CAPSTONE PROJECT

SKILLPILOT – AI BASED PERSONALIZED COURSE ADVISOR

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OUTLINE

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PROBLEM STATEMENT

Example: 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.

PROPOSED SOLUTION

- The proposed system, SkillPilot , aims to address the challenge of helping students identify the right learning path based on their interest, current skill level and long term career goals. It leverages agentic ai and generative language models to deliver adaptive, personalized course recommendations. The solution consists of the following components:
- User Input Understanding :
  - Engage users in natural conversation to gather input about their interests (e.g., Frontend Development, Cyber Security), existing knowledge and career goals.
  - Use Contextual questioning to guide uncertain users toward clarity in their learning direction.
- Dynamic course recommendation Engine :
  - Use IBM's Granite LLM (via watsonx.ai) to analyse user responses and generate a personalized course roadmap.
  - Recommend foundational to advanced courses progressively, ensuring logical learning flow.
  - Integrate Google Search to fetch real-time course options from platforms like Coursera, edX, IBM SkillsBuild etc..
- Adaptive Roadmap Construction :
  - The agent suggests learning paths that adapt over time based on the user's progress and follow up queries.
  - Introduce checkpoints and stage wise guidance (Beginner → Intermediate → Advanced).
- Deployment :
  - Developed using IBM watsonx Agent Builder on IBM Cloud Lite.
  - Deployed within a secure, testable deployment space.
  - Offers preview functionality through watsonx's built-in chat interface.
- Evaluation :
  - Responses Evaluated based on accuracy , relevance and clarity of learning paths suggested.
  - Iteratively improved through prompt refinement and test user feedback.

SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing the SkillPilot AI Based Personalized Course Advisor.

- System requirements

IBM Cloud (Lite Tier Account)

Access to watsonx.ai and Watson Assistant (Agent Builder)

Internet connectivity for enabling tool based we search

Deployment space for permissions to preview and interaction

- Library required to build the model

Watson Assistant (Agent Builder) – For no code conversational logic

Granite-3-3-8b-instruct (IBM LLM) – for intelligent, instruction-following dialog

Google Search Tool – for real – time course suggestions

ALGORITHM & DEPLOYMENT

- **Algorithm Selection**

SkillPilot uses the Granite-3-3-8b-instruct model, a large language model (LLM) developed by IBM. It is designed for following instructions and understanding natural language. This makes it perfect for engaging user interactions and creating personalized learning paths. The model was chosen because it meets the needs for adaptive, contextual, and multi-turn dialogue in an agentic AI system.

- **Data Input**

Instead of numerical data, SkillPilot processes natural language inputs from users. This includes:

- Area of interest (for example, “Frontend Development” or “Data Science”)

- Current skill level (beginner, intermediate, or advanced)

- Career goals (this is optional)

- Real-time course suggestions fetched using the Google Search Tool

- **Training Process**

Granite models are pre-trained by IBM on large datasets and adjusted for business use. No extra training was done by hand. Instead, prompt engineering and system instructions were refined to direct responses. The prompts mimic expert guidance by organizing learning suggestions in a clear, easy-to-use format.

- **Prediction Process**

When a user inputs a query, the agent:

Parses the natural language input.

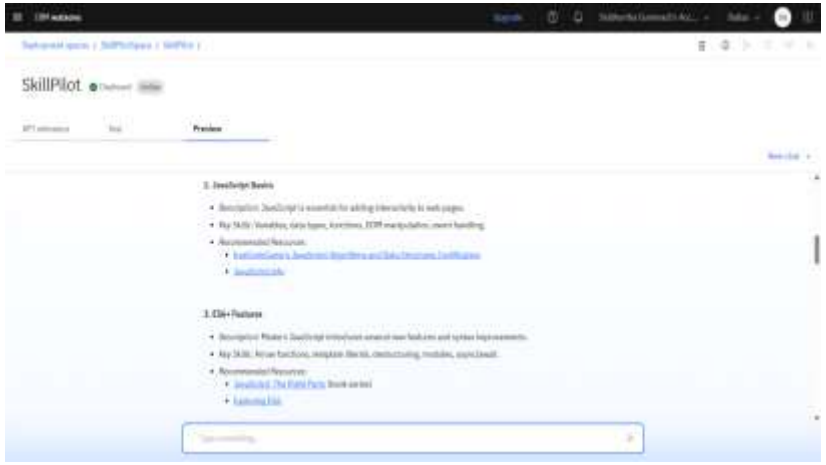
Uses prompt templates to frame a contextual response.

