
CAPSTONE PROJECT

AGENTIC AI FOR PERSONALIZED COURSE PATHWAYS

Presented By:

**1. Naveen Kumar G-VELS INSTITUTE OF SCIENCE TECHNOLOGY AND
ADVANCED STUDIES (VISTAS)-Applied Computing Emerging Technology**

OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

PROBLEM STATEMENT

- 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. Learn Mate 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

- ❑ Learn Mate is an Agentic AI Coach that interacts with students to:
- ❑ Understand their interests and goals (e.g., Cybersecurity, Frontend Development)
- ❑ Assess current skill levels through smart Q&A
- ❑ Recommend a personalized and adaptive learning roadmap
- ❑ Continuously update suggestions based on the student's feedback and progress

SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing the rental bike prediction system. Here's a suggested structure for this section:

- *System Requirements:*
 - *IBM Cloud*
 - *Watsonx.ai for (AI Model)*
 - *Watsonx.ai Studio (AI Development)*
 - *Watson x Runtime(AI Execution)*
 - *IBM cloud Object Storage (File Storage)*

ALGORITHM & DEPLOYMENT

❑ Input Collection

Capture user's name, learning interest (e.g., Frontend Dev, Cybersecurity), and skill level.

❑ Skill Assessment

Conduct Q&A or quiz to categorize skill level (Beginner / Intermediate / Advanced).

❑ Prompt Construction

Format input into a structured prompt for the **IBM Granite Foundation Model**.

❑ AI Response Generation

Use **Watsonx.ai API** to generate a tailored, level-based course roadmap.

❑ Feedback Loop

User updates progress → triggers dynamic adjustment via Granite re-prompting.

RESULT

■ Create Project

IBM watsonx

Upgrade

?

Naveen Kumar's Account

Dallas

N

Create a project

Start with a new, blank project or select from where to import an existing project.

+ New

Local file

Sample

Define details

Name

Personalized_Course_Agent

Enter a name

Description (optional)

This agent is to the student who are all having trouble in courses selection and study plan

Tags (optional)

Add tags

Add tags to make projects easier to find. To add tags, separate them with commas and press Enter.

Storage

Cloud Object Storage-pv

Cancel

Create

RESULT

- Instruction To Agent

The screenshot displays the IBM watsonx Agent Lab interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and user account information for 'Naveen Kumar's Account' in 'Dallas'. Below this, a breadcrumb trail shows 'Projects / Personalized_Course_Agent / Agent Lab', along with a 'Share feedback' button and a status bar indicating 'Unsaved' and options to 'New agent +' or 'Deploy'.

The main interface is divided into two primary sections: 'Build' and 'Agent preview'.

Build Section:

- Framework:** Set to 'LangGraph'.
- Architecture:** Set to 'ReAct'.
- Instructions:** A text box contains the instruction: 'You are Learnimate, an AI learning coach. Your role is to act like a friendly, knowledgeable academic advisor. Guide students by understanding their career interests, assessing their skill levels, and creating personalized course roadmaps.' A link for 'Advanced configuration' is also present.
- Knowledge:** A section for adding knowledge, currently empty.
- Tools:** A section for adding tools, currently empty. Buttons for 'Add a tool' and 'Create custom tool' are visible.
- Added tools (4):** A list of tools is shown, including 'Google search' with a description: 'Retrieve information from the internet with the Google search engine.'
- Model parameters:** A sidebar for configuring the model, currently set to 'granite-3-3-8b-instruct'. Parameters include:
 - Frequency penalty: -2 to 2, set to 0.
 - Presence penalty: -2 to 2, set to 0.
 - Temperature: 0 to 2, set to 0.
 - Top P (nucleus sampling): 0.01 to 1, set to 1.
 - Max tokens: 2000.
 - Random seed: (empty field).
 - Stop sequences: (empty field).

Agent preview Section:

- Shows a chat window titled 'watsonx Agent 10:43 PM'.
- The message says: 'Welcome to watsonx Agent' and 'Change this description to reflect your particular agent'.
- Below the message is a diagram of a graph with nodes and edges, and a magnifying glass icon.
- A text input field at the bottom says 'Type something...'.

RESULT

Projects / Personalized_Course_Agent / Agent Lab

Share feedback



Unsaved



New agent +

Deploy



Build



Model: granite-3-3-8b-instruct



Agent preview



You: 10:44 PM

i am intrested in ai technology



watsonx Agent 10:44 PM

That's fantastic! AI technology is a rapidly growing field with numerous opportunities. To help you get started, I recommend the following learning path:

Beginner:

1. **Introduction to AI:** Start with understanding the basics of Artificial Intelligence. A good beginner-friendly resource is the free online course "Introduction to Artificial Intelligence (AI)" offered by Coursera.
2. **Python Programming:** AI development often involves coding, and Python is one of the most popular languages in this field. Codecademy's "Learn Python 3" course is a great starting point.

