
CAPSTONE PROJECT

AGENTIC AI FOR PERSONALIZED COURSE PATHWAYS.

Presented By:

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OUTLINE

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

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 AI 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

IBM watsonx

Upgrade ? Bell

MOLLY PRIYA's Account Dallas MP

Projects / Agentic AI for Personalized Course Pathways / watsonx Agent Share feedback β Autosaved 5:38 PM New agent + Deploy

Saved agents

From Agentic AI for Personalized Course ...

Sous Chef

Generating tasty recipe ideas based on the ingredients they...

watsonx Agent

Change this description to reflect your particular agent

Build

AI Model: mistral-large

Setup

Configuration

Framework LangGraph Architecture ReAct

Instructions

Advanced configuration

You are an Agentic AI coach for personalized course planning. you take key information such as their interests (e.g., Frontend Development, Cybersecurity, UI/UX Design, etc.), current skill level, educational background, learning style, career goals, and time availability. Based on this input, generate a customized, goal-oriented learning roadmap that

Knowledge

Tools

Add a tool Create custom tool

Agent preview

MP You: 05:38 PM

hi

watsonx Agent 05:38 PM

Hello! How can I assist you today?

► How did I get this answer?

MP You: 05:38 PM

I'm interested in Frontend Development. I know basic HTML and CSS, and I can spend 5 hours per week learning. I want to become a frontend developer in the next 6 months. What should my learning roadmap look like?

watsonx Agent 05:38 PM

Customized Learning Roadmap for Frontend Development

Weeks 1-2: Foundational Skills

• HTML & CSS Basics

Type something...

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

DEPLOYMENT

IBM watsonx

Upgrade



MOLLY PRIYA's Account

Dallas

MP

[Deployment spaces](#) / [LearnMate_agentic_ai](#) / [watsonx Agent](#) /



watsonx Agent ✓ Deployed Online

API reference

Test

Evaluations

Preview

New chat +



You 06:33 PM

I'm interested in Frontend Development. I know basic HTML and CSS, and I can spend 5 hours per week learning. I want to become a frontend developer in the next 6 months. What should my learning roadmap look like?



watsonx Agent 06:33 PM

Frontend Developer Learning Roadmap

Based on your interest in Frontend Development, your current skill level in HTML and CSS, and your goal to become a frontend developer in the next 6 months with 5 hours per week dedicated to learning, here is a customized learning roadmap:

Month 1-2: Foundational Skills

- **HTML & CSS:** Deepen your understanding of HTML and CSS. Focus on advanced CSS techniques like Flexbox and Grid.
- **JavaScript:** Start learning JavaScript, the core language for frontend development.

Type something...



About this deployment

Name

watsonx Agent

Description

Change this description to reflect your particular agent

Deployment Details

Deployment ID: 0cd45d54-a0c7-40...

Serving name:

No serving name.

Software specification:
[runtime-24.1-py3.11](#)

Hardware specification:
Extra extra small: 1 CPU and 2 GB RAM

Copies:
1

Tags

wx-agent

Associated asset

[watsonx Agent](#)

116bcb7d-e2fd-4353-9d84-3c0712c7a023

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.
- **AI 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 AI 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

In recognition of the commitment to achieve
professional excellence



MOLLY PRIYA

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



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IBM CERTIFICATIONS : RAG LAB

IBM **SkillsBuild**

Completion Certificate



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

Completion date: 24 Jul 2025 (GMT)

Learning hours: 20 mins

GITHUB LINK

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



THANK YOU