CAPSTONE PROJECT

PROJECT TITLE

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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 frequently struggle to make informed career decisions due to a fragmented landscape of guidance, a lack of deep self-awareness of their own strengths, and the rapidly changing nature of the job market.
Traditional career counseling is often difficult to scale, lacks personalization, and cannot provide real-time insights based on current industry trends. This gap results in missed opportunities, skill mismatches, and potential underemployment, preventing students from reaching their full potential in a future-ready career.

PROPOSED SOLUTION

The proposed system is an Agentic Career Counseling Companion, an intelligent AI agent designed to provide personalized, dynamic, and scalable career guidance. The solution will consist of the following components:

- Student Profile Analysis:
  - The agent will process user inputs regarding their academic performance (e.g., major, grades), stated interests, and existing skills.
- Real-time Data Retrieval:
  - Utilize external tools to access live labor market data, including in-demand job roles, required skill sets from job postings, and emerging industry trends.
- Agentic AI Core:
  - Implement an agentic system using a foundation model that can autonomously reason, plan, and use its tools to formulate comprehensive career advice.
  - The agent will continuously monitor inputs and provide proactive, context-aware suggestions.
- User Interaction:
  - Provide a conversational, user-friendly interface where students can ask natural language questions and receive detailed, actionable guidance.
- Deployment:
  - Deploy the agent on a reliable cloud platform to ensure it is always accessible to students.

SYSTEM APPROACH

The overall strategy for developing the Agentic Career Counseling Companion is based on leveraging a powerful, cloud-based AI platform.

- System Requirements:
  - A cloud-based environment for building and hosting the AI model.
  - Access to a state-of-the-art foundation model with strong reasoning capabilities.
  - Integration with external APIs and tools for real-time data retrieval (e.g., web search).
  - A secure and scalable deployment infrastructure.
- Technology Used (Library required to build the model):
  - IBM Cloud: Serves as the core platform for all services.
  - IBM watsonx.ai: The integrated studio for building, managing, and deploying AI models.
  - IBM Granite / Mistral-Large: The foundation models used for their advanced reasoning and language understanding capabilities.
  - LangGraph: The framework used within watsonx.ai to orchestrate the agent's reasoning and tool usage.

ALGORITHM & DEPLOYMENT

- Algorithm Selection:
  - The core of the system is an Agentic AI architecture powered by a Large Language Model (LLM). This approach was chosen over simple chatbots because it allows the system to autonomously use tools, reason about complex queries, and generate tailored, evidence-based responses rather than relying on pre-programmed answers. The ReAct (Reason and Act) framework is used by the agent to decide when and how to use its tools.
- Data Input:
  - The agent uses two primary sources of input:
    - User Input: Natural language queries from the student detailing their profile and questions.
    - Tool Output: Real-time data retrieved from the Google Search and Wikipedia Search APIs.
- Training & Prediction Process:
  - The system uses a pre-trained foundation model, requiring no traditional model training. The "intelligence" comes from in-context learning via the detailed instructions (persona) and its ability to use live data. The prediction process involves the agent receiving a query, reasoning about what information is needed, activating the appropriate tools, and then synthesizing the retrieved data into a final answer.
- Deployment:
  - The completed agent is deployed as a web service on IBM Cloud, making it accessible via an API for potential integration into university portals or standalone applications.
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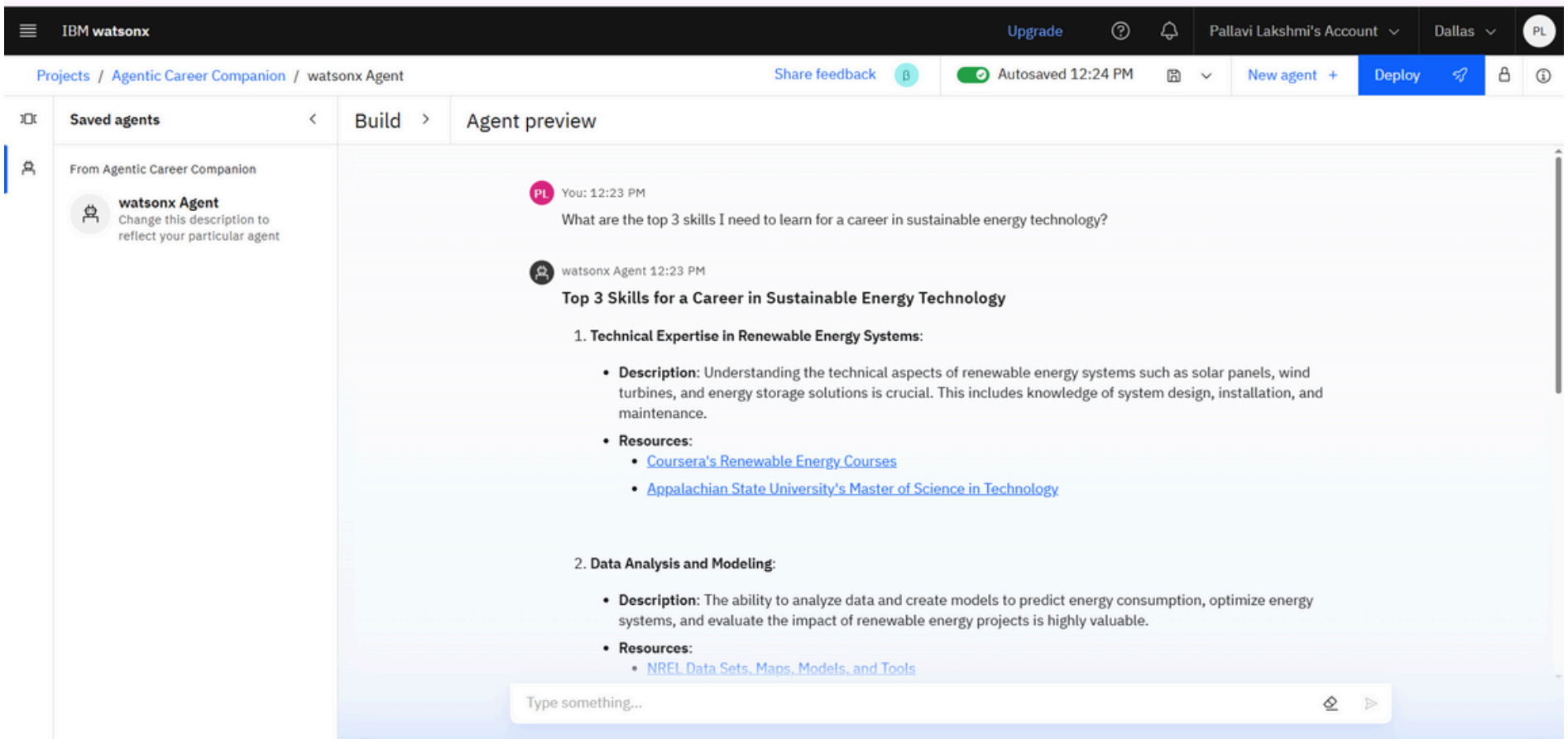
RESULT

