CAPSTONE PROJECT

LEARNMATE – AI-POWERED ACADEMIC ROADMAP AGENT

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OUTLINE

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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 Al-powered conversational agent built using IBM Watsonx's Prompt Lab and Al 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 Al 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

Al 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.

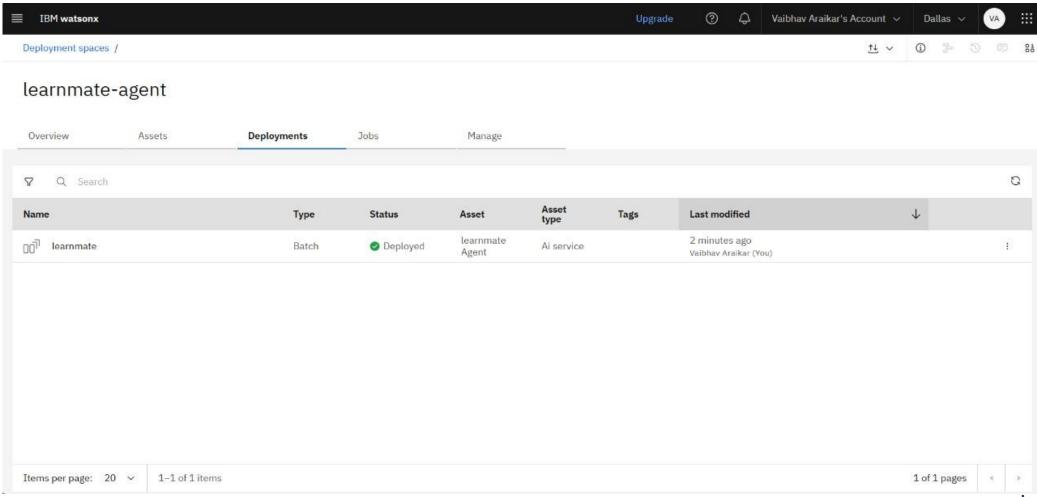
Deployment

- •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.



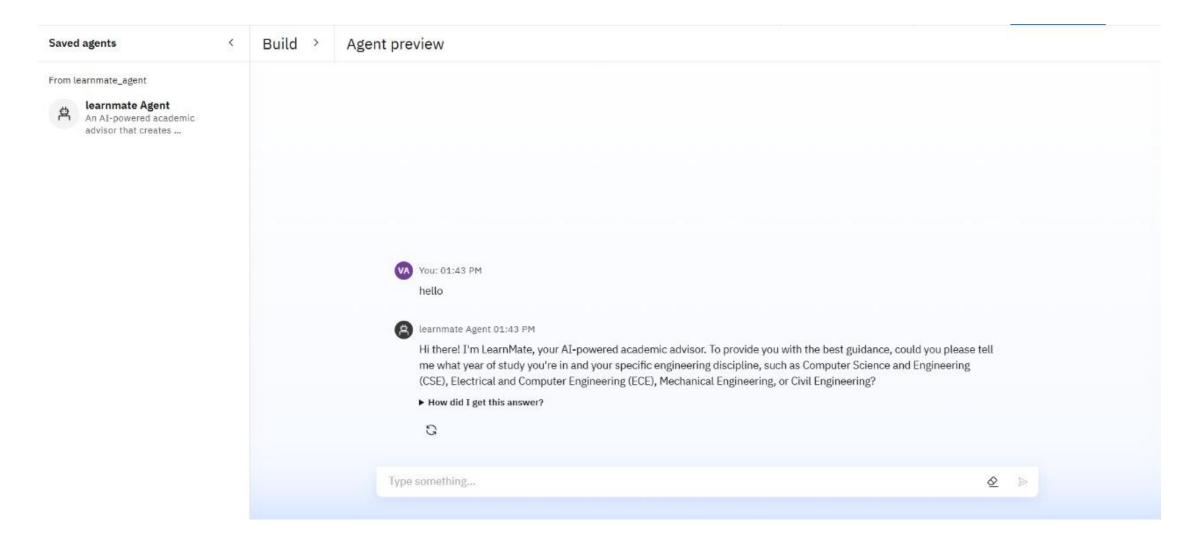
RESULT

GITHUB LINK: https://github.com/vaibhav-araikar/ibm_ai_cloud_project



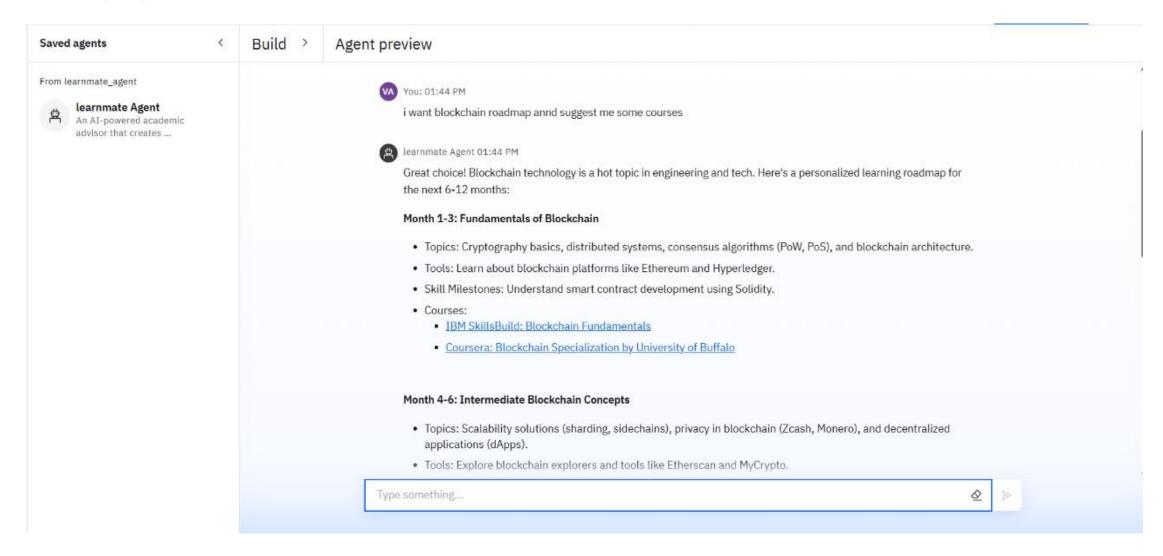


RESULT





RESULT





CONCLUSION

- LearnMate demonstrates the power of IBM Watsonx in building intelligent, scalable, and domainadaptive 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 Al 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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