Intermediate: 3. **Machine Learning:** Once you have a grasp of AI basics and Python, move on to machine learning. Andrew Ng's "Machine Learning" course on Coursera is highly recommended.

4. **Deep Learning:** After mastering machine learning, delve into deep learning, a subset of machine learning that focuses on neural networks with many layers. Fast.ai's "Practical Deep Learning for Coders" is an excellent resource.

Type something...



RESULT

■ One Month Study Plan:



You: 10:52 PM

Give me 1 month plan in ai tech with short passage for a day 2hrs



watsonx Agent 10:52 PM

Sure, here's a beginner-friendly, one-month AI technology learning plan. Each day, you'll spend 2 hours on the suggested topics.

Week 1: Introduction to AI and Machine Learning

- **Day 1:** Understand the Basics of AI
 - Read: "Artificial Intelligence: A Modern Approach" (Chapter 1)
 - Video: "AI 101" by Andrew Ng (YouTube)
- **Day 2:** Machine Learning Basics
 - Read: "Machine Learning" by Tom Mitchell (Chapter 1)
 - Video: "Machine Learning" by Google (YouTube)
- **Day 3:** Supervised Learning
 - Read: "Pattern Recognition and Machine Learning" by Christopher Bishop (Chapter 2)
 - Video: "Supervised Learning" by Andrew Ng (Coursera)

Week 2: Deep Learning

- **Day 6:** Neural Networks Basics
 - Read: "Deep Learning" by Ian Goodfellow (Chapter 1)
 - Video: "Neural Networks and Deep Learning" by Andrew Ng (Coursera)
- **Day 7:** Convolutional Neural Networks (CNNs)
 - Read: "Deep Learning" by Ian Goodfellow (Chapter 8)
 - Video: "Convolutional Neural Networks" by 3Blue1Brown (YouTube)
- **Day 8:** Recurrent Neural Networks (RNNs)
 - Read: "Deep Learning" by Ian Goodfellow (Chapter 10)
 - Video: "Understanding Recurrent Neural Networks" by 3Blue1Brown (YouTube)
- **Day 9:** Long Short-Term Memory (LSTM)
 - Read: "Sequence Learning" by Rupesh Kumar (Chapter 1)
 - Video: "Understanding LSTM" by 3Blue1Brown (YouTube)

RESULT

Week 3: AI Applications

- **Day 11:** AI in Healthcare
 - Read: "Artificial Intelligence in Healthcare" by Springer (Chapter 1)
 - Video: "AI in Healthcare" by IBM (YouTube)
- **Day 12:** AI in Finance
 - Read: "Artificial Intelligence in Finance" by Elsevier (Chapter 1)
 - Video: "AI in Finance" by Goldman Sachs (YouTube)
- **Day 13:** AI in Transportation
 - Read: "Artificial Intelligence in Transportation" by Springer (Chapter 1)
 - Video: "AI in Transportation" by MIT Technology Review (YouTube)
- **Day 14:** AI in Education
 - Read: "Artificial Intelligence in Education" by Springer (Chapter 1)
 - Video: "AI in Education" by Knewton (YouTube)

Week 4: Project and Review

- **Day 16-21:** Work on a small AI project. This could be anything from a simple machine learning model to a basic neural network. Use platforms like Kaggle for datasets and Jupyter Notebooks for coding.
- **Day 22:** Review the month's learning
 - Revisit key concepts from each week.
 - Summarize what you've learned in a blog post or journal entry.
- **Day 23-28:** Explore advanced topics based on your interests. This could be reinforcement learning, natural language processing, computer vision, or robotics.


Remember, this is a beginner's plan. As you progress, you can delve deeper into each topic. Also, practical implementation is crucial, so make sure to code along with the videos and readings. Good luck with your learning journey!

► How did I get this answer?



RESULT

- Gives Output In (Beginner\Intermediates\Advance) to the studies

 WatsonX Agent 00:00 AM



AI, or Artificial Intelligence, refers to the simulation of human intelligence processes by machines, especially computer systems. These processes include learning, reasoning, problem-solving, perception, and language understanding.