The system successfully functions as a dynamic Career Counseling Companion. When prompted with a student's profile, the agent autonomously uses its search tools to find relevant, up-to-date information and provides a comprehensive recommendation with sourced links.



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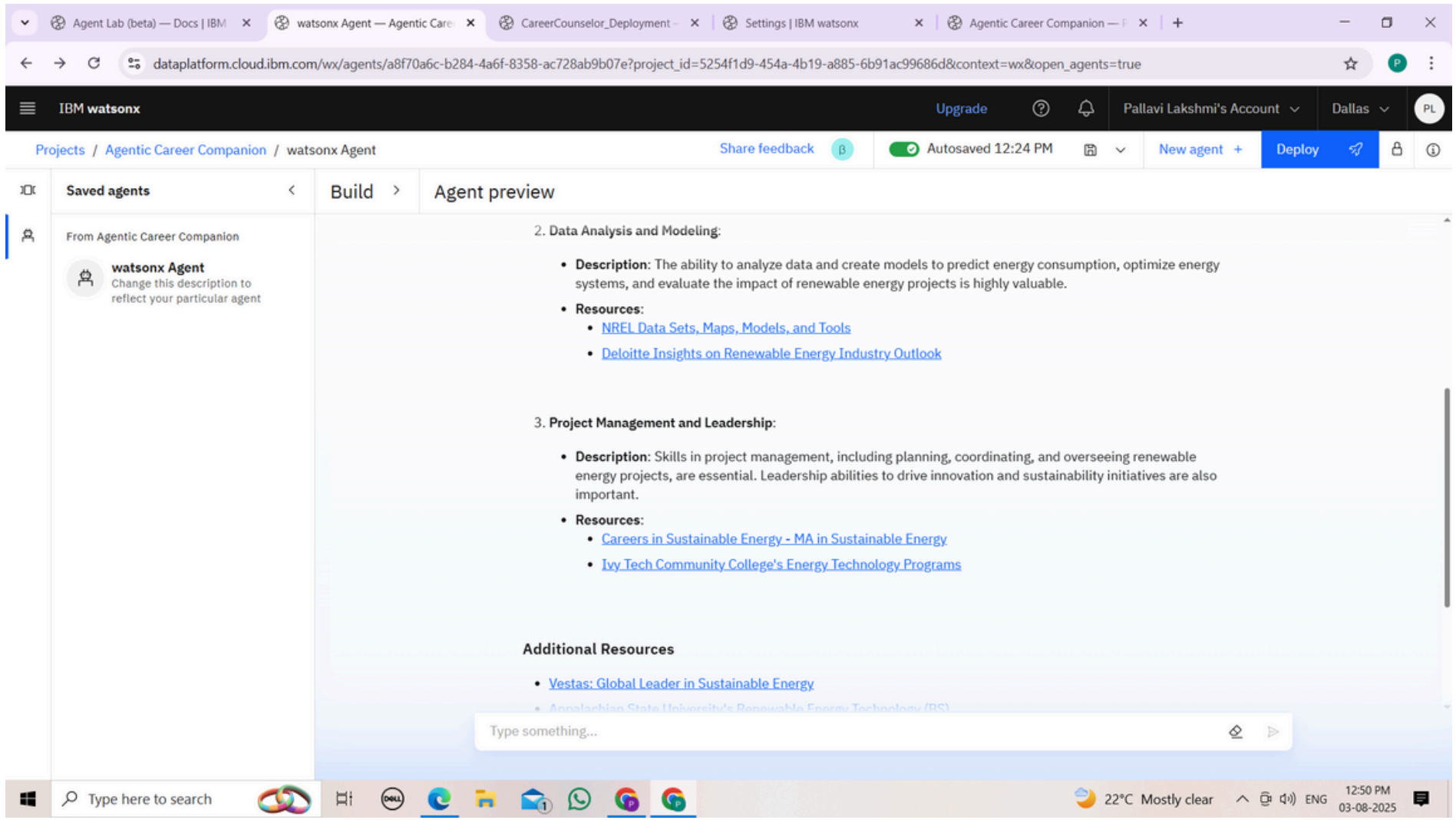

