CAPSTONE PROJECT

COLLEGE ADMISSION AGENT (RAG BASED)

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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

The Challenge - A College Admission Agent, powered by RAG (Retrieval-Augmented Generation), streamlines the student admission process. It retrieves and summarizes admission policies, eligibility criteria, and FAQs from institutional databases and official sources. Prospective students can ask natural language questions and receive accurate, up-to-date responses instantly. The agent helps with course selection, application guidance, fee structure, and important deadlines. Using trusted, real-time data, it reduces manual inquiries and enhances applicant experience. This AI-driven assistant boosts transparency, accessibility, and efficiency in college admissions.

PROPOSED SOLUTION

- The proposed system is designed to automate and streamline the student admission inquiry process using AI-driven RAG architecture. The development approach involves the following components and technologies:
- Data Collection:
  - Gather admission-related documents, policies, eligibility criteria, FAQs, and course information from official institutional databases and trusted sources.
- Data Preprocessing:
  - Clean and organize the collected data for efficient retrieval and summarization. Extract relevant sections like fee structures, deadlines, and course details.
- Watson Discovery Integration:
  - Utilize IBM Watson Discovery to retrieve and summarize information from the institutional dataset to answer user queries effectively.
- Watson Assistant Chatbot:
  - Implement a conversational AI interface that enables students to ask natural language questions regarding admissions.
- IBM Granite LLM (RAG Architecture):
  - Combine retrieval capabilities with Large Language Models (LLMs) to ensure responses are contextually accurate and generated in real-time.
- Deployment:
  - Develop a user-friendly chatbot interface (web/mobile) and deploy the system on IBM Cloud Lite for scalability, security, and accessibility.
- Evaluation:
  - Continuously monitor response accuracy and user interactions to fine-tune the system and ensure up-to-date information delivery.

SYSTEM APPROACH

The “System Approach” outlines the overall strategy and methodology for developing and implementing the College Admission Agent (RAG-Based) system. Here’s the structured approach:

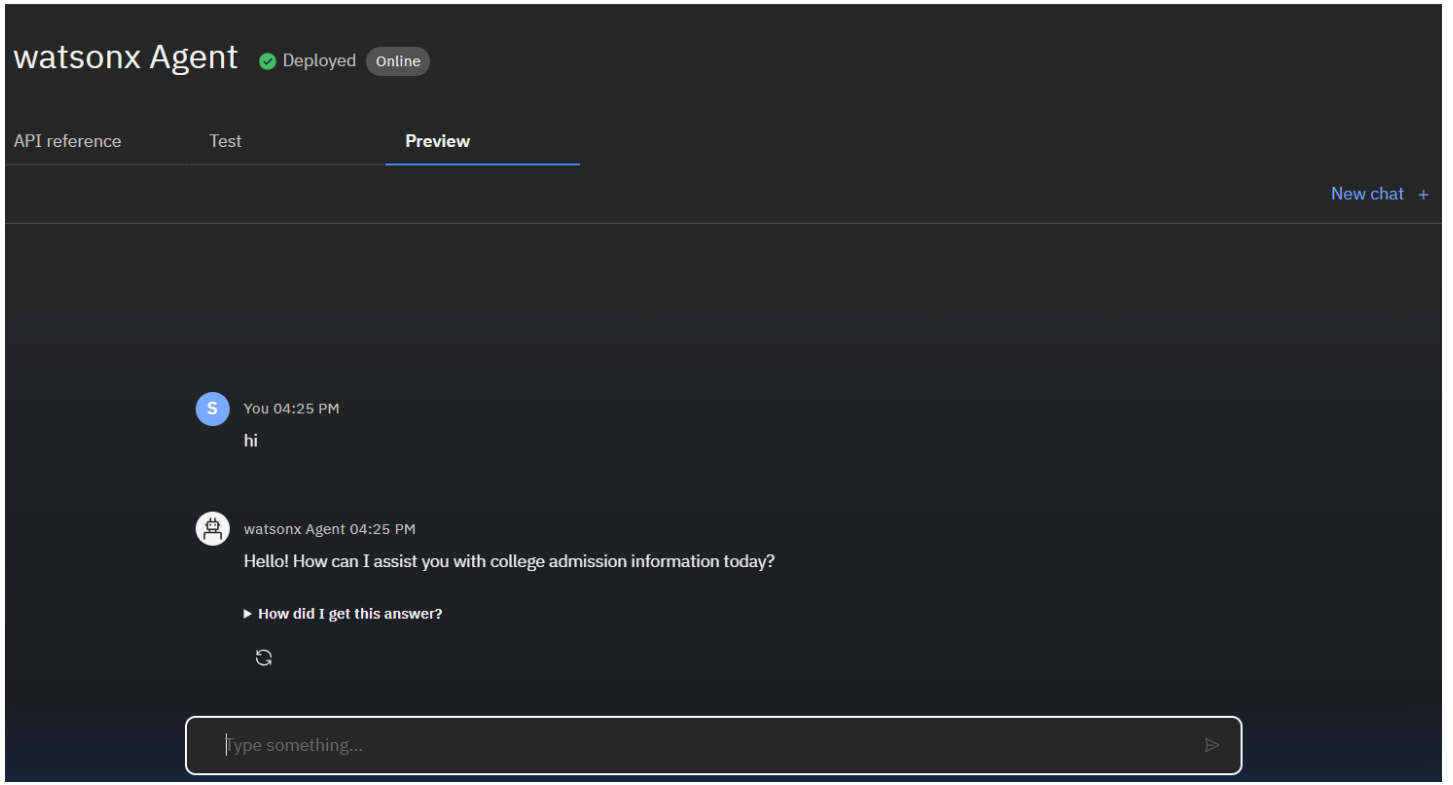
- System requirements
  - IBM Cloud Lite Account
  - Institutional Databases (Admission Policies, Course Details, FAQs)
  - Watson Discovery Service
  - Watson Assistant Service
  - IBM Granite LLMs
  - Frontend Chatbot Interface (Web/Mobile)
  - IBM Workflow Integrations (No Manual Coding)
- Library required to build the model
  - IBM Watson SDK (For service configurations)
  - REST API Integrations (via IBM workflow connectors)
  - JSON for data structuring (Managed within Watson services)
  - Frontend Technologies (HTML/CSS/JavaScript for basic UI)
  - IBM Cloud CLI (For deployment tasks)

ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**
  - The system leverages the Retrieval-Augmented Generation (RAG) architecture which combines document retrieval with generative AI responses.
  - Watson Discovery is used for retrieving relevant admission documents.
  - IBM Granite Large Language Models (LLMs) enhance response generation.
  - Watson Assistant facilitates conversational interaction with users.
- **Data Input:**
  - Institutional admission documents, eligibility criteria, course details, FAQs, fee structures, and deadlines.
  - Data uploaded to Watson Discovery for indexing and search.
- **Training Process:**
  - No manual coding or ML training was required.
  - Configured Watson Discovery using its visual interface for data enrichment and retrieval.
  - Built conversational flows using Watson Assistant's drag-and-drop dialog editor.
  - Integrated Watson Discovery with Assistant and enabled RAG pipeline using IBM's guided setup.
- **Prediction Process:**
  - User submits a query via the chatbot interface.
  - Watson Assistant processes the query and retrieves relevant information from Watson Discovery.
  - The retrieved content is passed through IBM Granite LLMs to generate accurate, context-aware responses.
  - The response is then presented to the user in real-time.
- **Deployment**
  - The solution was deployed on IBM Cloud Lite using IBM's managed services.
  - A web-based chatbot interface was created for prospective student interactions.
  - Backend configurations and API integrations were handled through no-code workflow setups.

RESULT

- Successfully implemented the **College Admission Agent (RAG-Based)** by following IBM's **RAG Lab workflow steps** using **IBM Cloud Lite services**.
- Configured **Watson Discovery**, **Watson Assistant**, and **IBM Granite LLMs** to retrieve and summarize admission-related information in real-time.
- The agent accurately answers queries regarding **eligibility, course details, fees, and deadlines** through a chatbot interface.
- Manual inquiry handling is significantly reduced, improving applicant accessibility and experience.