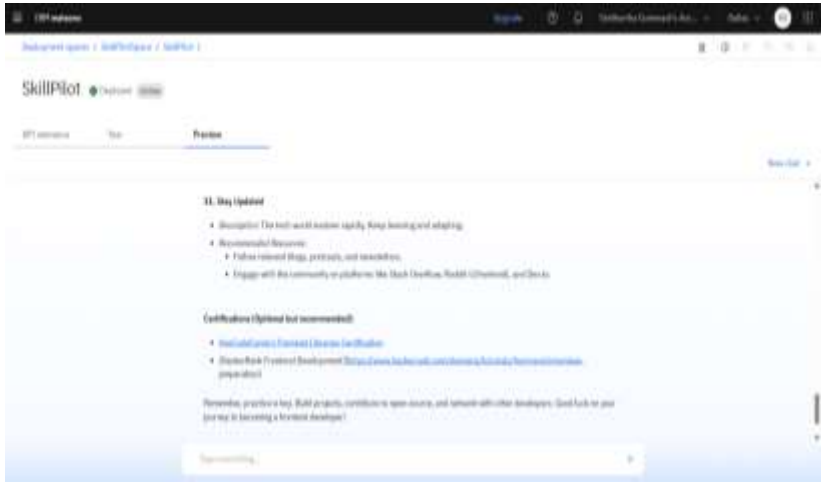
Queries the Google Search Tool if needed to fetch live course options.

Returns a step-by-step roadmap that includes skills, tools, and certification paths.

The model adjusts the response based on user history within the session, context, and question type. This makes each roadmap uniquely tailored to the learner.

RESULT





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CONCLUSION

- The SkillPilot rollout demonstrated how effective agentic AI can be at providing personalized learning path recommendations. By using IBM watsonx services and the Granite foundation model, the system engaged users in meaningful conversations. It created dynamic and structured roadmaps based on their interests and goals.
- During development, a major challenge was creating effective prompts. This was necessary to ensure the agent could respond to different types of user input. Limitations in memory persistence and tool availability also required flexibility with prompts instead of depending on complex logic.
- Despite these challenges, the system performed well by generating relevant suggestions. It showed promise as a helpful learning companion. This solution illustrates how AI can help reduce decision fatigue for learners and improve access to targeted upskilling in digital education.

GitHub Repository Link :

https://github.com/siddharthagummadi/SkillPilot-IBM-Cloud-Project

FUTURE SCOPE

- Add memory to keep user history and learning progress across sessions.
- Integrate real-time course APIs, such as Coursera, edX, and IBM SkillsBuild, for better recommendations.
- Introduce multilingual support to help learners from different backgrounds.
- Incorporate voice-based interaction to enhance accessibility.
- Use analytics to adjust prompts and boost agent performance.
- Expand deployment to schools and learning platforms for broader adoption.

