
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 student admission process in educational institutions often involves answering numerous queries related to eligibility criteria, admission policies, fee structure, course selection, and application deadlines. Traditionally, these queries are handled manually by the admissions office, leading to delayed responses, inconsistent communication, and a high workload for staff.

Prospective students face difficulty in accessing updated and accurate information from official sources in a structured manner. There is a need for a system that can interact with students in natural language and provide quick, precise, and trustworthy responses using institution-specific data.

PROPOSED SOLUTION

- The proposed system aims to address the challenge of efficiently handling admission-related queries by providing accurate, up-to-date, and instant responses to prospective students. This involves leveraging Retrieval-Augmented Generation (RAG) with IBM Granite models to retrieve relevant institutional data and generate precise answers. The solution will consist of the following components:
- Data Collection:
 - Gather official admission-related documents from the institution, including eligibility criteria, course details, fee structures, and important deadlines.
 - Include additional data from official websites and notices to ensure real-time accuracy.
 - Store these documents in a structured format (.txt) for easy retrieval.
- Retrieval-Augmented Generation Pipeline:
 - Use IBM embedding model(e.g. all-minilm-l6-v2) to vectorize document chunks.
 - Store embeddings in a vector index for semantic similarity search .
 - Pass the retrieved context and the user query to the IBM Granite model for answer Generation.
- Deployment:
 - Build the AI agent using Watsonx.ai Agentic Lab with Granite as the generation model.
 - Integrate File Tool (for document retrieval) and Web Tool (for official site scraping).
 - Deploy the agent to a Watsonx.ai Runtime Deployment Space, generating an API for external use.
- Evaluation:
 - Test the agent with a variety of queries covering all admission topics.

SYSTEM APPROACH

The **System Development Approach** describes the strategy followed to build and deploy the College Admission Agent using IBM Cloud Lite services and IBM Granite models, without the use of local Python scripting. The system was entirely implemented within IBM's cloud-based Agentic AI environment.

- **System requirements**
 - **1. Hardware Requirements:**
 - **Processor:** Dual-core or higher(Intel i3/ AMD Equivalent).
 - **RAM:** Minimum 4 GB
 - **2. Software Requirements:**
 - **Operating System:** Windows 10/11, macOS, Linux
 - **Web Browser:** Latest version of Chrome for accessing IBM cloud interface
- **Tools required to build the Agent**
 - **IBM Watsonx.ai Agentic Lab** → Used to create and configure the College Admission Agent.
 - **Granite Model** → Selected as the foundation model for natural language generation.
 - **File Tool** → Used to upload structured admission-related .txt documents for retrieval.
 - **Web Tool** → Enabled to fetch real-time data from the college's official website.
 - **Watsonx.ai Runtime Service** → Linked to the agent for deployment.
 - **Deployment Space** → Used to publish the agent and access it through the IBM Cloud preview interface.

ALGORITHM & DEPLOYMENT

- ❑ Here's the **Deployment Steps** section for your **College Admission Agent (RAG-Based)** project, based only on what you implemented in IBM Cloud Lite without Python scripting.
- ❑ **Deployment Steps**
 - The deployment of the College Admission Agent was carried out entirely on the IBM Cloud Lite platform using Watsonx.ai Agentic Lab and Granite foundation models. The steps followed were:
- ❑ **Step 1: Create IBM Cloud Services**
 - Logged in to **IBM Cloud** using a Lite plan account.
 - Created a **Watsonx.ai service instance** with the free plan.
 - Created a **Watsonx.ai Runtime service** to support deployment.
- ❑ **Step 2: Build the AI Agent**
 - Accessed **Watsonx.ai Agentic Lab** from the IBM Cloud dashboard.
 - Created a new project and named it appropriately (e.g., **College Admission Agent**).
 - Associated the project with the **Watsonx.ai Runtime service**.
 - Selected the **IBM Granite foundation model** for answer generation.
 - Added the **File Tool** and uploaded **.txt** documents containing admission-related information.
 - Enabled the **Web Tool** to retrieve real-time data from the official college website.

