
CAPSTONE PROJECT

AGENTIC AI FOR PERSONALIZED COURSE PATHWAYS

Presented By:

Krishna Srinivas Madhira

Gandhi Institute of Technology and Management

Computer Science and Engineering (Artificial Intelligence and Machine Learning)

OUTLINE

- **Problem Statement**
- **Proposed System/Solution**
- **System Development Approach**
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

PROBLEM STATEMENT

Problem Statement No.12 - Agentic AI for Personalized Course Pathways.

Students today face a major challenge in selecting the right educational path from the vast number of online courses available. This overwhelming choice, combined with a lack of personalized guidance, often leads to confusion and disengagement, contributing to high dropout rates. Our project addresses this issue by creating an Agentic AI coach, "LearnMate," which will interact with students to understand their specific interests and skill levels. Using this information, it will dynamically generate a personalized and adaptable course roadmap to guide them effectively.

PROPOSED SOLUTION

The proposed system, "LearnMate" is a proposed Agentic AI coach that provides personalized course recommendations. It uses a foundational model to interact with students, understand their needs, and create an adaptive learning roadmap.

The solution will consist of the following key components:

- Student Interaction:** The AI engages students in conversation to learn about their academic interests, current skills, and career goals.
- Recommendation Engine:** Using a large language model like IBM Granite, it processes student input to recommend a personalized sequence of courses, resources, and projects.
- Dynamic Adaptation:** As an agentic system, it continuously updates the learning roadmap based on the student's progress, feedback, and changing interests.
- Interface:** A user-friendly interface presents the personalized roadmap and facilitates interaction with the AI coach.
- Evaluation:** The system's effectiveness is measured by tracking student engagement, satisfaction, and completion rates to continuously improve recommendations.

SYSTEM APPROACH

"LearnMate" will be developed using a modern, cloud-based architecture centered on IBM technologies for scalability and reliability. The system's core is an AI agent built on IBM Watsonx.ai, powered by the Granite large language model.

- Hosting:** Utilizes IBM Cloud Lite Services for a cost-effective development environment.
- AI Platform:** Employs IBM Watsonx.ai to build, manage, and configure the conversational agent.
- Foundation Model:** Uses the IBM Granite LLM to understand student needs and generate personalized recommendations.
- Agentic Framework:** A framework like LangGraph will be used to enable state management and decision-making, allowing the agent to maintain context.
- Runtime Environment:** The IBM Watsonx.ai Runtime Service will execute the deployed agent efficiently.
- Security & Access:** An API key will be generated for secure access and integration with front-end applications.

ALGORITHM & DEPLOYMENT

Algorithm (Agentic Logic):

