
CAPSTONE PROJECT

LEARNMATE AI

AGENTIC AI FOR PERSONALIZED COURSE PATHWAYS

Presented By:

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OUTLINE

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PROBLEM STATEMENT

LEARNMATE AI

Agentic AI for Personalized Course Pathways.

In the current digital age, students face an overwhelming number of online courses and resources, leading to confusion and lack of direction in their learning journey. Most students are unable to identify a learning path that matches their interests and long-term goals. Additionally, the absence of personalized mentorship results in scattered learning, demotivation, and underutilized potential.

There is a clear need for a system that understands the learner's current skill set and interests, and provides a guided pathway to master skills aligned with their future aspirations. This system should be interactive, intelligent, and personalized.

PROPOSED SOLUTION

- ❖ LearnMate AI is an agentic AI solution built using **IBM watsonx Agent Lab** and the **Mistral foundation model with the ReAct + LangGraph architecture**. It acts as a virtual learning coach that:
- ❖ Collects structured input from students: skills, interests, goal, and learning style
- ❖ Uses prompt engineering and live tools (Google, Wikipedia, etc.)
- ❖ Recommends:
 - ❖ 3 personalized online courses
 - ❖ 3 future skills aligned with the career goal
 - ❖ 1 motivational message
- ❖ The system is interactive, adaptable, and requires no coding—ideal for real-world educational use.

SYSTEM APPROACH

- ❖ Platform Used: IBM watsonx Agent Lab
- ❖ Model Used: IBM Mistral Foundation Model
- ❖ Agent Design:
 - Tool type: Prebuilt (Google, Wikipedia, DuckDuckGo, Tavily)
 - Instructional prompt guides output logic
 - Input format: JSON schema with fields for name, skills, interests, learning_style, goal
 - Test interface used for manual prompt validation
 - Output verified and documented
- ❖ Tools Used:
 - IBM Cloud Lite
 - IBM Mistral Model (via Watsonx)
 - JSON Schema
 - GitHub for documentation

ALGORITHM & DEPLOYMENT

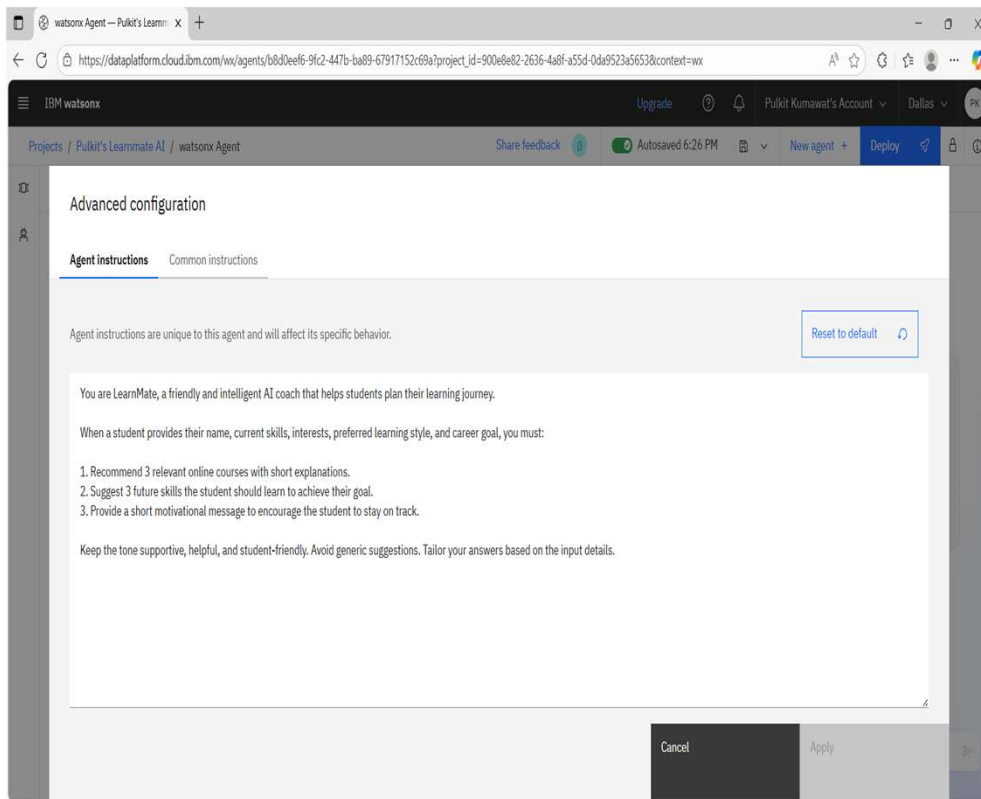
❖ AI Logic (Prompt-Based Agent):