ALGORITHM & DEPLOYMENT

□ Step 3: Save the Agent

- Saved the configured agent in Watsonx.ai.
- Verified that all tools, documents, and configurations were working correctly in the preview mode.

□ Step 4: Create Deployment Space

- From the IBM Cloud dashboard, navigated to **Deployment Spaces**.
- Created a new deployment space and linked the **Watsonx.ai Runtime service**.
- Named the space appropriately (e.g., Admission Agent Deployment).

□ Step 5: Deploy the Agent

- Returned to the Watsonx.ai Agentic Lab interface.
- Selected **Deploy** for the created agent.
- Chose the target **Deployment Space** created in Step 4.
- Confirmed and initiated the deployment process.

□ Step 6: Test the Deployed Agent

- Once deployment status showed as **Initialized**, opened the **Preview** interface.
- Entered test queries (e.g., “What is the eligibility for B.Tech?”) to verify accuracy.
- Confirmed that responses were generated from the uploaded files and website data.

RESULT

IBM Cloud

Search resources and products...

Catalog

Manage

Piyush Tambe's Account

Resource list

Create resource

Name	Group	Location	Product	Status	Tags
Filter by name or IP address...	Filter by group...	Filter...	Filter...	Filter...	Filter...
Compute (0)					
Containers (0)					
Networking (0)					
Storage (1)					
Cloud Object Storage-is	Default	Global	Cloud Object Storage	Active	cpdaas
Converged infrastructure (0)					
Enterprise applications (0)					
AI / Machine Learning (2)					
watsonx.ai Runtime-og	Default	Dallas (us-south)	watsonx.ai Runtime	Active	cpdaas
watsonx.ai Studio-wg	Default	Dallas (us-south)	watsonx.ai Studio	Active	cpdaas
Analytics (0)					

RESULT

IBM watsonx

Upgrade ? Piyush Tambe's Account Dallas PT

Projects / College_Admission_Agent Launch IDE

Overview **Assets** Deployments Jobs Manage

Find assets

10 assets

All assets

Asset types

> Data access 1

> Data 8

> Agents 1

All assets

<input type="checkbox"/>	Name	Last modified	
<input type="checkbox"/>	watsonx Agent Agent	6 hours ago Modified by you	
<input type="checkbox"/>	database_mescoe Vector index	3 days ago Modified by you	
<input type="checkbox"/>	reservation_policy.txt Text file	3 days ago Modified by you	
<input type="checkbox"/>	intake_cutoff.txt Text file	3 days ago Modified by you	
<input type="checkbox"/>	eligibilty_m_tech.txt Text file	3 days ago Modified by you	
<input type="checkbox"/>	placement_scholarships.txt Text file	3 days ago Modified by you	
<input type="checkbox"/>	admission_process.txt Text file	3 days ago Modified by you	
<input type="checkbox"/>	fees_structure.txt Text file	3 days ago Modified by you	
<input type="checkbox"/>	eligibility_b_tech.txt Text file	3 days ago Modified by you	
<input type="checkbox"/>	important_dates.txt Text file	3 days ago Modified by you	

RESULT

IBM watsonx

Projects / College_Admission_Agent / watsonx Agent

Upgrade ⓘ ? 🔔 Piyush Tambe's Account ▾ Dallas ▾ PT ⋮

Share feedback ⓘ Autosaved 6:36 PM 📄 ▾ New agent + Deploy 🔗 🔒 ⓘ

Saved agents <

Build AI Model: mistral-large ⚠️ ▾ <

From College_Admission_Agent

watsonx Agent

Change this description to reflect your particular agent

Setup

Name

watsonx Agent

Description 62/100

Hello! I am your assistant for the MESCOE admission process.