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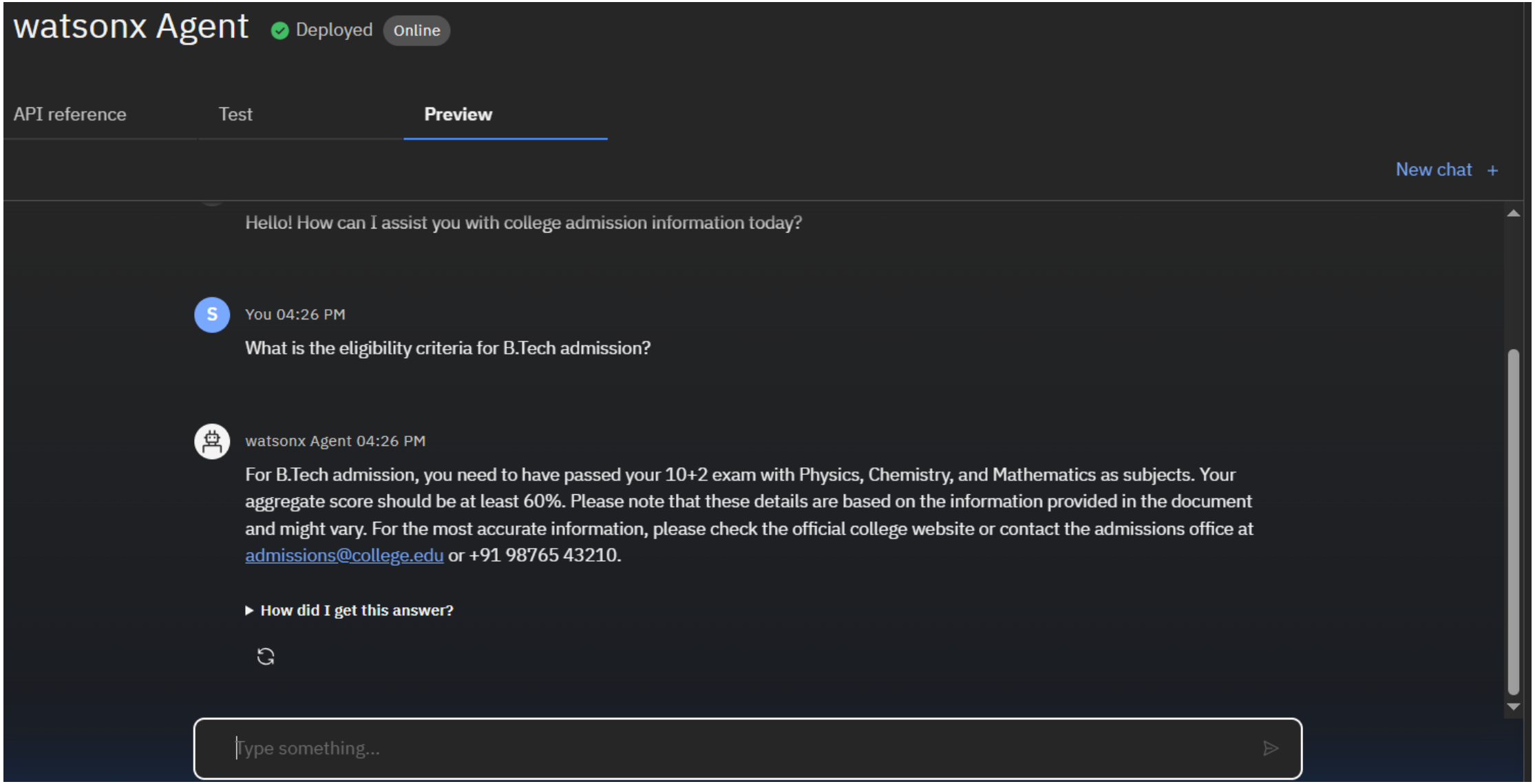
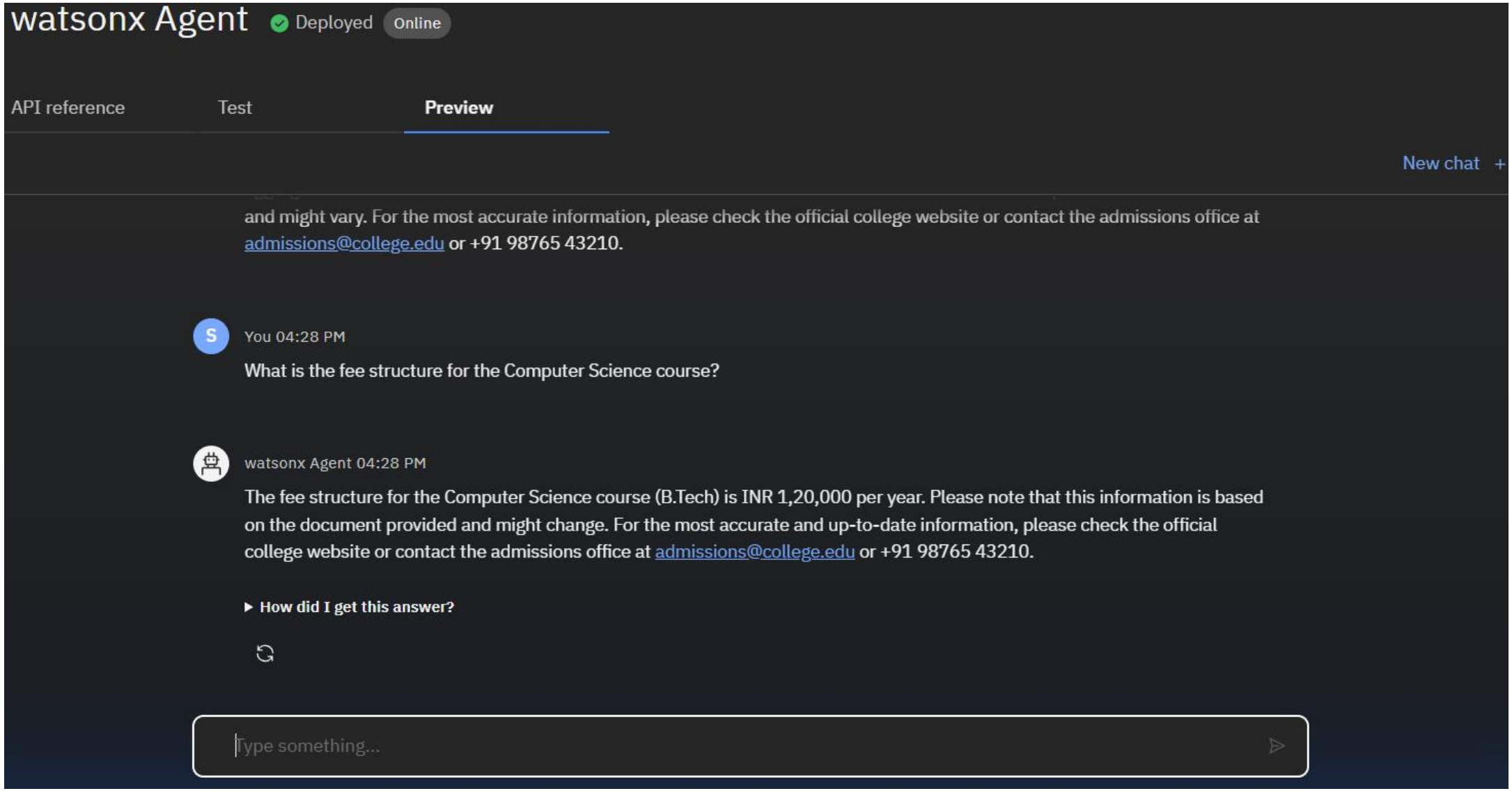