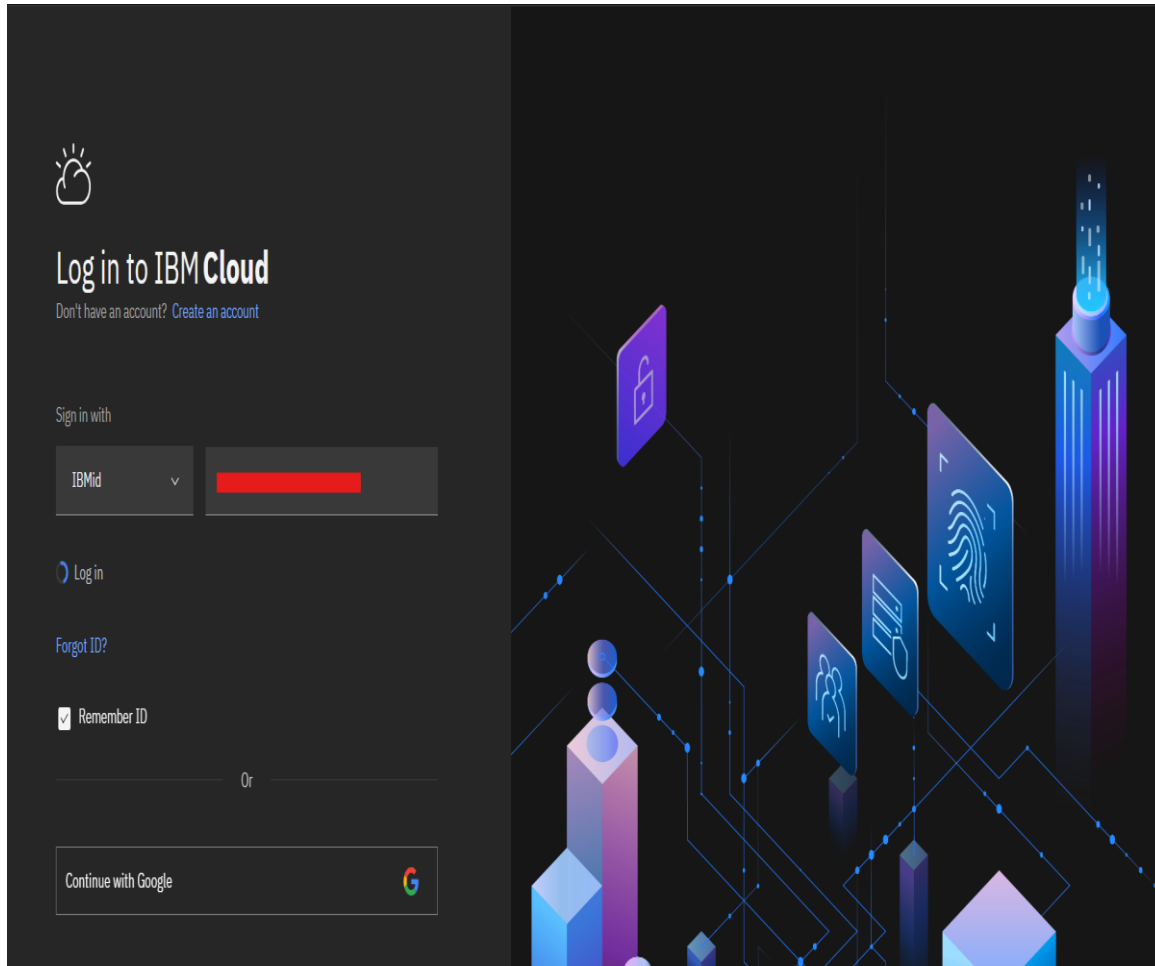
- The system uses an agentic framework where the IBM Granite model acts as a controller.
- When a user enters a query, the agent interprets the intent and selects the appropriate tool (e.g., Google Search) to find relevant medical information.
- It then processes this information and generates a structured, easy-to-understand response based on the custom instructions provided.

Deployment:

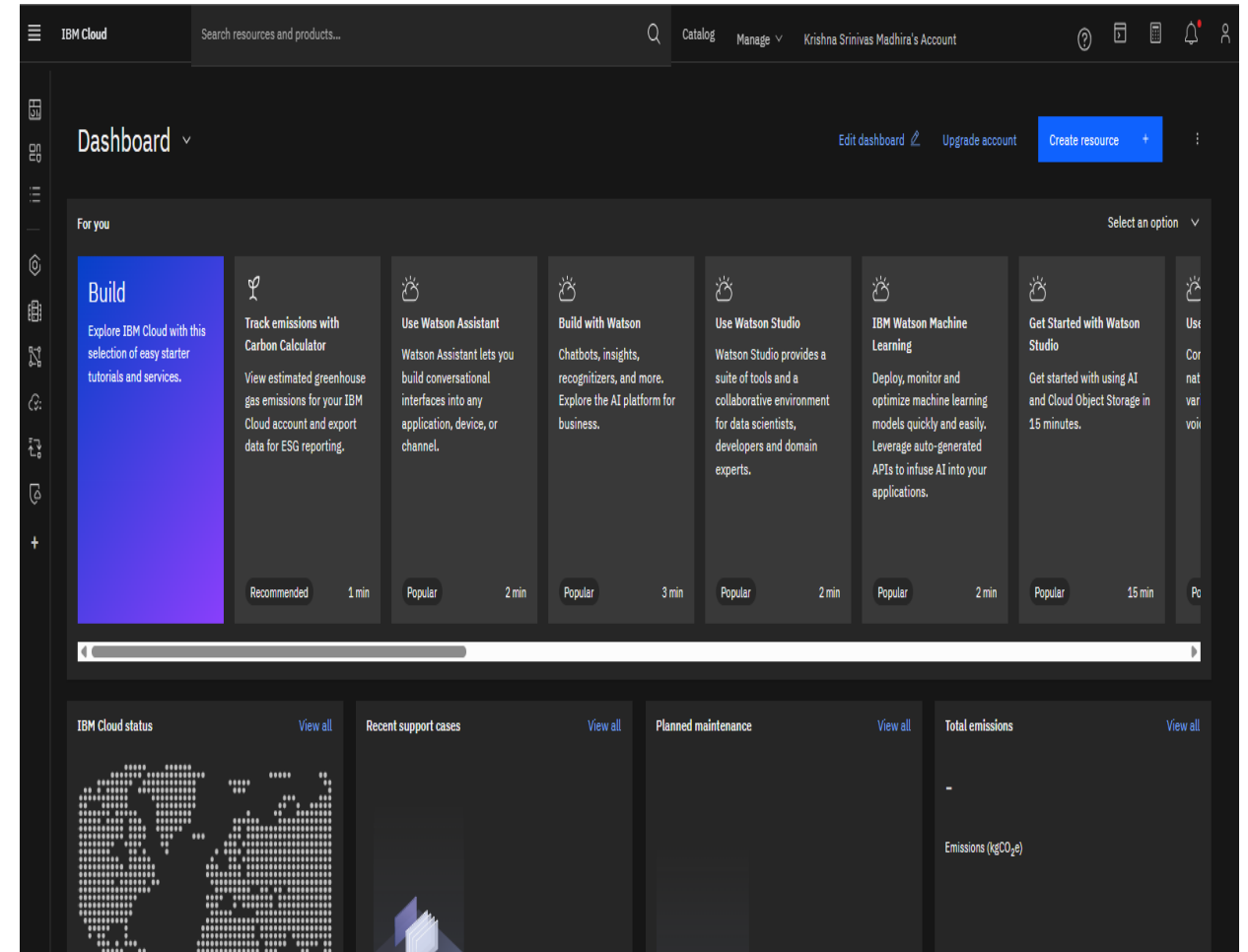
- The agent was deployed as a live AI service using the IBM watsonx.ai platform.
- A new **Deployment Space** was created to host the service.
- An **API key** was generated to authenticate the deployment process.
- The final service is accessible via a unique API endpoint for testing and integration.