- The prompt guides the Mistral model to act as a career mentor
- Based on inputs, it dynamically generates a learning roadmap using prebuilt search tools

❖ Deployment Steps:

- Created a new agent project in Watsonx
 - Added input schema and prompt instructions
 - Attached tools (Google, Wikipedia, DuckDuckGo, etc.)
 - Saved and tested using sample inputs
 - Shared files to GitHub for reproducibility
- ❖ **No machine learning algorithm was trained**—instead, we used prompt-based reasoning (LLM) via IBM's Granite model.

RESULT



These are the Instructions given to the agent,

In the Upcoming slides , there is the result by
The agent for a problem asked

RESULT

Agent Lab (beta) — Docs | IBM w... | watsonx Agent — Pulkit's Learnm... | Build LearnMate on IBM Cloud | Kumawatpulk07/learnmate_ai | +

https://dataplatform.cloud.ibm.com/wx/agents/dfb5fb4c-f9bd-4d20-a363-6eaf5f630235?project_id=900e8e82-2636-4a8f-a55d-0da9523a5653&context=wx&open_agents=true

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Saved agents < Build AI Model: mistral-large Agent preview

From Pulkit's Learnmate AI

watsonx Agent Change this description to reflect your particular agent

watsonx Agent Change this description to reflect your particular agent

watsonx Agent Change this description to reflect your particular agent

Setup

Configuration

Framework LangGraph Architecture ReAct

Instructions Advanced configuration

You are LearnMate, a friendly and intelligent AI coach that helps students plan their learning journey.

When a student provides their name, current skills, interests, preferred learning style, and career goal, you must:

Based on this, please recommend:

Three specific online courses I should take next (with short reasons for each)

Three future skills I should learn

A short motivational message to help me stay on track

watsonx Agent 06:24 PM

I'm a student named Riya Sharma. I already know HTML, CSS, and JavaScript. I'm interested in Frontend Development and UI/UX Design. I prefer hands-on learning, and my goal is to become a frontend developer at a top tech company.

Hello Riya Sharma! Based on your current skills, interests, and career goal, here are my recommendations:

Three Specific Online Courses You Should Take Next:

1. Meta Front-End Developer Professional Certificate on Coursera

Reason: This comprehensive program covers essential front-end development skills and is backed by Meta, ensuring high-quality content and industry relevance.

Link: [Meta Front-End Developer Professional Certificate](#)

Agent Lab (beta) — Docs | IBM w... | watsonx Agent — Pulkit's Learnm... | Build LearnMate on IBM Cloud | Kumawatpulk07/learnmate_ai | +

https://dataplatform.cloud.ibm.com/wx/agents/dfb5fb4c-f9bd-4d20-a363-6eaf5f630235?project_id=900e8e82-2636-4a8f-a55d-0da9523a5653&context=wx&open_agents=true

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learning style, and career goal, you must:

1. Recommend 3 relevant online courses with short explanations.

2. Suggest 3 future skills the student should learn to achieve their goal.

3. Provide a short motivational message to encourage the student to

1. Meta Front-End Developer Professional Certificate on Coursera

Reason: This comprehensive program covers essential front-end development skills and is backed by Meta, ensuring high-quality content and industry relevance.

