CAPSTONE PROJECT

Digital Finance AI Agent

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OUTLINE

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Problem Statement

In today’s digital economy, many individuals lack the financial literacy needed to safely and effectively use tools like UPI, manage budgets, understand interest rates, or protect themselves from online scams. Although digital payment systems are growing rapidly, a large portion of the population struggles to find accurate, accessible, and trustworthy financial information. This gap in awareness leads to confusion, misuse of financial products, and vulnerability to fraud. There is a pressing need to make financial knowledge more understandable, inclusive, and readily available to all segments of society.

Proposed Solution

- **The proposed system aims to address the lack of accessible, real-time financial knowledge by creating an AI agent that leverages Retrieval-Augmented Generation (RAG) along with multiple search tools to answer user questions on digital finance. The solution will consist of the following components:**

- **Knowledge Base Creation:**
  Collect verified financial content from trusted sources like RBI, SEBI, NPCI, and educational websites. Include detailed coverage of topics such as UPI usage, fraud prevention, budgeting, interest rates, and savings.

- **Tool Integration:**
  Integrate Watsonx-supported tools to enhance response quality:
  - **Google/DuckDuckGo Search: For retrieving real-time web content.**
  - **Wikipedia Search: For general financial definitions and concepts.**

- **RAG-Based Retrieval & Response:**
  Use Retrieval-Augmented Generation to combine real-time search results with generative model outputs, enabling the agent to answer natural language questions accurately.

- **Deployment on IBM Watsonx:**
  The agent will be built and deployed using Watsonx Agent Builder on IBM Cloud, with IBM Cloud Object Storage used to store financial documents and resources. The solution is hosted entirely within IBM's cloud infrastructure to ensure scalability, stability, and fast response times.

- **Evaluation:**
  The agent's response accuracy and relevance will be continuously tested and evaluated, using user feedback and interaction logs to refine the knowledge base and enhance the quality of retrieved search results.

System Approach

- **System Requirements:**
  - IBM Cloud account with Watsonx access
  - Watsonx Agent Builder for agent creation
  - IBM Cloud Object Storage for document management
  - PDF knowledge base file (financial content)

- **Libraries/Tools Used:**
  - Watsonx Foundation Model: Granite-3-3-8b-Instruct
  - Google Search Tool (Watsonx integration)
  - DuckDuckGo Search Tool (Watsonx integration)
  - Wikipedia Search Tool (Watsonx integration)
  - Document Loader for RAG-based retrieval

Algorithm & Deployment

- **Algorithm Selection:**
  - The system uses Retrieval-Augmented Generation (RAG), which combines the strengths of information retrieval and large language models. RAG is ideal for this use case because it enables the agent to ground its responses in external, trusted documents and real-time search results.

- **Data Input:**

  The inputs to the system include:
  - User queries in natural language
  - Indexed financial documents (e.g., PDFs from RBI, SEBI, NPCI)
  - Web search results from tools like Google, DuckDuckGo, and Wikipedia