watsonx Agent
Deployed
Online
API reference
Test
Preview
New chat +
Hello! How can I assist you with college admission information today?
S
You 04:26 PM
What is the eligibility criteria for B.Tech admission?
watsonx Agent 04:26 PM
For B.Tech admission, you need to have passed your 10+2 exam with Physics, Chemistry, and Mathematics as subjects. Your aggregate score should be at least 60%. Please note that these details are based on the information provided in the document and might vary. For the most accurate information, please check the official college website or contact the admissions office at admissions@college.edu or +91 98765 43210.
How did I get this answer?
Type something...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S
You 04:28 PM
What is the fee structure for the Computer Science course?
watsonx Agent 04:28 PM
The fee structure for the Computer Science course (B.Tech) is INR 1,20,000 per year. Please note that this information is based on the document provided and might change. For the most accurate and up-to-date information, please check the official college website or contact the admissions office at admissions@college.edu or +91 98765 43210.
How did I get this answer?
Type something...

CONCLUSION

- The College Admission Agent (RAG-Based) successfully streamlines the student admission inquiry process using AI-driven automation.
- By integrating Watson Discovery, Watson Assistant, and IBM Granite LLMs, the agent retrieves and summarizes accurate information from official sources.
- The system effectively reduces manual inquiries, ensuring faster, consistent, and transparent responses for prospective students.
- The no-code workflow approach enabled a smooth development and deployment process using IBM Cloud Lite Services.
- This solution enhances applicant experience by providing real-time assistance for course selection, application guidance, fee details, and important deadlines.