REFERENCES

- IBM watsonx Documentation, https://www.ibm.com/products/watsonx
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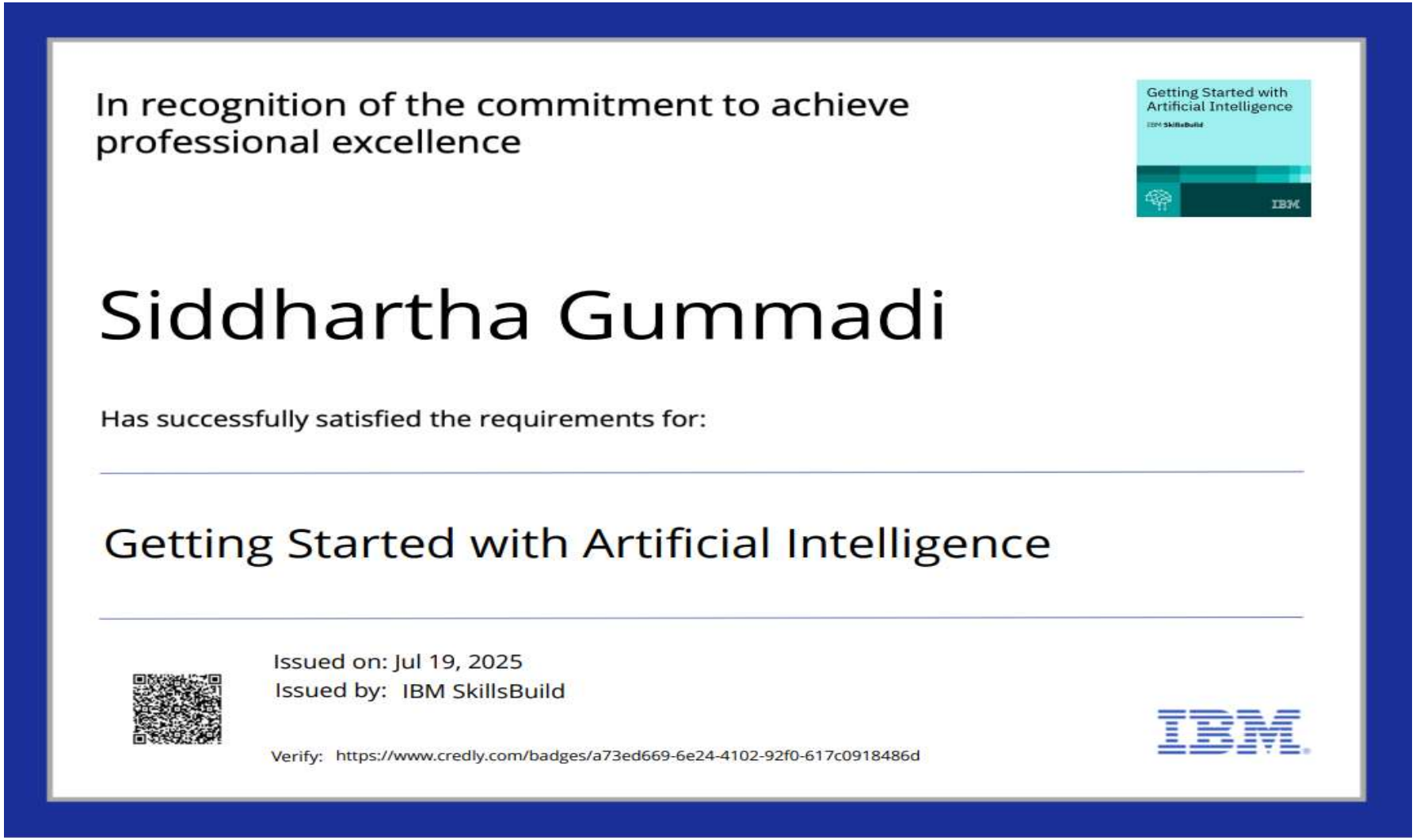
- Prompt Engineering Guide, https://github.com/dair-ai/Prompt-Engineering-Guide
- Google Search Tool Integration, IBM watsonx Agent Tooling
- Coursera and edX APIs for course discovery concepts
- Research on AI in Education:

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

IBM CERTIFICATIONS



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IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Journey to Cloud: Envisioning Your Solution

IBM SkillsBuild

IBM

Siddhartha Gummadi

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution

Issued on: Jul 19, 2025

Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/39ed5837-7240-473a-879d-3cbb25f9c651

IBM

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IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Siddhartha Gummadi

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

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THANK YOU

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