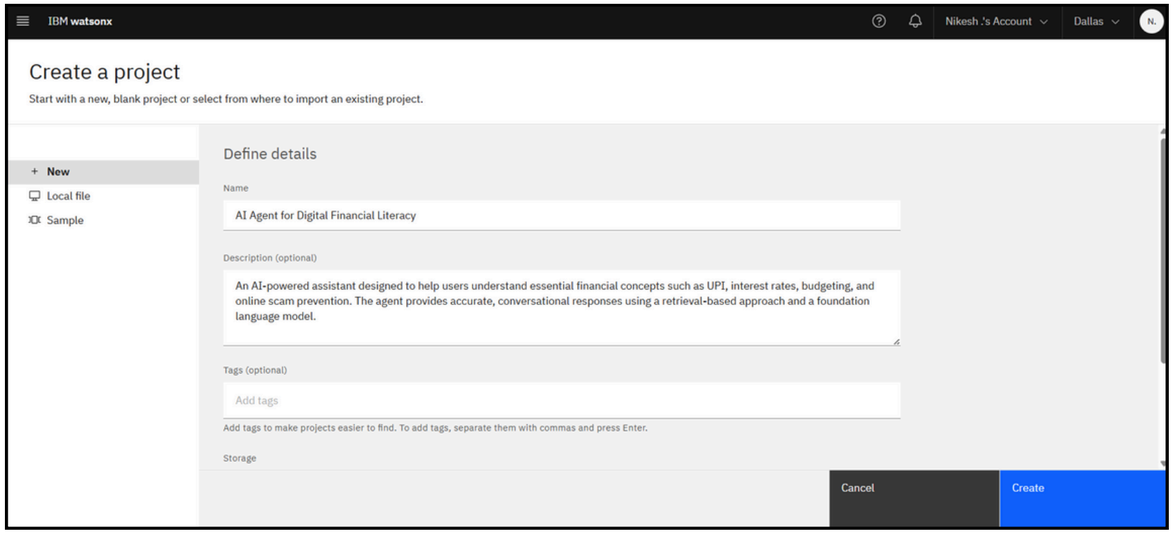
- **Retrieval Process:**

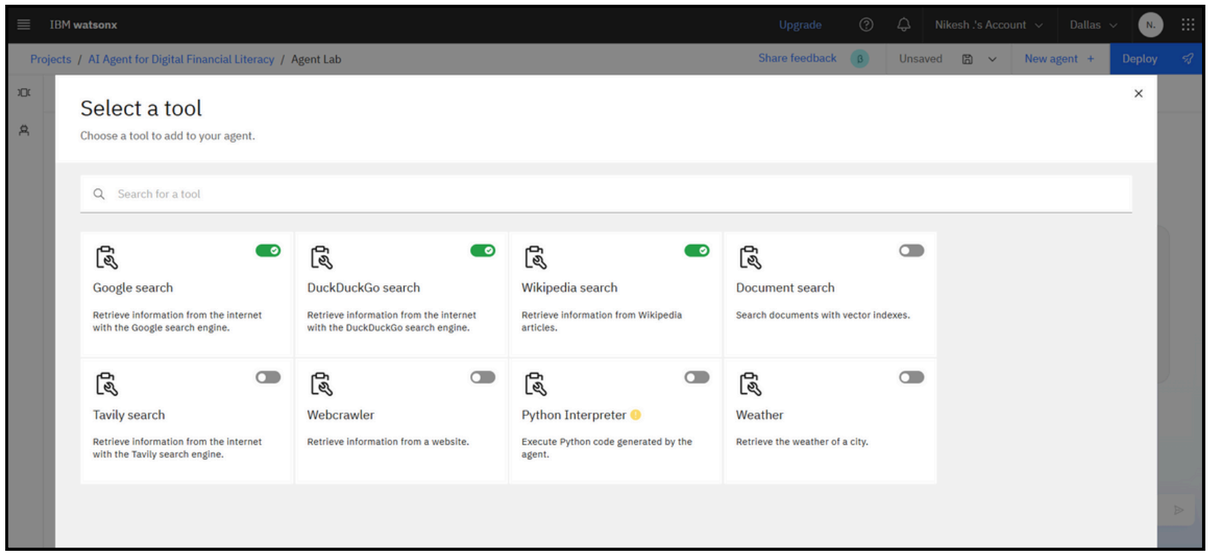
  When a question is asked, the agent retrieves relevant text passages from the uploaded knowledge base and/or search tools. These retrieved contexts are then passed into the language model to generate accurate and context-aware answers.

- **Deployment:**

  The solution is deployed using IBM Watsonx Agent Builder on IBM Cloud, with IBM Cloud Object Storage used to store and access financial documents. The entire pipeline is hosted on the IBM Cloud infrastructure to ensure real-time performance, scalability, and high availability.

Result





This image shows the initial project setup in IBM Watsonx, where the AI Agent for Digital Financial Literacy is being defined.

