
CAPSTONE PROJECT

LEARNMATE – AI-POWERED ACADEMIC ROADMAP AGENT

Presented By:

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OUTLINE

- Problem Statement
- Proposed System/Solution
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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/vaibhav-araikar/ibm_ai_cloud_project

The screenshot displays the IBM watsonx user interface. At the top, the header bar includes the 'IBM watsonx' logo, an 'Upgrade' button, a help icon, a notification bell, and a user profile for 'Vaibhav Araikar's Account' with a location dropdown set to 'Dallas'. Below the header, the breadcrumb 'Deployment spaces /' is visible. The main section is titled 'learnmate-agent' and features a tabbed interface with 'Overview', 'Assets', 'Deployments' (selected), 'Jobs', and 'Manage'. The 'Deployments' tab contains a table with the following data:


Name	Type	Status	Asset	Asset type	Tags	Last modified
learnmate	Batch	Deployed	learnmate Agent	Ai service		2 minutes ago Vaibhav Araikar (You)

At the bottom of the interface, there is a pagination section showing 'Items per page: 20' and '1-1 of 1 items', along with a '1 of 1 pages' indicator and navigation arrows.


RESULT

Saved agents<Build>Agent preview

From learnmate_agent


 **learnmate Agent**
An AI-powered academic advisor that creates ...

VA You: 01:43 PM
hello



 learnmate Agent 01:43 PM

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

► How did I get this answer?



Type something...

RESULT

Saved agents


<

Build

>

Agent preview

From learnmate_agent




learnmate Agent
An AI-powered academic advisor that creates ...

VA

You: 01:44 PM

i want blockchain roadmap annd suggest me some courses



learnmate Agent 01:44 PM

Great choice! Blockchain technology is a hot topic in engineering and tech. Here's a personalized learning roadmap for the next 6-12 months:


Month 1-3: Fundamentals of Blockchain


- Topics: Cryptography basics, distributed systems, consensus algorithms (PoW, PoS), and blockchain architecture.
- Tools: Learn about blockchain platforms like Ethereum and Hyperledger.
- Skill Milestones: Understand smart contract development using Solidity.
- Courses:
 - [IBM SkillsBuild: Blockchain Fundamentals](#)
 - [Coursera: Blockchain Specialization by University of Buffalo](#)

Month 4-6: Intermediate Blockchain Concepts

- Topics: Scalability solutions (sharding, sidechains), privacy in blockchain (Zcash, Monero), and decentralized applications (dApps).
- Tools: Explore blockchain explorers and tools like Etherscan and MyCrypto.

Type something...





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>

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