
CAPSTONE PROJECT

LEARNMATE – AI AGENT FOR PERSONALIZED COURSE PATHWAYS

Presented By:

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OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result
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- Future Scope
- References

PROBLEM STATEMENT

- PROBLEM STATEMENT – 12
- 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. LearnMate aims to solve this by acting as an Agentic AI coach that interacts with students, understands their interests (like Frontend Development, Cybersecurity, UI/UX Design, etc.), assesses their current skill level, and dynamically builds a personalized course roadmap that adapts over time based on progress and preferences.

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/namitha2526/ibm_AI-Cloud_project

IBM watsonx

Upgrade ⓘ 🔔

Namitha Rajashekar's Acco... ▾

Dallas ▾



NR

Deployment spaces /

learnmate-agent

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Name	Type	Status	Asset	Asset type	Tags	Last modified	↓
 Learnmate agent	Online	✅ Deployed	Learnmate agent	Ai service	wx-agent 	37 seconds ago Namitha Rajashekar (You)	⋮

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RESULT


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Learnmate agent ✓ Deployed Online

[API reference](#)[Test](#)[Preview](#)


[New chat](#) +

 You 03:05 PM


hi

 Learnmate agent 03:05 PM

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


 You 03:05 PM

i want aiml roadmap

 Learnmate agent 03:05 PM

Great! You're interested in Artificial Intelligence and Machine Learning (AI/ML). To create a personalized learning roadmap for

RESULT




Saved agents

<


Build

>


Agent preview




From learnmate




Learnmate agent
An AI-powered academic advisor that builds ...



 You: 01:22 PM

give aiml roadmap

 Learnmate agent 01:22 PM

Here's a personalized learning roadmap for Artificial Intelligence and Machine Learning (AI/ML) with topics, tools, and skill milestones for the next 6-12 months:

Month 1-3: Foundations

1. Mathematics:



- Linear Algebra: Vector spaces, eigenvalues, and eigenvectors
- Calculus: Probability, statistics, and optimization
- Python libraries: NumPy, SciPy, and Pandas

2. Programming:

- Python: Data structures, file operations, and object-oriented programming
- Python libraries: scikit-learn, TensorFlow, and Keras

3. Data Preprocessing:

- Data cleaning and visualization
- Feature engineering and selection
- Data augmentation and generation



RESULT

The screenshot displays the IBM WatsonX JupyterLab environment. The top navigation bar includes the 'IBM watsonx' logo, an 'Upgrade' button, a help icon, a notification bell, and a user profile dropdown for 'Namitha Rajashekar's Acco...'. The breadcrumb trail shows 'Projects / learnmate / learnmate-notebok1'. The main menu includes 'File', 'Edit', 'View', 'Run', 'Kernel', and 'Help'. The status bar indicates 'Trusted' security, 'Memory: 535 / 4096 MB', and 'Python 3.11'.

AI Service Deployment Notebook

This notebook contains steps and code to test, promote, and deploy an Agent as an AI Service.

Note: Notebook code generated using Agent Lab will execute successfully. If code is modified or reordered, there is no guarantee it will successfully execute. For details, see: [Saving your work in Agent Lab as a notebook](#).

Some familiarity with Python is helpful. This notebook uses Python 3.11.

Contents

This notebook contains the following parts:

1. Setup
2. Initialize all the variables needed by the AI Service
3. Define the AI service function
4. Deploy an AI Service
5. Test the deployed AI Service

1. Set up the environment

Before you can run this notebook, you must perform the following setup tasks:

▶ **Connection to WML**

This cell defines the credentials required to work with Watson API for both the execution in the project, as well as the deployment and runtime execution of the function.

Action: Provide the IBM Cloud personal API key. For details, see [documentation](#).

+ 2 cells hidden

Connecting to a space

A space will be used to host the promoted AI Service.

```
[20]: space_id = "a887c708-c708-45ce-91ea-e8a2ff49020e"
      client.set_default_space(space_id)
```

```
[20]: 'SUCCESS'
```

Promote asset(s) to space

We will now promote assets we will need to stage in the space so that we can access their data from the AI service.

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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Namitha .R

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**Lab: Retrieval Augmented Generation with
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(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT)

Learning hours: 20 mins



THANK YOU