This image shows the tool selection step in IBM Watsonx Agent Lab, where tools like Google Search, DuckDuckGo Search, and Wikipedia Search are enabled for the agent. These tools allow the AI agent to retrieve real-time and verified information from the internet, enhancing the accuracy and relevance of its financial responses.

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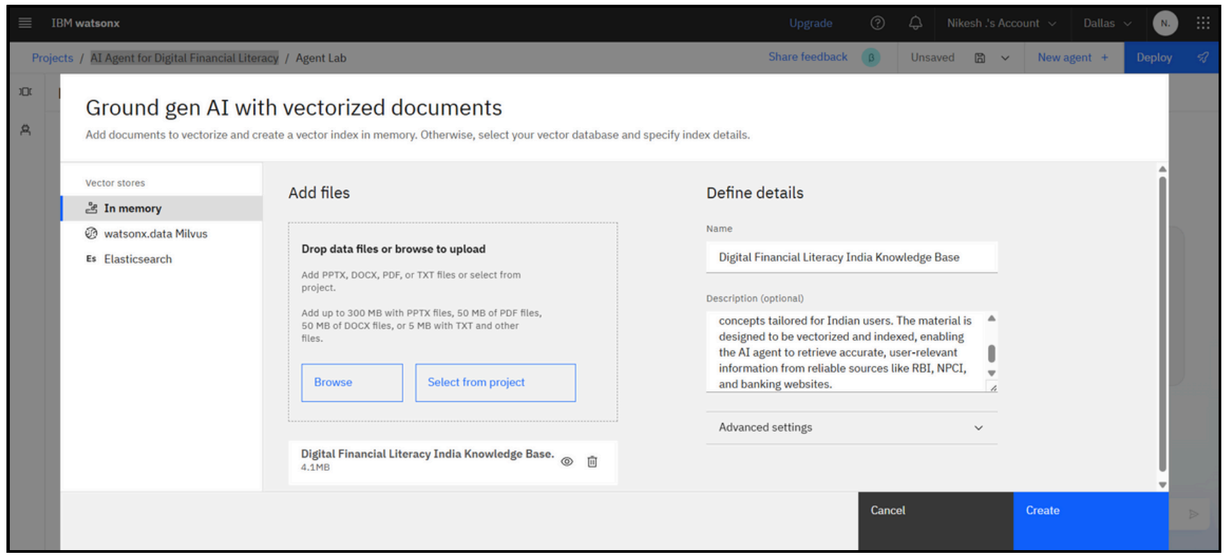
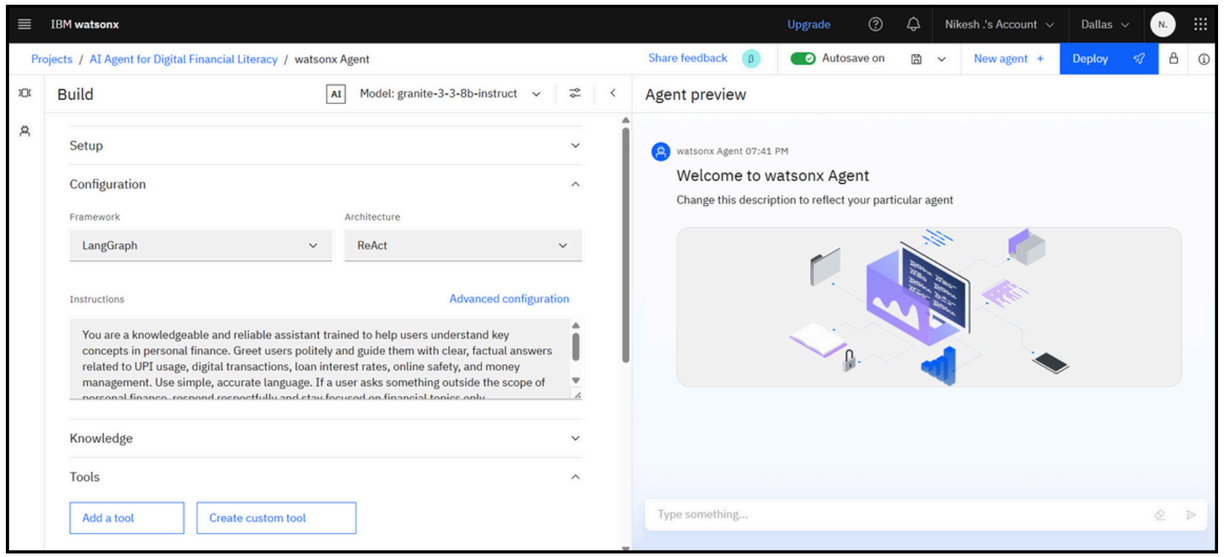
Result

