IBM AICTE PROJECT

RAG-POWERED COLLEGE ADMISSION AGENT

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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

- 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 aims to address the challenge of providing accurate, real-time information to prospective students, streamlining the admission process, and reducing the burden on administrative staff. This involves leveraging RAG to retrieve and synthesize information from official college sources to answer natural language queries.**
- **Data Collection & Preprocessing:**
  - **Knowledge Base**: Gather official college documents like admission policies, course catalogs, FAQs, and fee structures.
  - **Vector Database**: Process these documents into numerical embeddings and store them in a vector database for efficient retrieval.
- **RAG System with IBM Granite:**
  - **Retrieval**: Use the query embedding to search the vector database and retrieve the most relevant document chunks..
  - **Query-to-Embedding**: Convert a student's natural language question into an embedding.
  - **Generation**: Use the retrieved information and the original question as context for the **IBM Granite model** to generate a comprehensive and accurate response.
- **Deployment & User Interface:**
  - **Platform**: Deploy the agent on **IBM Cloud Lite services** to ensure scalability and reliability.
  - **User Interface**: Develop a simple, intuitive chat interface where students can ask questions and receive instant answers.
- **Evaluation & Maintenance:**
  - **Metrics**: Continuously assess the agent's performance based on accuracy and user feedback.
  - **Updates**: Regularly update the knowledge base with new information to keep the system current.
- **Expected Outcome:** A highly efficient, transparent, and accessible college admission agent that significantly improves the student application experience while reducing administrative workload.

SYSTEM APPROACH

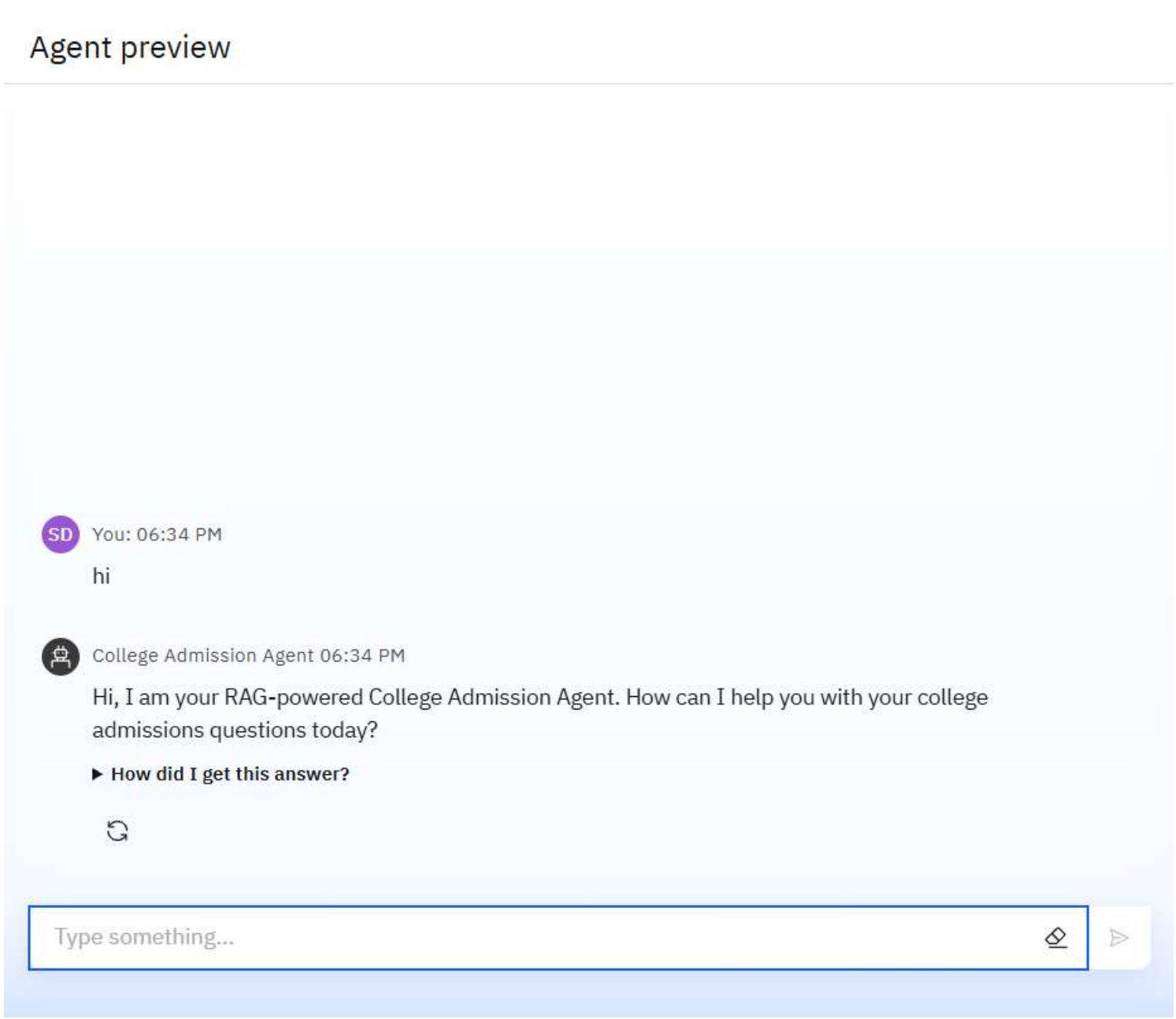
System Approach for RAG-powered College Admission Agent: This section outlines the core requirements and tools needed to build the project.

