CAPSTONE PROJECT AGENTIC AI FOR PERSONALIZED COURSE PATHWAYS.

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OUTLINE

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PROBLEM STATEMENT

Problem Statement No.12 -

The Challenge - Students often struggle to identify the right learning path that aligns with their interests and long-term goals due to the overwhelming number of online courses and a lack of personalized guidance. Many students struggle to identify the right learning path due to the overwhelming number of online courses and lack of personalized guidance. This often leads to confusion, wasted time, and unstructured learning. Existing systems provide generic recommendations that don't adapt to individual interests, skill levels, or career goals. Students need a dynamic solution that understands their background and guides them step by step. LearnMate addresses this challenge by acting as an Agentic AI coach that interacts with learners, assesses their needs, and builds personalized, evolving course roadmaps. This ensures focused learning, better outcomes, and increased motivation.



PROPOSED SOLUTION

LearnMate is an intelligent Agentic AI coach developed on **IBM Cloud using Watsonx AI**, designed to help students create and follow personalized learning roadmaps. By leveraging Agentic AI principles, it dynamically interacts with students to:

- Understand their career interests (e.g., Frontend Development, Cybersecurity, UI/UX Design).
- Assess their current skill level, time commitment, and learning goals.
- Recommend a step-by-step, adaptive course roadmap that evolves based on student feedback and progress.



KEY FEATURES AND ARCHITECTURE

Built with:

- IBM Watsonx AI platform
- LangGraph Framework
- ReAct Architecture (for decision-making and interaction planning)
- Agent developed using the "Build an Al Agent" module on Watsonx

Agent Capabilities:

- Acts as an interactive coach, not just a chatbot
- Collects contextual input: skill level, weekly learning hours, timeframe
- Provides customized learning plans (e.g., a 6-month roadmap for Frontend Development)
- Updates recommendations based on learner progress and changing interests

Dynamic Adaptation:

- Weekly check-ins to reassess learner goals and pace
- Suggests alternative resources or deeper topics when progress is rapid
- Offers motivational nudges and productivity tips

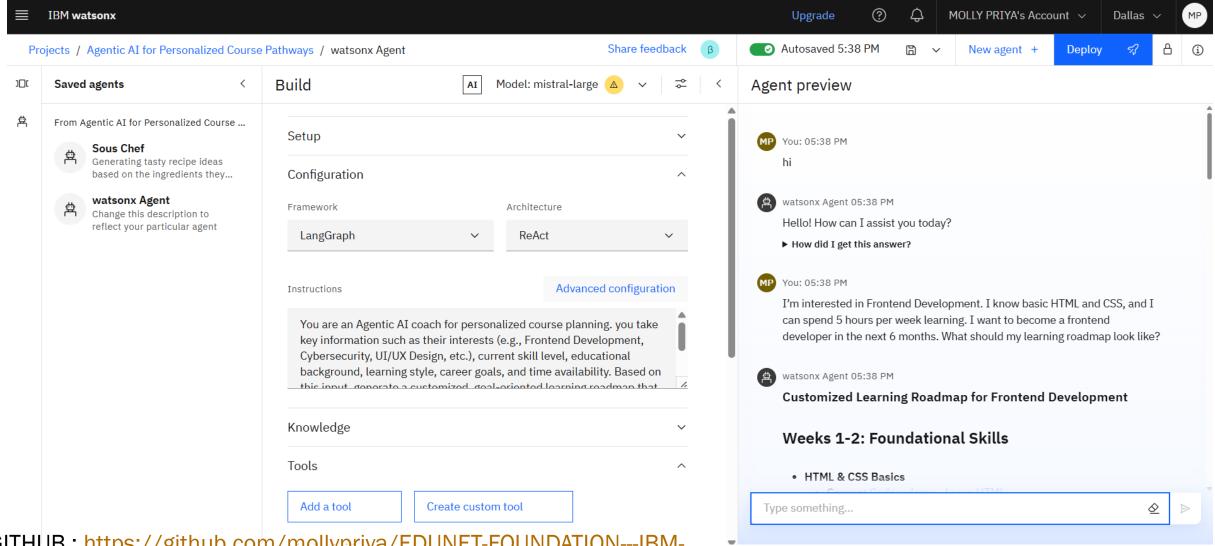


ALGORITHM & DEPLOYMENT

- Developed using IBM Watsonx AI with the "Build an AI Agent" tool to enable Agentic AI behavior.
- Integrated the Mistral Large language model hosted on IBM Cloud for powerful natural language understanding and response generation.
- Follows the ReAct (Reason + Act) architecture to allow the agent to reason through user inputs and generate dynamic learning plans.
- Implements LangGraph to manage agent state, task orchestration, and decision-making based on user profiles and feedback loops.
- Collects and processes user preferences, skill levels, and learning goals via interactive dialogue.
- Dynamically creates and updates personalized course roadmaps that adapt over time as the learner progresses.
- Deployed on IBM Cloud, ensuring scalable, secure, and real-time access across devices and platforms.