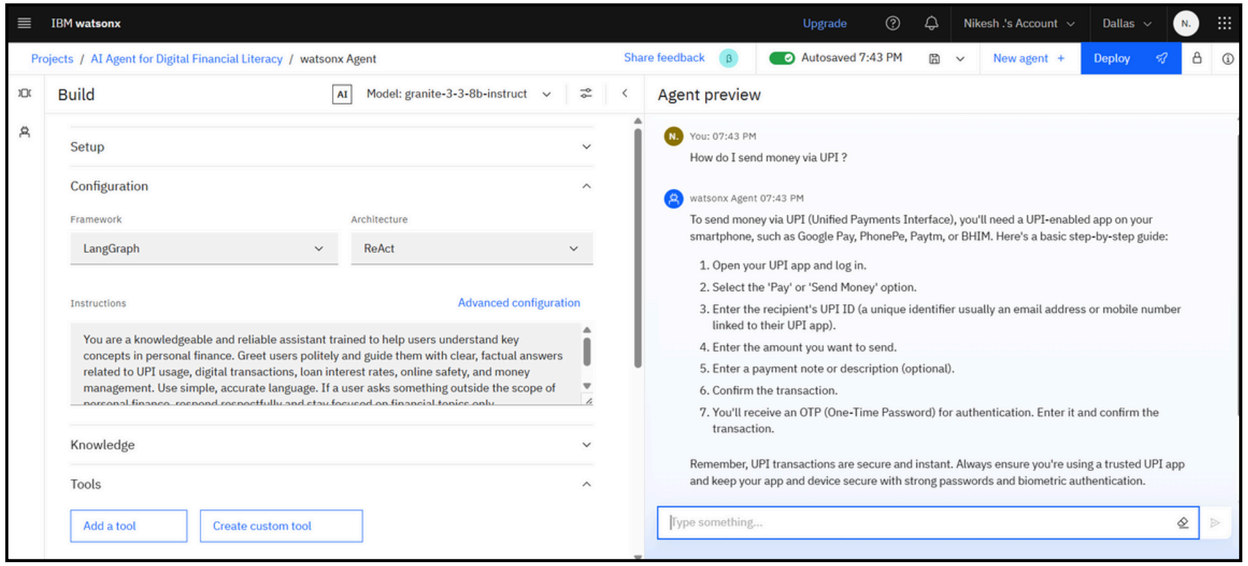


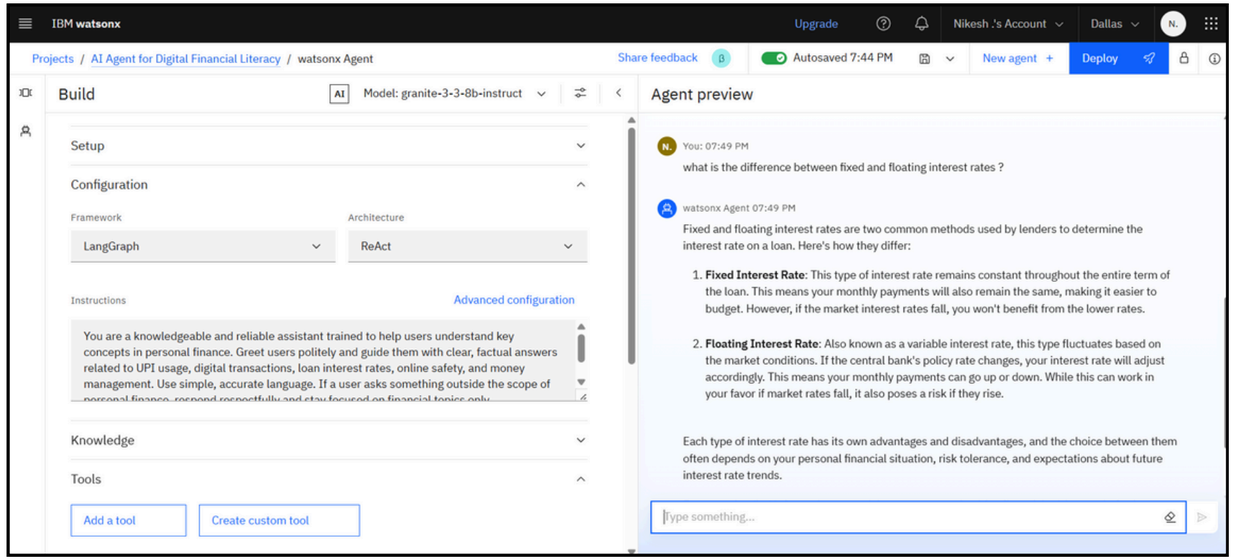


This image shows the knowledge base upload step, where a document titled "Digital Financial Literacy India Knowledge Base" is being added and vectorized in IBM Watsonx. This enables the AI agent to use RAG (Retrieval-Augmented Generation) to provide accurate, contextual responses based on indexed financial data tailored for Indian users.

This image displays the final AI agent configuration interface in IBM Watsonx. The assistant has been built using the LangGraph framework and ReAct architecture, with clear instructions to guide users on financial topics. It integrates the added knowledge base and tools, marking the setup as ready for deployment and real-time interaction.

Result





This image showcases the working response of the AI agent in IBM Watsonx. When asked “How do I send money via UPI?”, the agent accurately replies with a clear, step-by-step guide, demonstrating its ability to provide relevant and user-friendly financial information in real time.

This image demonstrates the AI agent’s response capability by accurately answering the question “What is the difference between fixed and floating interest rates?”. The agent provides a clear comparison between the two loan types, helping users understand how their interest payments may behave over time, thereby enhancing their financial literacy.

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Conclusion