Icon

Placeholder image

Quick start questions

Add up to 4 quick start questions that your users can select. +

What are total number of intake student ? 🗑️

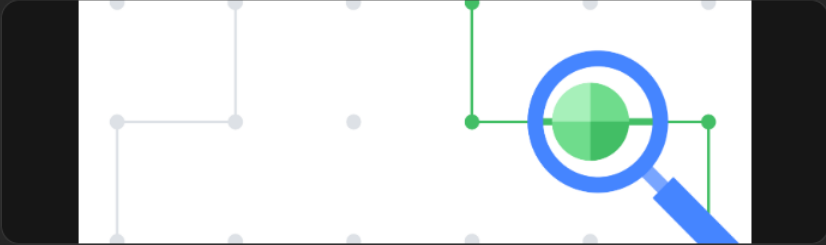
Tell me about the Admission process. 🗑️

Agent preview

watsonx Agent 06:36 PM

Welcome to watsonx Agent

Hello! I am your assistant for the MESCOE admission process.



Sample questions

What are total number of intake student ? →

Tell me about the Admission process. →

Type something... 🔍 ➤

RESULT

The screenshot displays the IBM watsonx web interface. At the top, a dark navigation bar contains the 'IBM watsonx' logo, user account information for 'Piyush Tambe', and a 'Deploy' button. Below this, a breadcrumb trail shows the path 'Projects / College_Admission_Agent / watsonx Agent'. A modal dialog titled 'Select a tool' is open, prompting the user to 'Choose a tool to add to your agent.' The dialog features a search bar and a grid of tool cards. Each card includes an icon, a title, a description, and a toggle switch. The tools shown are Google search, DuckDuckGo search, Wikipedia search, Document search, Tavily search, Webcrawler, Python Interpreter, and Weather. The 'Deploy' button in the top right corner of the interface is highlighted with a red box.

IBM watsonx

Upgrade ? 🔔 Piyush Tambe's Account ▾ Dallas ▾ PT ⋮

Projects / College_Admission_Agent / watsonx Agent









Share feedback 6 Autosave on 📄 ▾ New agent + Deploy 🔗 🔒 ⓘ

Close ×

















Select a tool

Choose a tool to add to your agent.

🔍 Search for a tool

 Google search Retrieve information from the internet with the Google search engine. 🟢	 DuckDuckGo search Retrieve information from the internet with the DuckDuckGo search engine. 🟢	 Wikipedia search Retrieve information from Wikipedia articles. 🟢	 Document search Search documents with vector indexes. 🟢	 Tavily search Retrieve information from the internet with the Tavily search engine. 🔴	 Webcrawler Retrieve information from a website. 🟢
 Python Interpreter ⓘ Execute Python code generated by the agent. 🔴	 Weather Retrieve the weather of a city. 🟢				


RESULT

     Sort  View  				
Name	Date modified	Type	Size	
 admission_process.txt	8/1/2025 2:16 PM	Text Document	1 KB	
 eligibility_b_tech.txt	8/1/2025 2:15 PM	Text Document	1 KB	
 eligibilty_m_tech.txt	8/1/2025 2:16 PM	Text Document	1 KB	
 fees_structure.txt	8/1/2025 2:17 PM	Text Document	1 KB	
 important_dates.txt	8/1/2025 2:17 PM	Text Document	1 KB	
 intake_cutoff.txt	8/1/2025 2:17 PM	Text Document	1 KB	
 placement_scholarships.txt	8/1/2025 2:18 PM	Text Document	1 KB	
 reservation_policy.txt	8/1/2025 2:16 PM	Text Document	1 KB	


RESULT

Agent preview

PT You: 06:37 PM
hii

 watsonx Agent 06:37 PM
Hi, I am watsonx.ai agent. How can I help you?
► **How did I get this answer?**