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CONCLUSION

- We have successfully developed and deployed an Agentic Career Counseling Companion using IBM watsonx.ai. The agent effectively addresses the problem statement by providing personalized, data-driven career guidance that is both scalable and accessible. The use of an agentic architecture with real-time tools proved highly effective in delivering relevant and timely advice. The primary challenge was crafting precise instructions to ensure the agent's responses were consistently accurate and aligned with its intended purpose. This project highlights the immense potential of Agentic AI in revolutionizing personalized education and professional development.

FUTURE SCOPE

- Enhanced Personalization: Integrate with university systems to securely access a student's academic records for more deeply personalized advice.
- Expanded Toolset: Add tools that can connect to specific job portals like LinkedIn or Indeed for live job application links.
- Proactive Notifications: Develop a system where the agent can proactively alert students to new internship opportunities or relevant workshops based on their profile.
- Multi-language Support: Expand the agent's capabilities to offer guidance in multiple languages to support a more diverse student population.

REFERENCES

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- Wei, J., et al. (2022). *Chain-of-Thought Prompting Elicits Reasoning in Large Language Models*. Google Research.
- Yao, S., et al. (2023). *ReAct: Synergizing Reasoning and Acting in Language Models*. Google Research.

IBM CERTIFICATIONS

- getting started with AI :

IBM CERTIFICATIONS

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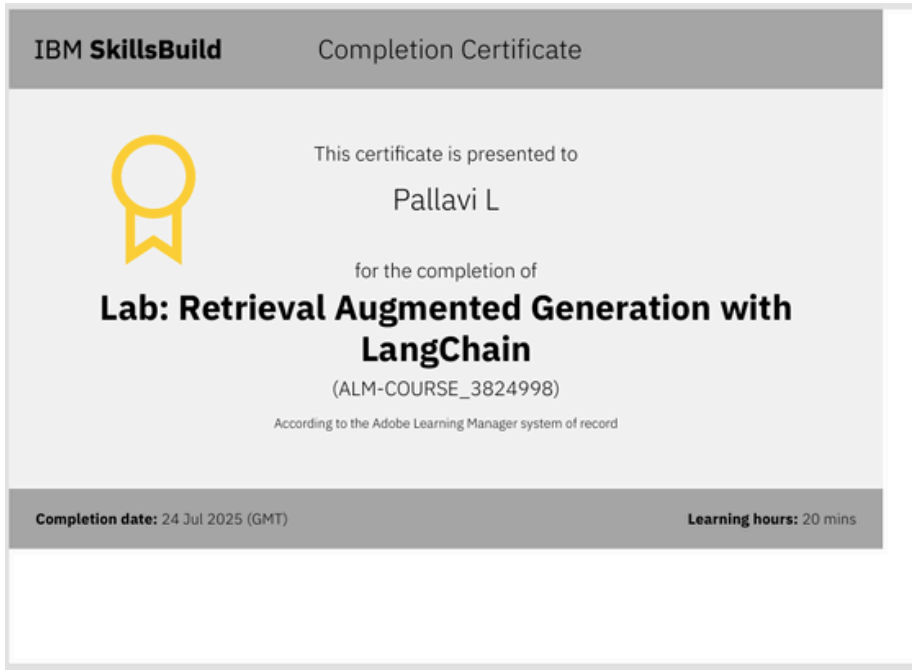

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Pallavi L

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

THANK YOU

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