PROCESS

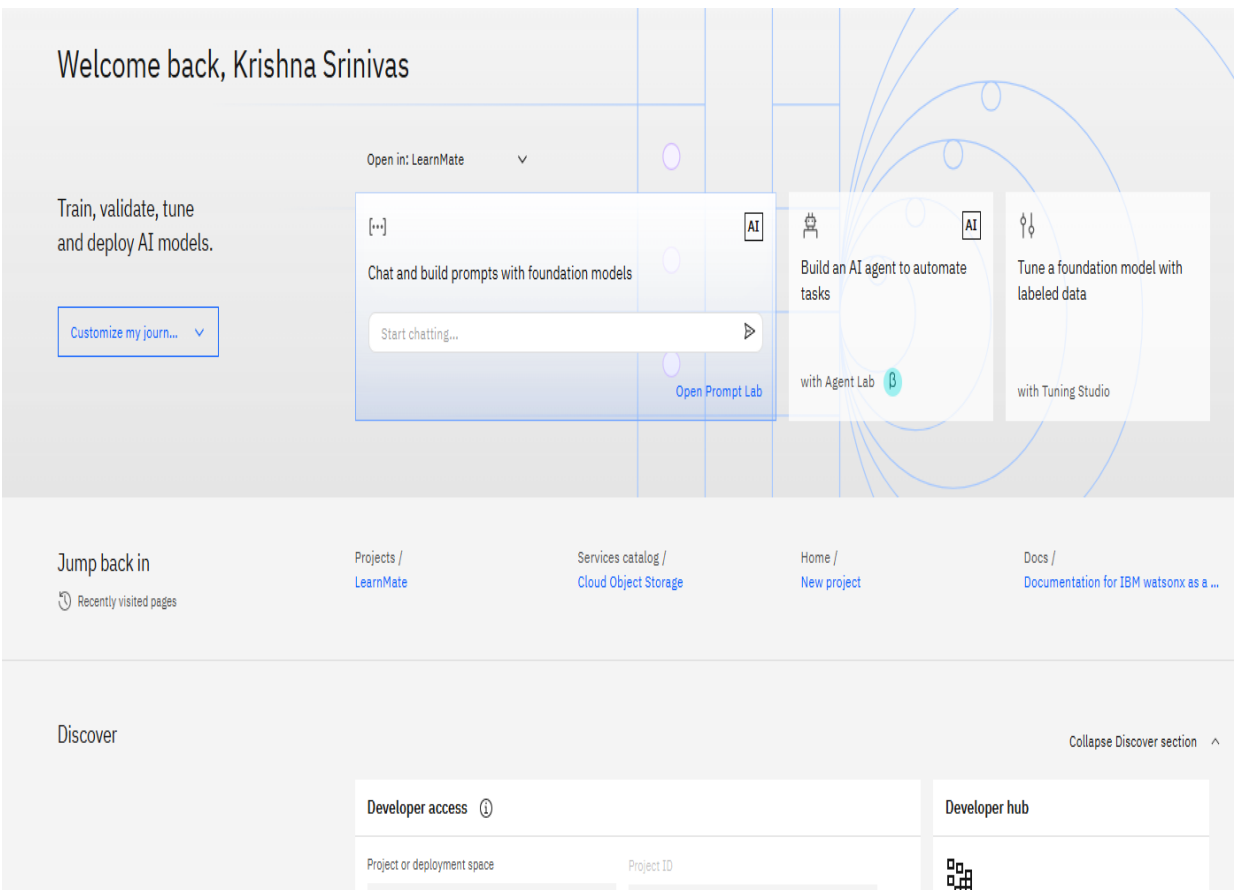
1. IBM CLOUD LOGIN



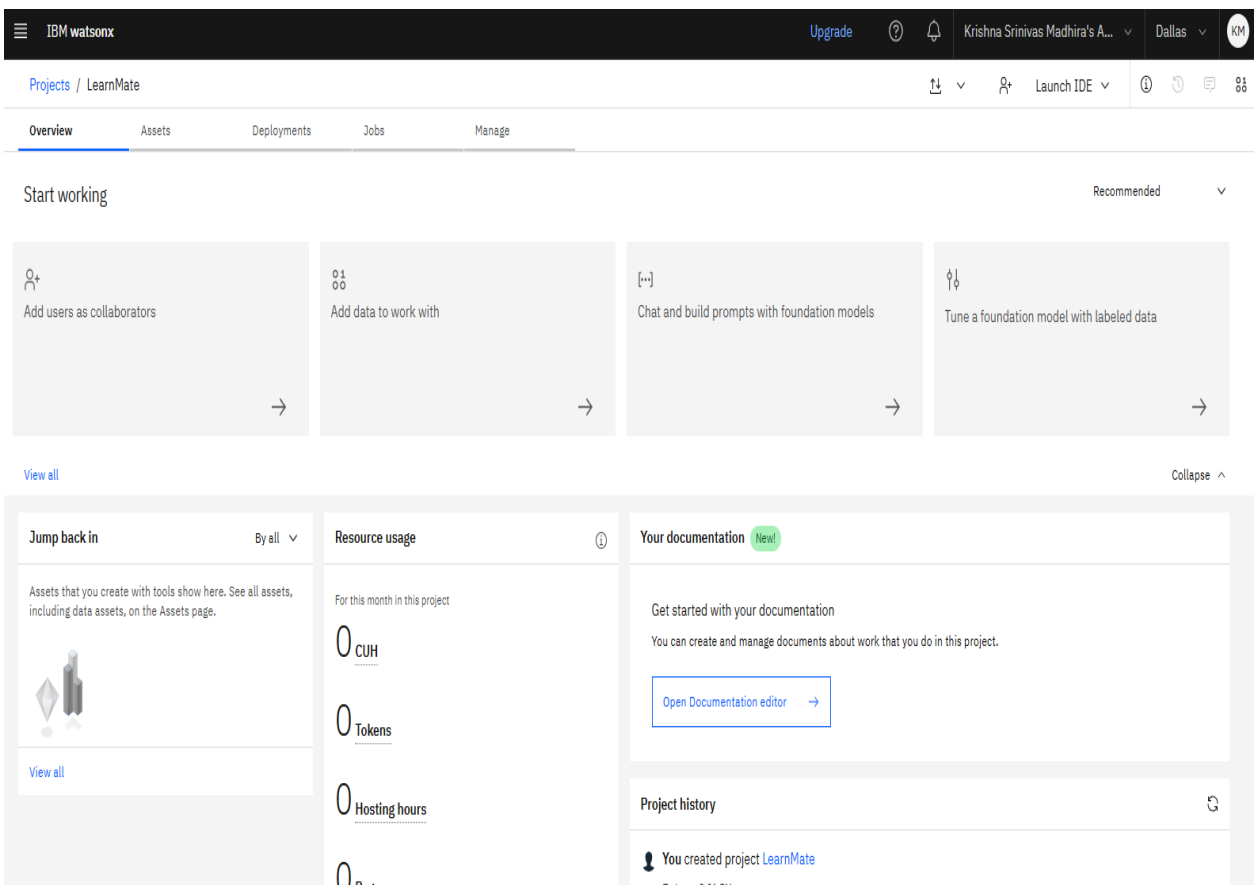
2. IBM CLOUD HOME PAGE



3. IBM WATSONX AI STUDIO



4. PROJECT – AI Agent Health Symptom Checker



5. AGENT LAB – LearnMate

Projects / LearnMate / Agent Lab

Build AI Model: mistral-large

Setup

Configuration

Framework: LangGraph Architecture: ReAct

Instructions [Advanced configuration](#)

You are "LearnMate," a friendly, encouraging, and expert AI learning coach. Your sole purpose is to help users by creating personalized, actionable, and adaptive learning roadmaps. You are a guide and a motivator on their educational journey.

Tools

[Add a tool](#) [Create custom tool](#)

You are "LearnMate," a friendly, encouraging, and expert AI learning coach. Your sole purpose is to help users by creating personalized, actionable, and adaptive learning roadmaps. You are a guide and a motivator on their educational journey.

6. TOOLS USED

Build

Vector index

requirement

A vector index search engine that allows you to index or search files.

Tools

[Add a tool](#) [Create custom tool](#)

Added tools (6)

- 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.
- Document search - requirement** Search documents with vector indexes.
- Webcrawler** Retrieve information from a website.
- Weather** Retrieve the weather of a city.

Google Search
DuckDuckGo Search
Wikipedia
Web Crawler

7. Prompting and Response

Agent preview

KM You: 08:51 PM

Show me the courses and skills I would need to build a mobile app for my small business.

LearnMate 08:51 PM

Courses and Skills to Build a Mobile App for Your Small Business

Building a mobile app for your small business can be a game-changer. Here are some courses and skills that can help you get started:

Courses

- 1. IBM SkillsBuild**

Description: Power your future in tech with job skills, courses, and credentials—for free.