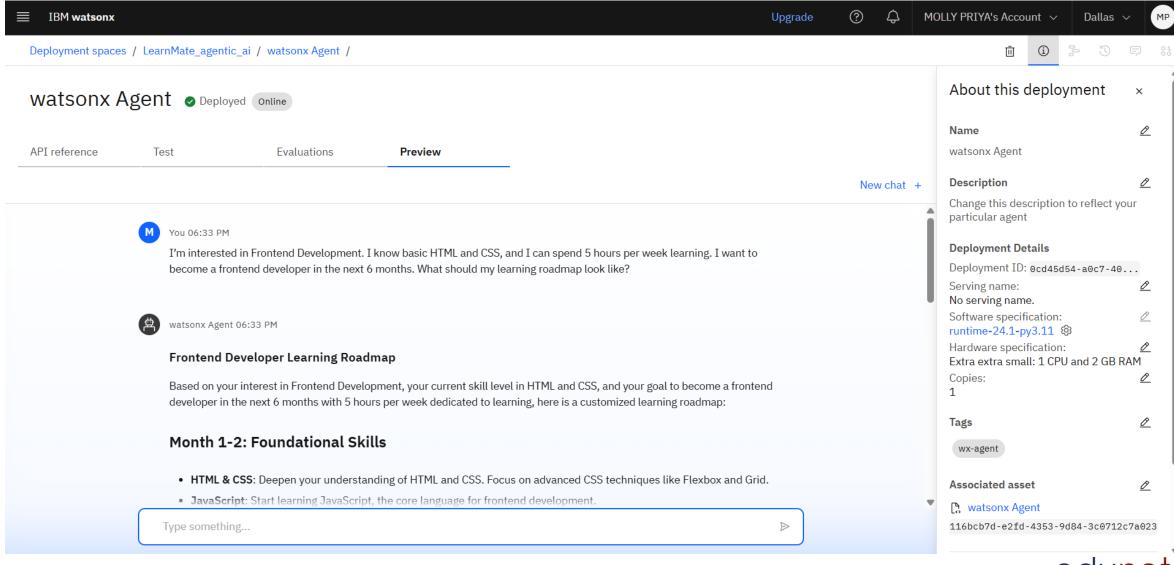
RESULT



GITHUB: https://github.com/mollypriya/EDUNET-FOUNDATION---IBM-SKILLSBUILD-4WEEKS-INTERNSHIP-ON-AI-IBM-CLOUD-TECHNOLOGIES



DEPLOYMENT





CONCLUSION

LearnMate demonstrates the potential of Agentic AI in revolutionizing personalized education. By leveraging the *Mistral Large model* on IBM Cloud and Watsonx's powerful Agentic AI tools, the system provides students with dynamic, adaptive learning roadmaps tailored to their individual goals and progress. The conversational agent not only guides learners intelligently but also evolves with them, ensuring long-term engagement and skill development. This solution bridges the gap between overwhelming course choices and meaningful learning, making career-oriented education more accessible and effective.



FUTURE SCOPE

- Multi-Modal Interaction: Integrate voice input and visual learning aids (e.g., flowcharts, mind maps) to enhance user experience.
- Integration with Learning Platforms: Connect with platforms like Coursera, Udemy, or edX to recommend real-time course links and track completion.
- Skill Assessment Modules: Incorporate quizzes or coding challenges to evaluate the learner's progress
 and refine the roadmap accordingly.
- Community & Mentorship Features: Enable peer-to-peer collaboration, discussion forums, and expert mentorship for additional support.
- Gamification: Introduce badges, progress streaks, and leaderboards to keep learners motivated and consistent.
- Multilingual Support: Expand accessibility by supporting regional languages, allowing non-English speakers to benefit.
- Al Feedback Loop: Continuously improve roadmap generation using user feedback and performance analytics via reinforcement learning.



REFERENCES

IBM SkillsBuild

- •Getting Started with AI Learned fundamentals of artificial intelligence and how AI can be applied in real-world scenarios.
- Journey to Cloud Understood cloud computing concepts, deployment models, and how cloud technologies support AI development.

LangChain & RAG

•Retrieval Augmented Generation (RAG) with LangChain – Explored how to integrate external data sources with LLMs using LangChain to build smarter, context-aware Al agents.

Edunet Foundation Educators

•Attended expert-led sessions and hands-on activities focused on AI, cloud, and building agentic systems for personalized learning.



IBM CERTIFICATIONS: GETTING STARTED WITH AI

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Completion Certificate



Completion date: 24 Jul 2025 (GMT)

This certificate is presented to

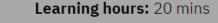
MOLLY PRIYA

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE 3824998)

According to the Adobe Learning Manager system of record



GITHUB LINK

 https://github.com/mollypriya/EDUNET-FOUNDATION---IBM-SKILLSBUILD-4WEEKS-INTERNSHIP-ON-AI-IBM-CLOUD-TECHNOLOGIES



THANK YOU