PT You: 06:38 PM
Tell me the total number of intake for each Stream

 watsonx Agent 06:38 PM
Here is the total number of intake for each Stream:


- B.E. Computer Engineering: intake ~180
- B.E. Electronics & Telecommunication: ~120 seats
- B.E. Mechanical Engineering: ~120 seats

► **How did I get this answer?**

RESULT

PT You: 06:38 PM

Tell me the Eligibility criteria.

 watsonx Agent 06:38 PM

Eligibility for M.Tech (ME) at MESCOE:

- Completed BE/B.Tech or B.Sc (CSE/IT) from a recognized university
- Minimum aggregate: ~50% marks (Reserved category: ~45%)
- Qualified in GATE or valid MHT-CET score followed by Maharashtra CAP rounds

Eligibility for B.Tech (BE) at MESCOE:

- Completed 10+2 (HSC) with Physics & Mathematics as compulsory subjects
- One additional subject from: Chemistry / Biotechnology / Biology / Technical Vocational / Computer Science / Agriculture / Engineering Graphics / Business Studies
- Minimum aggregate: ~45% marks (Reserved category: ~40%)
- Valid score in MHT-CET or JEE Main for Maharashtra CAP rounds
- Lateral entry (Diploma holders): 10+2 + valid JEE Main score, course duration 3 years

CONCLUSION

- ❑ The development of the College Admission Agent demonstrates the effectiveness of using a **Retrieval-Augmented Generation (RAG)** approach with IBM Granite models to address the challenges of providing accurate, instant, and reliable admission-related information to prospective students. By integrating structured admission documents and real-time website data within IBM Watsonx.ai Agentic Lab, the system was able to deliver relevant responses based on the exact user query, thereby reducing manual workload for admission staff and improving the applicant experience.
- ❑ During implementation, a key challenge was ensuring that the AI retrieved **only relevant chunks of information** instead of displaying unnecessary data from all uploaded documents. This was addressed by structuring the knowledge base into well-organized .txt files and configuring retrieval tools effectively. Additionally, the absence of a built-in file upload tool in certain configurations required adapting the project workflow to the available IBM Cloud Lite services.
- ❑ Overall, the system proved to be an efficient, scalable, and user-friendly solution for college admission query handling. With further refinement, such as **multi-language support**, **voice query handling**, and **automatic knowledge base updates** from the college website, the system can become an even more powerful resource for enhancing transparency and accessibility in the admission process.

FUTURE SCOPE

The College Admission Agent can be further enhanced and expanded to provide an even more comprehensive and intelligent admission assistance experience. Potential improvements include:

- **Incorporating Additional Data Sources**
 - Integrate with government education portals, university databases, and entrance exam result systems to provide up-to-date eligibility verification and application tracking.
 - Include real-time updates from official notices, social media announcements, and academic calendars to ensure the agent delivers the latest information.
- **Optimizing Retrieval and Generation**
 - Improve the retrieval mechanism by fine-tuning embedding models and context filtering to deliver more precise and concise answers.
 - Implement user intent detection to better understand queries and avoid unnecessary data retrieval.
- **Multi-Language and Accessibility Support**
 - Enable the agent to respond in multiple regional and international languages to reach a broader audience.
 - Integrate voice-based interaction for visually impaired or less tech-savvy users.
- **Scalability Across Institutions**
 - Adapt the system to serve multiple colleges or universities by enabling institution-specific configurations within a single platform.
 - Expand coverage to multiple cities or regions with location-based content retrieval.
- **Analytics and Insights**
 - Add an analytics dashboard to track frequently asked questions, user trends, and peak query times, enabling institutions to optimize their admission process further.