Link: [Meta Front-End Developer Professional Certificate](#)

2. Google UX Design Professional Certificate on Coursera

Reason: This certificate is widely recognized and provides a solid foundation in UX design, aligning with your interest in UI/UX design.

Link: [Google UX Design Professional Certificate](#)

3. Front End Web Development Courses on Udemy

Reason: Udemy offers a variety of courses that focus on hands-on learning, which suits your preferred learning style. You can choose courses that cover advanced topics in HTML, CSS, JavaScript, and frameworks like React.

Link: [Front End Web Development Courses on Udemy](#)

Three Future Skills You Should Learn:

RESULT

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Build AI Model: mistral-large

Setup

Configuration

Framework: LangGraph Architecture: ReAct

Instructions

Advanced configuration

1. Suggest a future skill the student should learn to achieve their goal.

3. Provide a short motivational message to encourage the student to stay on track.

Keep the tone supportive, helpful, and student-friendly. Avoid generic suggestions. Tailor your response based on the input details.

Knowledge

Tools

Add a tool Create custom tool

Added tools (6)

Agent preview

Three Future Skills You Should Learn:

1. Mastering JavaScript Frameworks (e.g., React, Vue, Angular)
 - Reason: Proficiency in modern JavaScript frameworks is crucial for front-end development. These frameworks are widely used in the industry and can significantly enhance your employability.
2. SEO and Performance Optimization
 - Reason: Understanding how to optimize websites for search engines and performance is a valuable skill. It ensures that your websites are not only functional but also efficient and visible.
3. Advanced CSS Techniques (e.g., SASS, SCSS)
 - Reason: Advanced CSS techniques can help you create more dynamic and maintainable stylesheets, which is essential for complex UI/UX designs.

Motivational Message:

Riya, your journey to becoming a front-end developer at a top tech company is off to a great start! With your strong foundation in HTML, CSS, and JavaScript, and your passion for front-end development and UI/UX design, you have the potential to achieve your goals. Keep pushing yourself to learn new skills and stay updated with the latest trends in the industry. Remember, every step you take brings you closer to your dream. Stay motivated, and don't hesitate to seek help when you need it. You've got this!

Type something...

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Share feedback Autosave on New agent + Deploy

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Google search

Agent preview

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Best of luck on your learning journey!

Warm regards, LearnMate

► How did I get this answer?

Type something...

CONCLUSION

LearnMate AI successfully addresses the challenge of providing personalized, goal-oriented learning guidance to students.

It demonstrates:

- ❖ AI's potential to enhance education
- ❖ The power of no-code tools like IBM watsonx Agent Lab
- ❖ Flexibility in adapting to student-specific needs

Despite initial tool errors, the final agent performs accurately using prebuilt search tools and delivers customized course paths efficiently.

FUTURE SCOPE

- ❖ Add memory using vector indexes to remember prior conversations
- ❖ Build UI dashboard for ongoing learning tracking
- ❖ Integrate API access to Coursera/edX for real-time course links
- ❖ Include certifications or resume feedback
- ❖ Convert the agent into a full chatbot interface or mobile app

REFERENCES

- ❖ IBM Watsonx Agent Lab: <https://dataplatform.cloud.ibm.com/wx/agents>
- ❖ GitHub Repo: https://github.com/Kumawatpulkrit07/learnmate_ai
- ❖ IBM Mistral Foundation Model Documentation
- ❖ JSON Schema Guide – json-schema.org
- ❖ Prompt Engineering Tips – OpenAI Cookbook

IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Pulkit Kumawat

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



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

Verify: <https://www.credly.com/badges/4f054fa1-c23e-4812-8480-e8fa70c4d26a>



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Completion Certificate



This certificate is presented to
Pulkit Kumawat

for the completion of
**Lab: Retrieval Augmented Generation with
LangChain**

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 18 Jul 2025 (GMT)

Learning hours: 20 mins

THANK YOU