This project successfully built an AI-powered assistant for Digital Financial Literacy using IBM Watsonx Agent Builder. Leveraging a Retrieval-Augmented Generation (RAG) approach, the system combines real-time web search tools (Google, DuckDuckGo, Wikipedia) with a custom vectorized knowledge base to deliver accurate and contextual responses. The assistant helps users understand financial topics like UPI, interest rates, and online safety through a conversational interface. The implementation demonstrated the effectiveness of RAG in retrieving reliable information and generating relevant answers.

Future scope

The system can be further enhanced by incorporating additional trusted financial data sources such as real-time feeds from government APIs and official portals. Expanding the knowledge base to include more in-depth topics like taxation, insurance, and credit management would improve coverage. The agent can also be extended to support multilingual interactions to reach users across different regions in India. Performance optimization through smarter retrieval strategies and improved document structuring can further enhance accuracy and response time. In the long term, integrating emerging technologies like edge computing for faster local responses and advanced LLMs for better contextual understanding could significantly improve the system's scalability, accessibility, and impact.

References

- Reserve Bank of India – https://rbi.org.in
- National Payments Corporation of India (NPCI) – https://www.npci.org.in
- Securities and Exchange Board of India (SEBI) – https://www.sebi.gov.in
- Government of India Financial Literacy Portal – https://financialservices.gov.in
- Wikipedia – Financial Terms and Concepts – https://en.wikipedia.org
- IBM Watsonx Documentation –https://www.ibm.com/cloud/watsonx
- Articles and updates retrieved using Google and DuckDuckGo Search tools integrated in Watsonx.