To dive deeper into this topic, I recommend the following learning path:

1. **Beginner:** Start with an introductory course on AI, such as "Introduction to Artificial Intelligence (AI)" on Coursera or edX. This will give you a foundational understanding of AI concepts, types, and applications.
2. **Intermediate:** Once you have grasped the basics, move on to more specialized topics. Consider taking "Machine Learning" by Andrew Ng on Coursera, which is a cornerstone course for understanding how AI systems learn from data.
3. **Advanced:** For a more in-depth understanding, explore advanced topics like Deep Learning, Natural Language Processing (NLP), or Robotics. Courses such as "Deep Learning Specialization" by Andrew Ng on Coursera or "Natural Language Processing" on Coursera can be beneficial.

Remember, AI is a vast field, so pace yourself and build a strong foundation before advancing to more complex topics. Let me know if you need more information or resources on any of these steps!

► How did I get this answer?

Type something...  

CONCLUSION

- Learn Mate is an intelligent AI coach that personalizes learning pathways for students by understanding their goals and skill levels. Built using IBM Watsonx.ai and IBM Cloud it generates adaptive course roadmaps and evolves with user progress. This project showcases how agentic AI can transform education through smart, personalized guidance at scale.

FUTURE SCOPE

- ❑ Learn Mate can be expanded to support voice and image inputs using IBM Speech-to-Text and Vision AI. Integration with real-time course APIs from platforms like Coursera and NPTEL can enable live recommendations. In future, it can also include gamification features, mentor matchmaking, and multilingual support to enhance engagement and accessibility for diverse learners.

REFERENCES

- **Agentic AI Concept – OpenAI and Beyond**

OpenAI. (2024). *The Rise of Agentic AI: From Tools to Autonomous Agents*.

- **Personalized Learning with AI – Research Paper**

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*.

- **IBM Watsonx.ai Documentation**

<https://www.ibm.com/cloud/watsonx-ai>

(Official documentation for using Watsonx.ai and Granite foundation models)

IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



NAVEENKUMAR G

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence

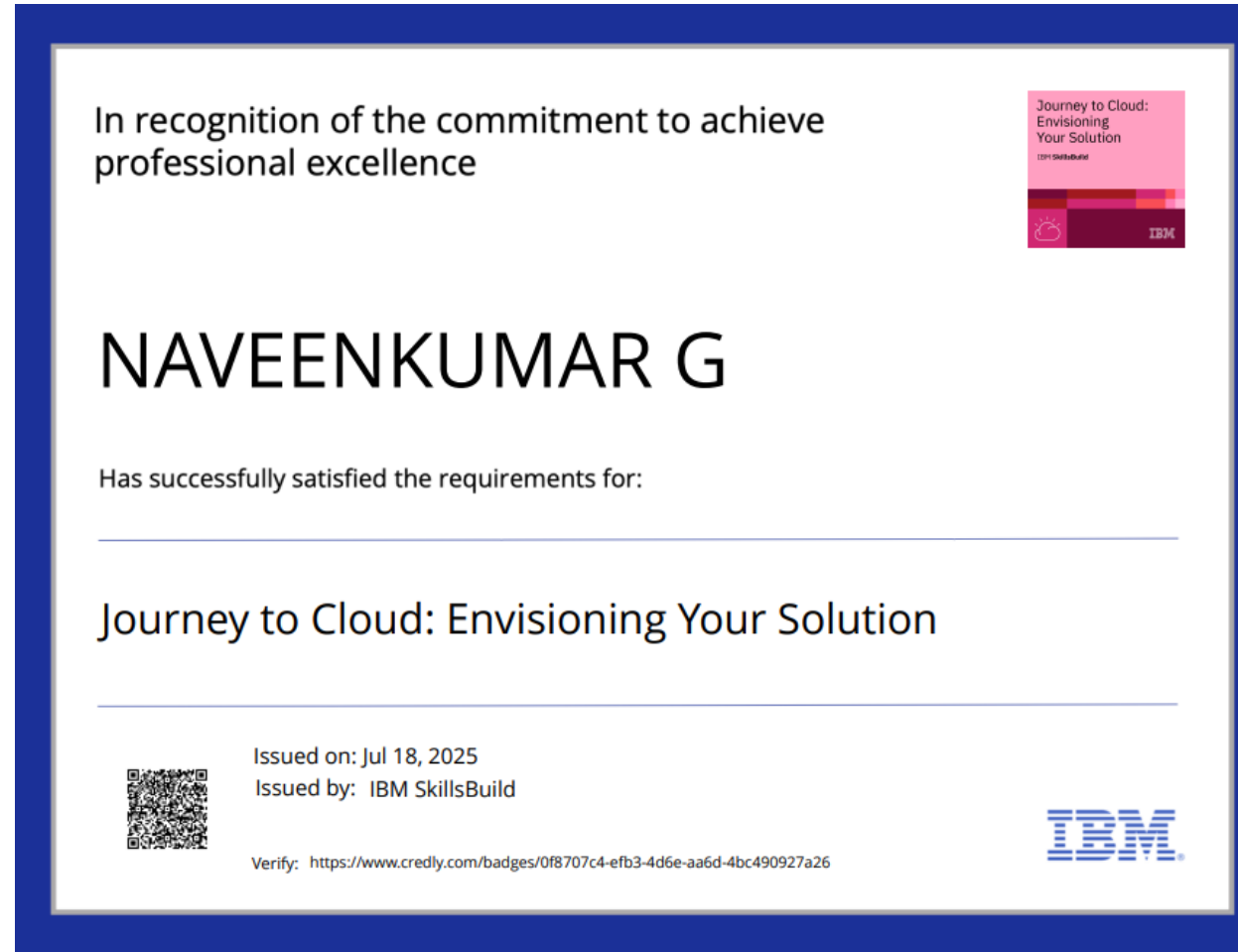


Issued on: Jul 16, 2025
Issued by: IBM SkillsBuild

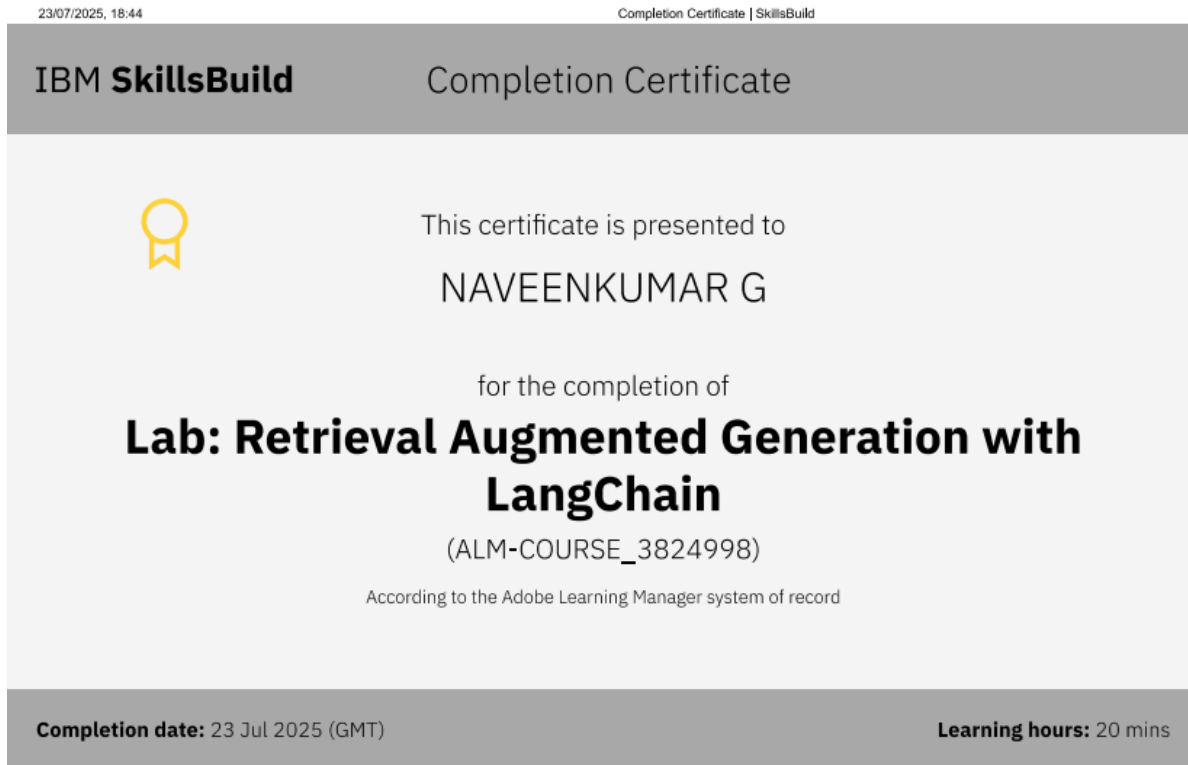
Verify: <https://www.credly.com/badges/0990a34c-42b3-4725-b539-29cbe5a8479a>



IBM CERTIFICATIONS



IBM CERTIFICATIONS



https://skills.yourlearning.ibm.com/certificate/ALM-COURSE_3824998

1/1



THANK YOU