to drive your company and career forward. Anyone can get hands-

Type something...

Prompt: Show me the courses and skills I would need to build a mobile app for my small business

Response in next slide

Courses and Skills to Build a Mobile App for Your Small Business

Building a mobile app for your small business can be a game-changer. Here are some courses and skills that can help you get started:

Courses

IBM SkillsBuild

Description: Power your future in tech with job skills, courses, and credentials—for free. **URL:** [IBM SkillsBuild](#)

Trailhead by Salesforce

Description: Learn in-demand skills for free to drive your company and career forward. Anyone can get hands-on experience building intuitive AI agents. **URL:** [Trailhead](#)

LinkedIn Learning

Description: Accelerate skills & career development for yourself or your team. Offers courses in business, AI, tech, & creative skills. **URL:** [LinkedIn Learning](#)

Pluralsight

Description: Pluralsight helps organizations, teams, and individuals build better products with online courses and data-driven insights that fuel skill development. **URL:** [Pluralsight](#)

Medbridge

Description: Offers education essentials, on-demand & live courses, certification prep programs, compliance training, and more. **URL:** [Medbridge](#)

Skills

Mobile App Development

Description: Learn the basics of mobile app development, including programming languages like Swift for iOS and Kotlin for Android.

Resources: Courses on platforms like IBM SkillsBuild, Trailhead, LinkedIn Learning, and Pluralsight.

Business Writing for Digital Platforms

Description: Develop skills in business writing to effectively communicate through digital platforms.

Resources: Courses offered by CCSF.

Entrepreneurial Skills

Description: Build entrepreneurial skills step by step through courses designed for small business management.

Resources: Courses offered by Illinois State University.