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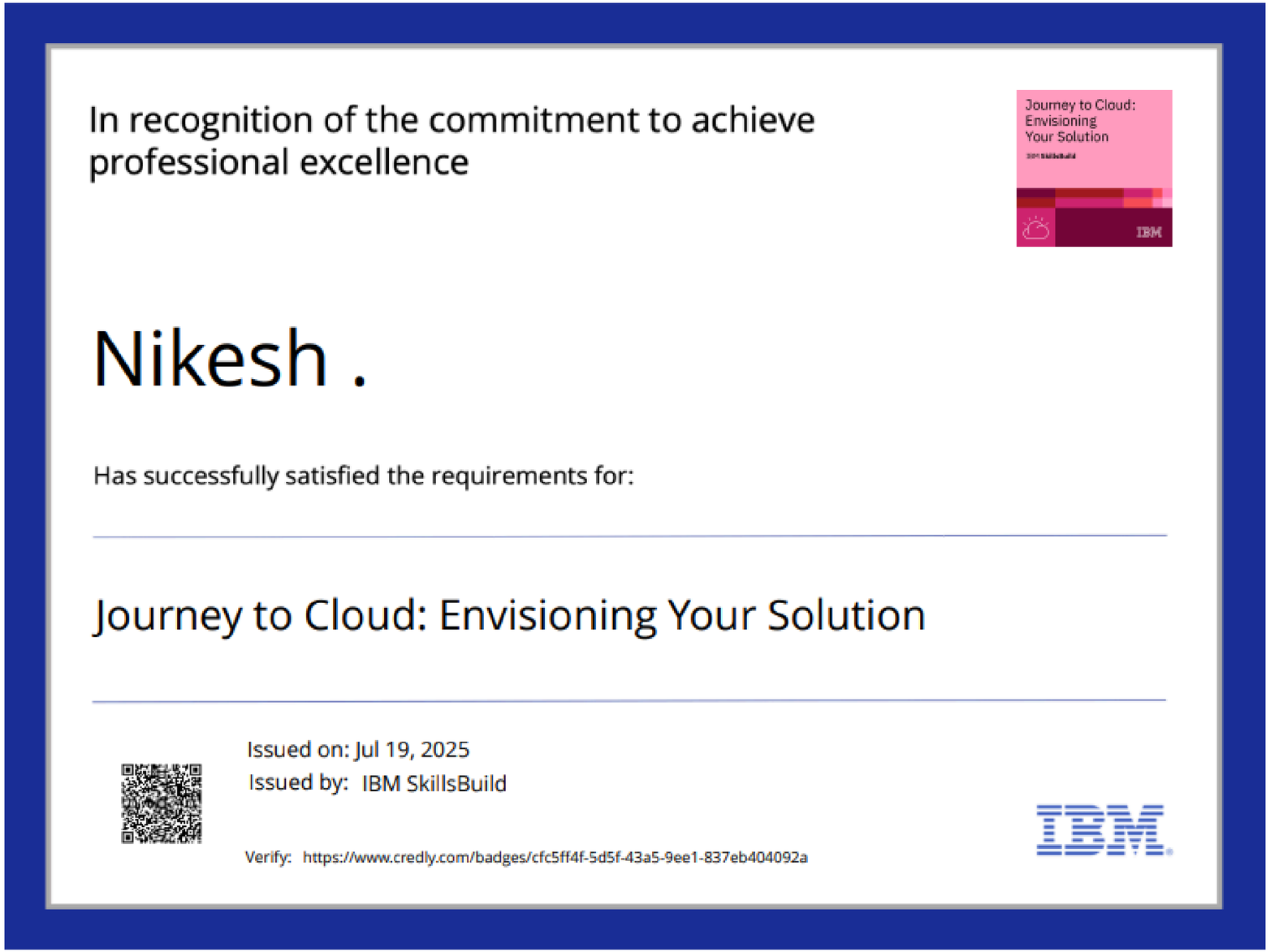