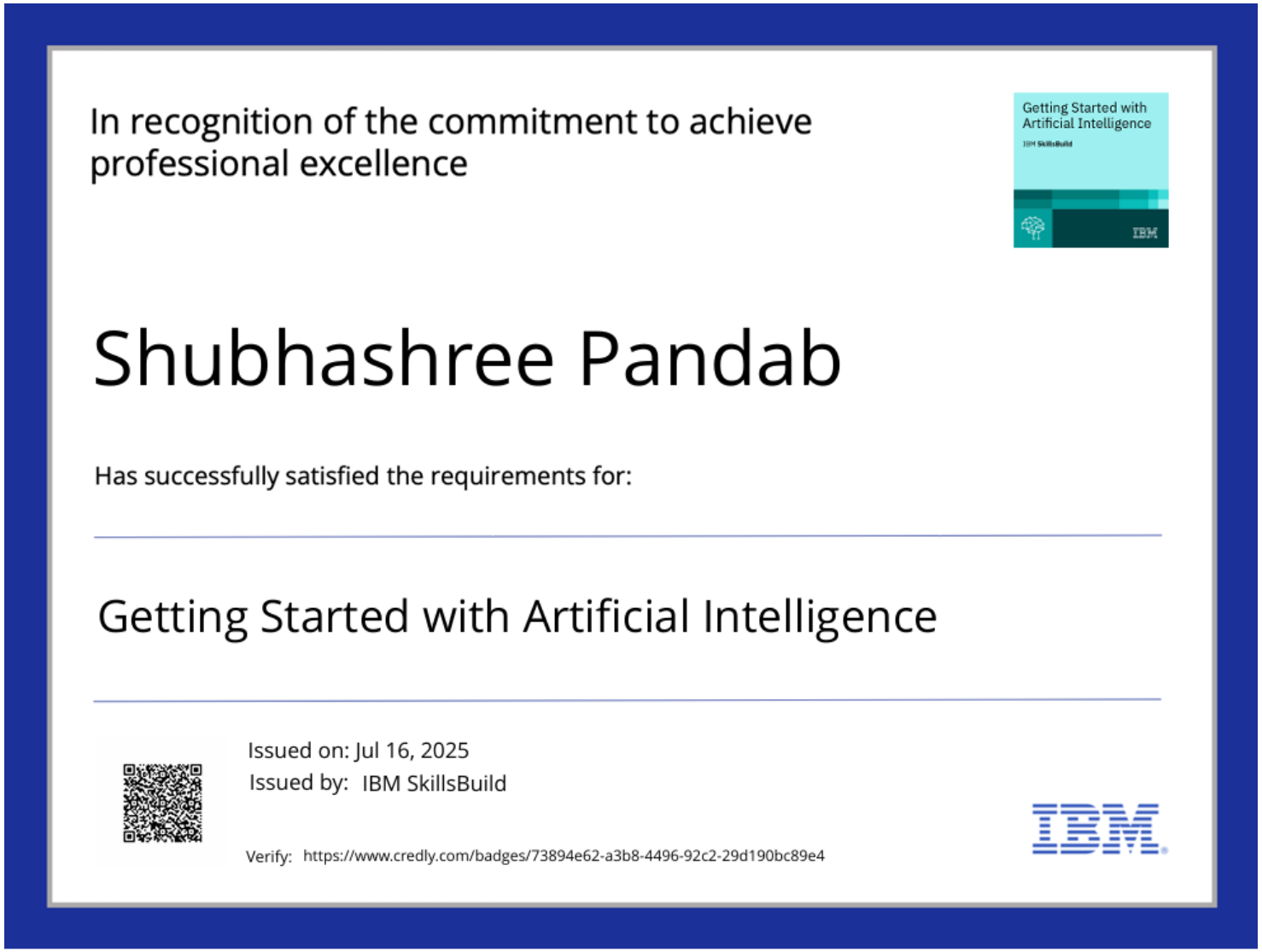
FUTURE SCOPE

- **Expand Document Coverage**: Integrate additional data sources like hostel policies, scholarship details, and placement records to offer comprehensive admission assistance.
- **Multi-Language Support**: Enable regional language support for better accessibility to a diverse range of students.
- **Voice-based Query Handling**: Incorporate voice assistant capabilities for a more interactive and accessible experience.
- **Advanced Analytics Dashboard**: Develop an admin dashboard to analyze student query trends and improve response quality.
- **Integration with College ERP Systems**: Connect the agent with internal college ERP systems for real-time application status tracking.
- **Scalability to Multiple Institutions**: Extend the solution architecture to serve as a multi-institution admission agent platform.