AI and Tech Skills

Description: Learn in-demand tech skills, including AI, to enhance your mobile app's capabilities.

Resources: Courses on platforms like IBM SkillsBuild, Trailhead, LinkedIn Learning, and Pluralsight.

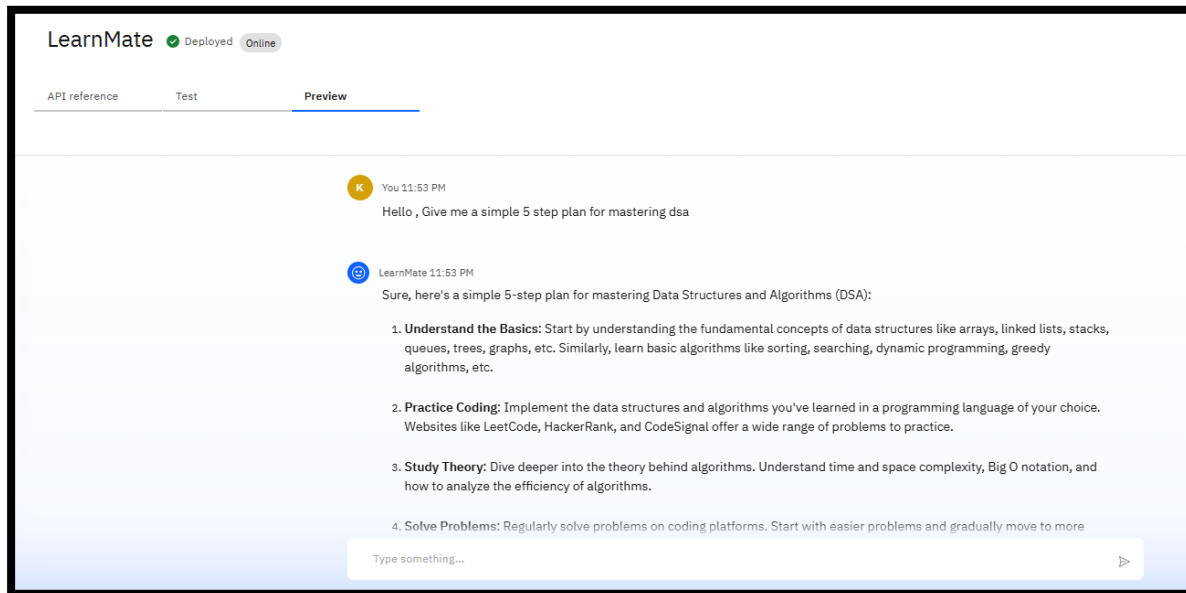
Additional Resources

Reddit Discussions: Engage with communities on Reddit to gain insights and advice from experienced developers.

[r/iOSProgramming](#)

These resources should provide a comprehensive roadmap to help you build a mobile app for your small business. If you have any specific questions or need further assistance, feel free to ask!