REFERENCES

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6. Edunet Foundation

IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Piyush Tambe

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



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

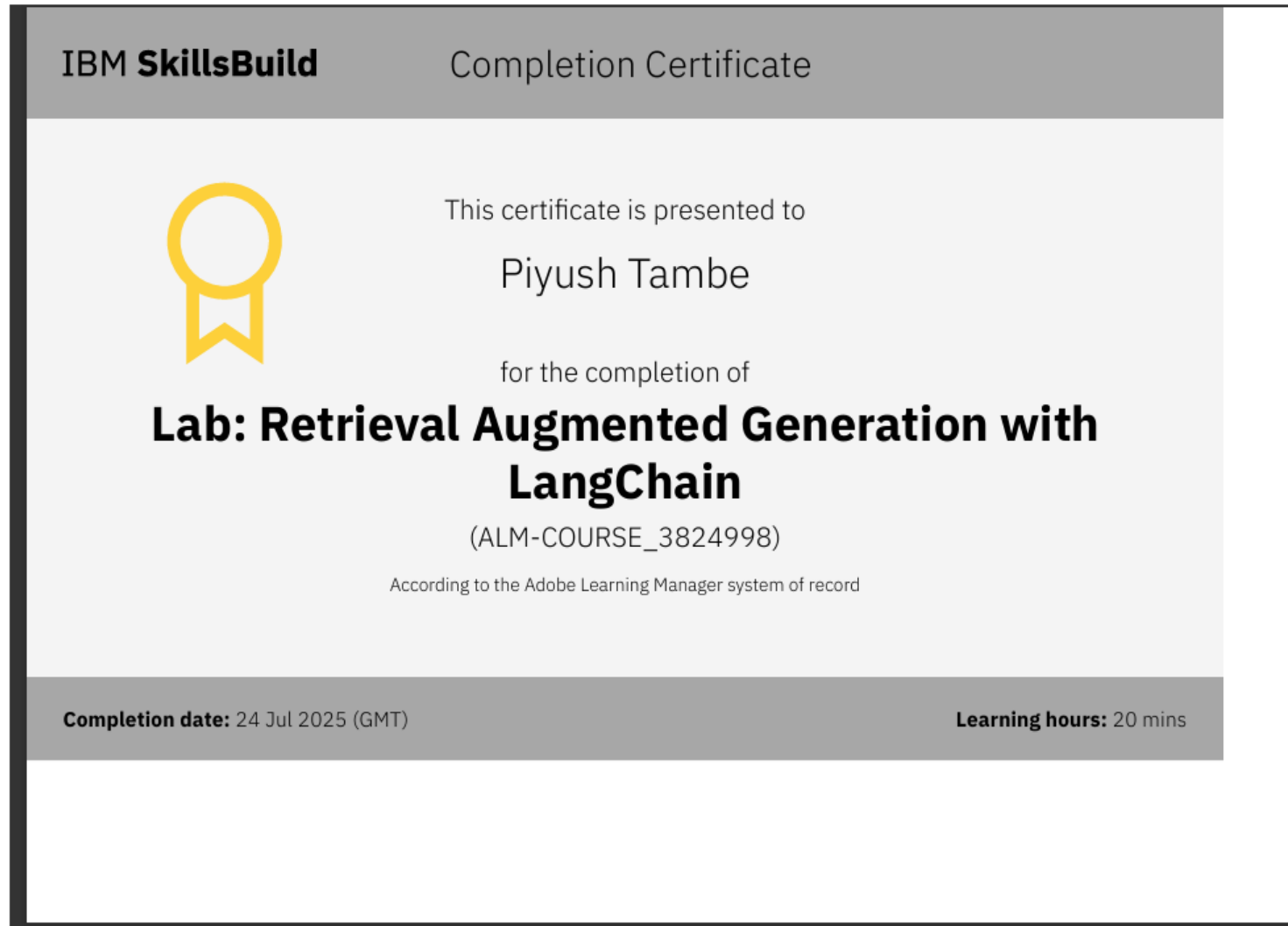
Verify: <https://www.credly.com/badges/4aa7b34e-fced-4f23-9062-aa34eef0b6a8>



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THANK YOU