
CAPSTONE PROJECT

LEARNMATE – AI-POWERED ACADEMIC ROADMAP AGENT

Presented By:
**NAMITHA R – DAYANANDA SAGAR UNIVERSITY – COMPUTER
SCIENCE AND ENGINEERING**

OUTLINE

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

PROBLEM STATEMENT

- Students in diverse engineering fields often face difficulty in identifying the right courses or technologies to focus on based on their interests, branch, and current skill level. Generic career advice platforms fail to offer tailored learning journeys. There's a strong need for an intelligent system that can act like a personalized mentor, guiding students on their academic and career paths effectively.

PROPOSED SOLUTION

LearnMate is an AI-powered conversational agent built using IBM Watsonx's Prompt Lab and AI Runtime. It offers personalized course roadmaps to students from any engineering background. By simply interacting through natural language, students can receive curated learning paths, resources, and career suggestions tailored to their goals and capabilities.

LearnMate solves this by using a **conversational AI agent**.

It:

- Understands user input (like “I’m in 3rd year ECE”)
- Generates **personalized course roadmaps**
- Suggests learning platforms (IBM Skillsbuild, Coursera, NPTEL, etc.)
- Is **easy to use** — just type and get answers

SYSTEM APPROACH

Tool/Service:

Purpose:

Watsonx.ai Studio

Build, test, and deploy foundation model agents

Prompt Lab

Create and refine prompts without coding

Granite-3-3-8b-instruct

IBM Foundation LLM powering the agent

AI Runtime

Allows API access to your deployed agent

IBM Cloud Project

Manages agent assets and security

ALGORITHM & DEPLOYMENT

Algorithm Used

- Utilized IBM's **Granite-3-3-8b-instruct** large language model (LLM) for natural language understanding.
- Applied **Prompt Engineering** techniques to control and guide the agent's behavior without coding.
- Used **Zero-shot Learning** to allow the model to respond without prior task-specific training.
- Prompts included contextual guidance like student domain, goals, and course types.

Deployment

- Created and tested prompts within **IBM Watsonx Prompt Lab**.
- Deployed the prompt directly via **Watsonx Runtime**, which generated a secured **API endpoint**.
- Linked deployment to a **Watsonx Project** for access control using API Key and Project ID.
- No additional frontend/backend setup required — fully cloud-based deployment.

RESULT

GITHUB LINK: https://github.com/namitha2526/ibm_AI-Cloud_project

IBM watsonx

Upgrade ⓘ 🔔

Namitha Rajashekar's Acco... ▾

Dallas ▾



NR

Deployment spaces /

learnmate-agent

OverviewAssetsDeploymentsJobsManage

🔍 Search







Name	Type	Status	Asset	Asset type	Tags	Last modified	
 Learnmate agent	Online	✅ Deployed	Learnmate agent	Ai service	wx-agent 	37 seconds ago Namitha Rajashekar (You)	⋮

Items per page: 20 ▾1-1 of 1 items

1 of 1 pages◀▶

RESULT


[Deployment spaces](#) / [learnmate-agent](#) / [Learnmate agent](#) /




Learnmate agent ✓ Deployed Online

[API reference](#)[Test](#)[Preview](#)


[New chat](#) +

 You 03:05 PM


hi

 Learnmate agent 03:05 PM


Hello! I'm Learn Mate, your AI-powered academic advisor. To provide you with the best guidance, could you please tell me your year of study and your specific engineering discipline, such as Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), Mechanical Engineering, or Civil Engineering?

 You 03:05 PM


i want aiml roadmap

 Learnmate agent 03:05 PM

Great! You're interested in Artificial Intelligence and Machine Learning (AI/ML). To create a personalized learning roadmap for

Type something... 

RESULT




Saved agents

<


Build

>


Agent preview




From learnmate




Learnmate agent
An AI-powered academic advisor that builds ...



 You: 01:22 PM

give aiml roadmap

 Learnmate agent 01:22 PM

Here's a personalized learning roadmap for Artificial Intelligence and Machine Learning (AI/ML) with topics, tools, and skill milestones for the next 6-12 months:

Month 1-3: Foundations

1. Mathematics:



- Linear Algebra: Vector spaces, eigenvalues, and eigenvectors
- Calculus: Probability, statistics, and optimization
- Python libraries: NumPy, SciPy, and Pandas

2. Programming:

- Python: Data structures, file operations, and object-oriented programming
- Python libraries: scikit-learn, TensorFlow, and Keras

3. Data Preprocessing:

- Data cleaning and visualization
- Feature engineering and selection
- Data augmentation and generation



CONCLUSION

- **LearnMate** demonstrates the power of IBM Watsonx in building intelligent, scalable, and domain-adaptive AI agents.
- It provides personalized guidance to engineering and technology students across diverse fields using a robust foundation model.
- The project showcases how **no-code prompt engineering** can create impactful solutions without deep AI infrastructure setup.
- With minimal configuration, the agent was effectively deployed via **Watsonx Runtime**, making it accessible and production-ready.
- This project highlights the future of education technology powered by **enterprise-grade AI tools**.

FUTURE SCOPE

- **Multi-language support** to assist non-English-speaking students globally.
- **Integration with LMS platforms** (like Moodle, Google Classroom) for real-time curriculum adaptation.
- **Voice interface** for better accessibility to visually impaired or low-literacy users.
- **User analytics and dashboards** to track learning progress and suggest improvements.
- **Model fine-tuning** using feedback data for improved domain-specific accuracy.
- **Mobile-first deployment** for wider reach and better usability on low-end devices.

REFERENCES

- **IBM watsonx.ai Documentation**

<https://cloud.ibm.com/docs/watsonx-ai>

- **IBM Granite Model Lifecycle**

<https://dataplatform.cloud.ibm.com/docs/content/wsj/analyze-data/fm-model-lifecycle.html>

- **IBM Cloud IAM (API Key Management)**

<https://cloud.ibm.com/apidocs/iam-identity-token-api>

- **Watsonx Prompt Lab Overview**

<https://cloud.ibm.com/docs/watsonx-ai?topic=watsonx-ai-prompt-lab>

IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Namitha R

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



Issued on: Jul 15, 2025
Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/af424bfe-e756-4791-8b21-ee5c462589c5>



IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Namitha R

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



Issued on: Jul 18, 2025
Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/58a1024d-40ba-4474-958c-3585693302e2>



IBM CERTIFICATIONS

IBM SkillsBuild

Completion Certificate



This certificate is presented to

Namitha .R

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