- AI-Driven Educational Support : Leveraging IBM Cloud and NLP, the system represents a step toward modernizing academic infrastructure with intelligent, student-centric tools.

# GITHUB LINK

- link :  
<https://github.com/karishma574/internship-projectIBM01/edit/main/README.md>

## Project Description

The Library AI Agent is an AI-powered virtual assistant designed to modernize the library experience for students. It uses Natural Language Processing (NLP) to understand queries in plain English and intelligently recommend relevant academic books based on the user's course syllabus, interests, and academic progress. Developed using IBM Cloud services like Watson NLP and Cloudant, this system brings smart automation to educational resource discovery.

## Need for the Project

Traditional library systems require users to know exact book titles or authors, making the search process time-consuming and inefficient. Students often struggle to find course-specific materials or updated editions without guidance. There's a growing need for a smarter, more personalized system that can bridge this gap using artificial intelligence.

## Role in Students' Lives

This AI agent acts as a personalized academic guide, helping students:

- Discover the right books without knowing exact keywords
- Get instant access to book availability and reservation options
- Stay updated on high-demand resources during exams or projects

By aligning book suggestions with the course syllabus and real-time needs, it enhances the overall academic experience.

## How It Is Useful

- Saves time by replacing manual searches with smart queries
- Reduces confusion and improves academic resource utilization
- Encourages better engagement with library systems
- Supports inclusive learning through easy access to the right materials at the right time

This system empowers students to focus more on learning and less on searching.

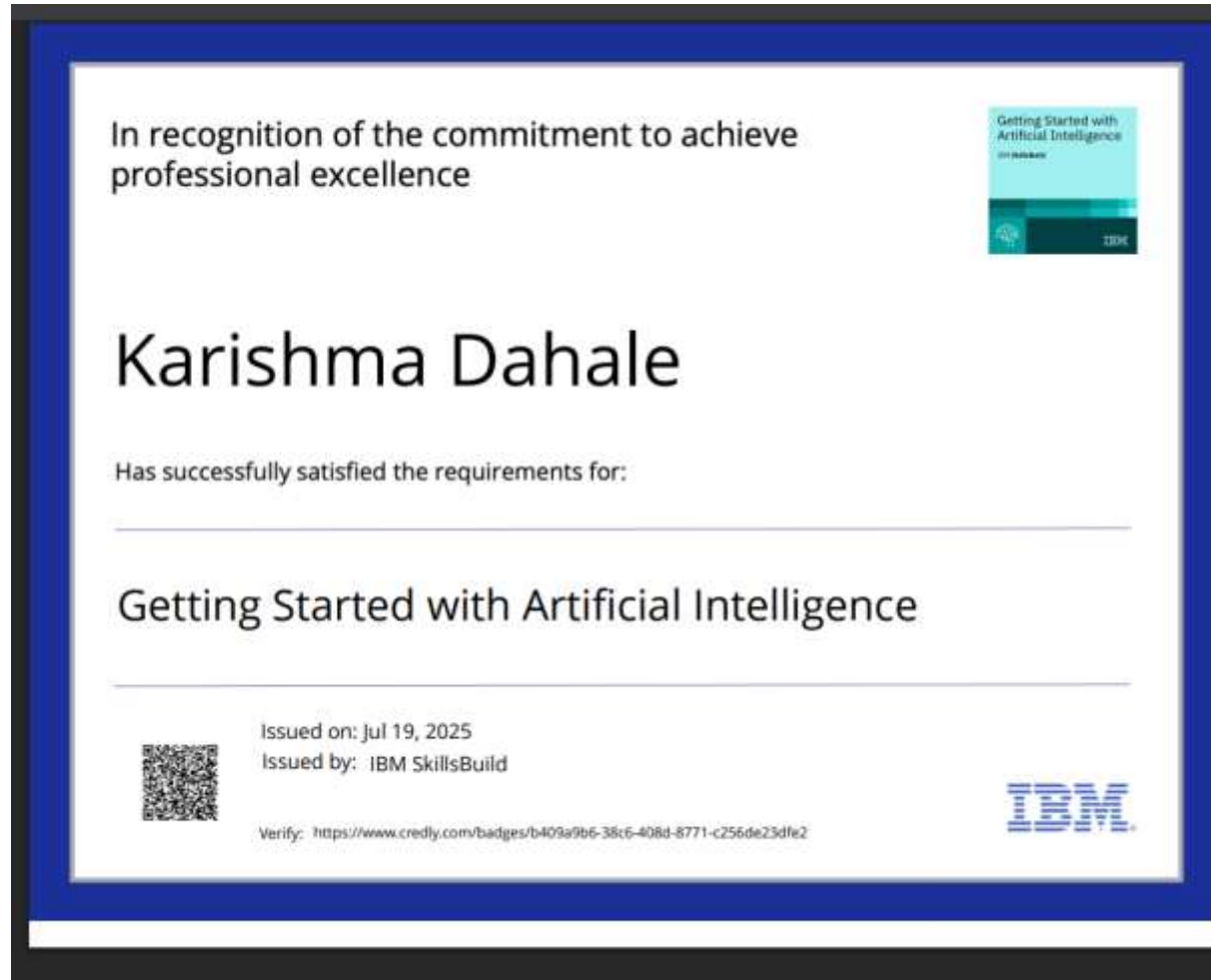
## Acknowledgement

Special thanks to IBM, AICTE, and the IBM SkillsBuild Internship Program for providing cloud services, resources, and mentorship that made this AI project possible. Leveraging IBM Watson NLP and IBM Cloudant, we were able to build a scalable and intelligent solution that contributes to smarter education systems.

# FUTURE SCOPE

- **Integration with Research Papers & Journals** : Extend the system to include academic papers, journals, and online repositories, enabling a unified knowledge discovery platform for students and researchers.
- **Voice-Based Assistance** : Implement voice command support using AI speech recognition to make the system more accessible for differently-abled users and enhance usability.
- **Cross-Institutional Library Access** : Enable collaboration between multiple institutions by allowing users to search and request books across a network of libraries.
- **AI-Based Reading Pattern Analysis** : Use machine learning to analyze user reading habits and suggest advanced materials or remedial content for better academic outcomes.
- **Mobile App with Offline Sync** : Develop a mobile version with offline reservation and reading list sync features for greater flexibility and on-the-go access.

# IBM CERTIFICATIONS



IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Karishma Dahale

for the completion of

**Lab: Retrieval Augmented Generation with  
LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 27 Jul 2025 (GMT)

**Learning hours:** 20 mins





**THANK YOU**