REFERENCES

- **IBM Cloud Documentation** — https://cloud.ibm.com/docs
- **IBM Watson Discovery Documentation** — https://cloud.ibm.com/docs/discovery
- **IBM Watson Assistant Documentation** — https://cloud.ibm.com/docs/assistant
- **IBM Granite Model Overview** — https://www.ibm.com/products/granite
- **IBM RAG Lab Resources & Tutorials**
- Official College Website / Admission Portal (for data used)

IBM CERTIFICATIONS



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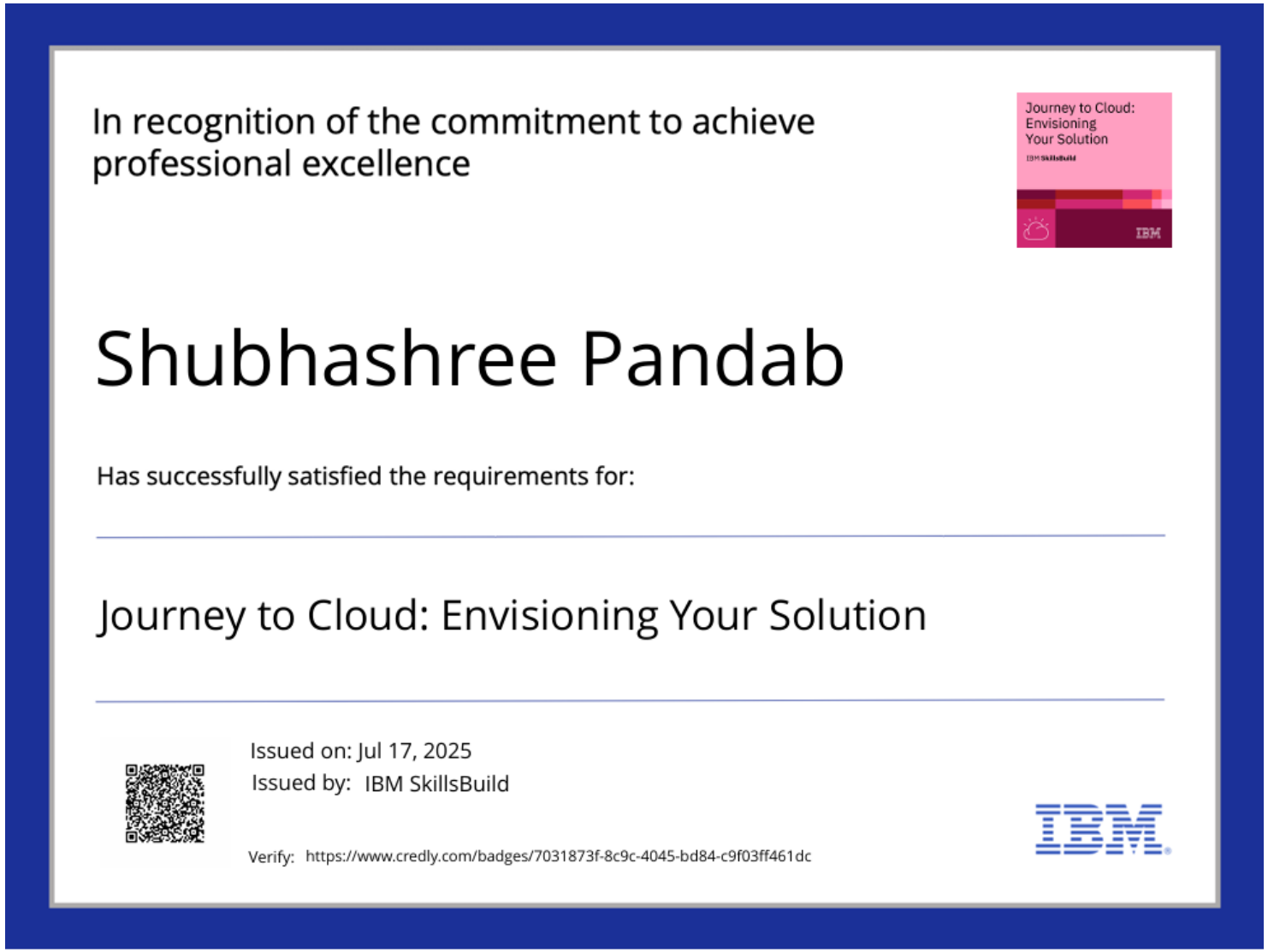