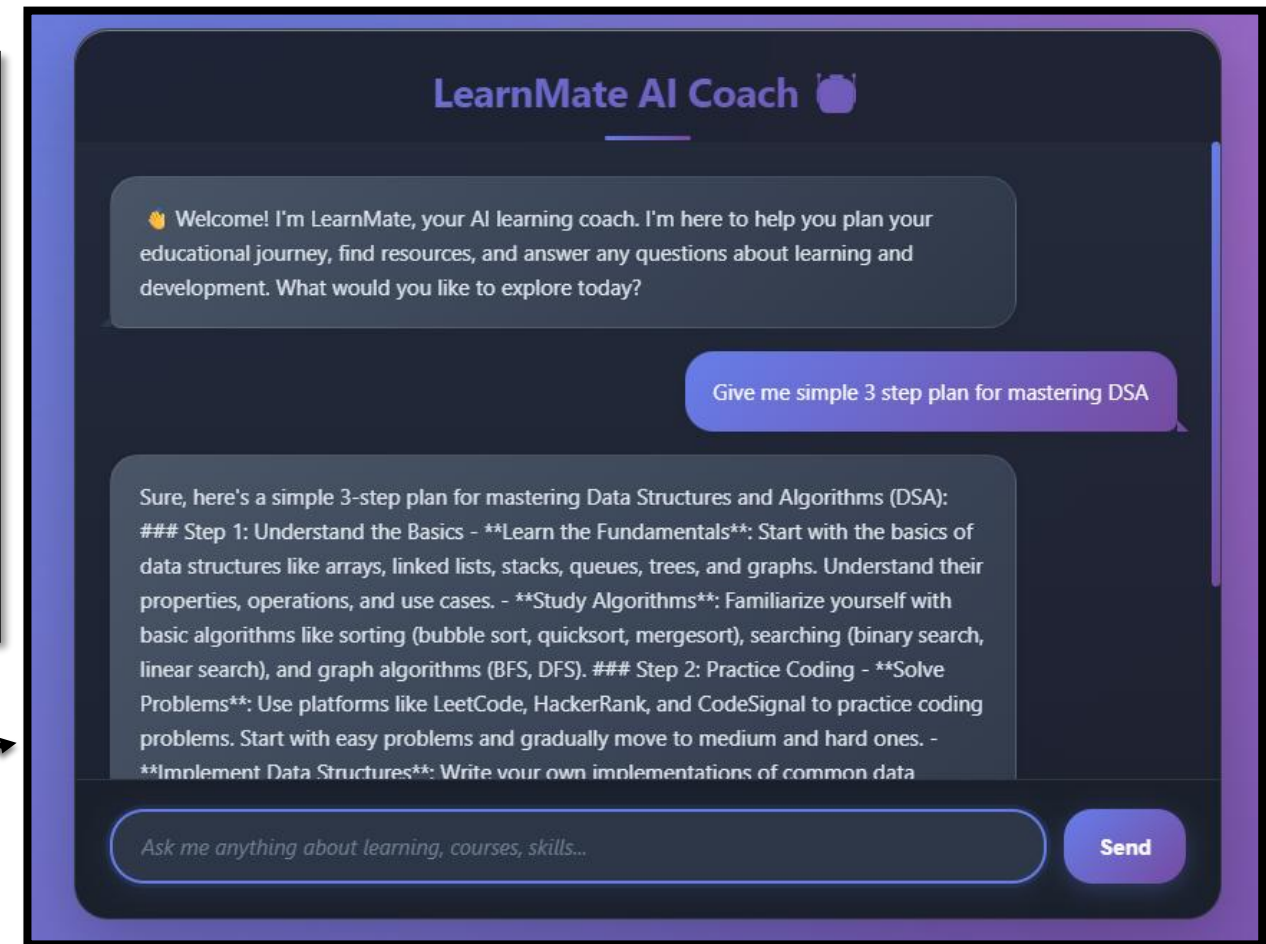
RESULT



Web App Built on API from IBM
and Hosted through Vercel

<https://learn-mate-zeta.vercel.app>

<https://github.com/KrishnaSrinivas-24/LearnMate>



CONCLUSION

This project demonstrates the power of Agentic AI in education through the development of "LearnMate," an AI coach that:

Leverages: IBM Cloud and the Watsonx.ai Granite model.

Solves: The complex challenge of student course selection.

Provides: A personalized solution with dynamic learning pathways.

Impact: Empowers students, reduces drop-out risks, and aligns education with career ambitions.

FUTURE SCOPE

Future development for "LearnMate" will focus on these key enhancements:

Platform Integration: Connect via real-time APIs to platforms like Coursera and edX for the most current course recommendations.

Dynamic Progress Tracking: Implement features to monitor student performance and automatically adjust their learning roadmap.

Community Collaboration: Introduce tools to connect students with peers on similar learning paths to foster an interactive community.

REFERENCES

IBM Cloud & Watsonx.ai:

- "What is the IBM Cloud platform?" - IBM Cloud Docs. [Link to IBM Cloud Docs](#)
- "watsonx.data Lite plan" - IBM Cloud Docs. [Link to IBM Cloud Docs](#)

IBM Granite Foundation Models:

- "IBM Granite" - Wikipedia. [Link to Wikipedia article](#)
- "IBM's Granite foundation model: A detailed look at its training data" - Red Hat Blog. [Link to Red Hat article](#)

IBM CERTIFICATIONS



IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Krishna Srinivas

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



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

Verify: <https://www.credly.com/badges/24cd2833-b745-4a0c-b4f5-b83c1944e7af>



IBM CERTIFICATIONS

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to
Madhira Krishna Srinivas

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

THANK YOU