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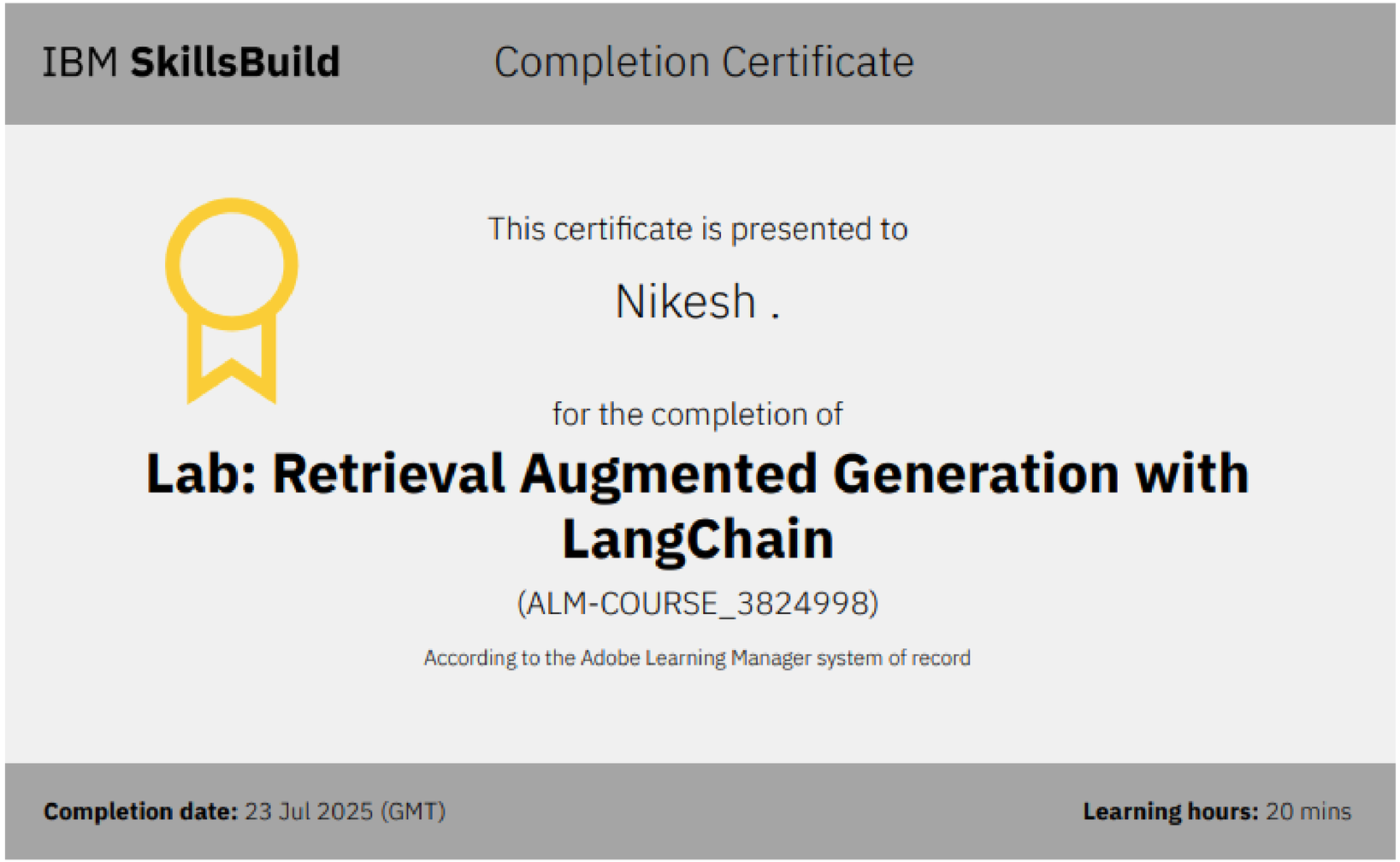

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

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for the completion of

Lab: Retrieval Augmented Generation with LangChain

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According to the Adobe Learning Manager system of record

Completion date: 23 Jul 2025 (GMT) **Learning hours:** 20 mins

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