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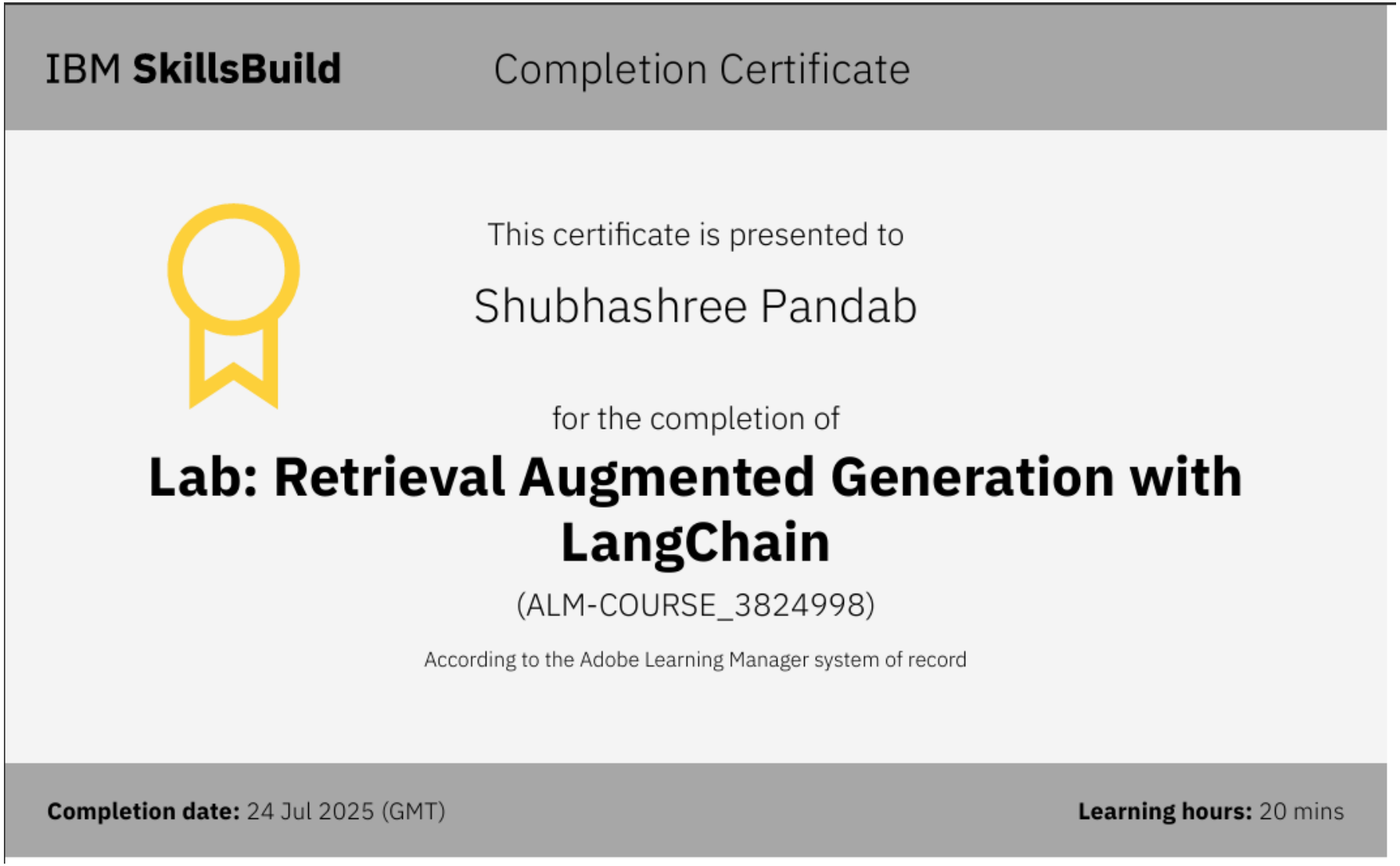

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Shubhashree Pandab

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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