- **System requirements:** Knowledge Base, IBM Cloud, Vector Database, User Interface.
- **Library required to build the model:** IBM Granite, LangChain/LlamaIndex, Embedding Model, Web Framework.

ALGORITHM & DEPLOYMENT

- **Algorithm Selection (RAG):**
  - **Chosen Approach**: Retrieval-Augmented Generation (RAG).
  - **Justification**: RAG combines a retriever (to find relevant info) and a generator (like IBM Granite) to provide accurate, fact-based answers from college documents. This prevents the model from hallucinating.
- **Data Input:**
  - **Primary Input**: Student questions in natural language.
  - **Secondary Input**: The pre-processed knowledge base of official college documents.
- **Training Process (Embedding):**
  - **Core Process**: Creating embeddings—numerical representations of all college documents. This allows for fast and accurate information retrieval.
- **Deployment:**
  - **Platform**: The entire system will be deployed on IBM Cloud Lite services.
  - **Architecture**: A web server will connect the chat interface to the vector database and the IBM Granite model. The RAG pipeline runs in real-time to generate responses for student queries.

RESULT



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CONCLUSION

- The RAG-powered College Admission Agent is a highly effective and innovative solution for modernizing the student admission process. It successfully addresses the challenge of providing instant, accurate, and personalized information to prospective students. By leveraging the power of IBM Granite and a Retrieval-Augmented Generation (RAG) system, the agent delivers reliable answers based on official institutional data. This approach significantly boosts transparency and accessibility. Ultimately, the project streamlines the entire admissions journey. It reduces the manual workload on administrative staff and enhances the overall applicant experience, making college admissions more efficient and user-friendly for everyone involved.

FUTURE SCOPE

- The project can be expanded with the following enhancements: Multilingual Support: Implement support for multiple languages to assist international students. Proactive Engagement: The agent could proactively send alerts about deadlines, events, and scholarship opportunities. Personalized Recommendations: Provide tailored course and program suggestions based on a student's profile and interests. Application Integration: Integrate with the college's official application portal to help students track their application status and upload documents .Voice and Image Recognition: Upgrade the interface to support voice commands and process information from uploaded images.

REFERENCES

- IBM Research - Granite Models: https://research.ibm.com/topics/granite
- IBM Cloud Documentation: https://cloud.ibm.com/docs
- LangChain Documentation: https://python.langchain.com/docs/get_started/introduction
- LlamaIndex Documentation: https://www.llamaindex.ai/framework

Github

Github: https://github.com/Shreyash31944/College_Addmission_Agent

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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Shreyash Deshmukh

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 27 Jul 2025 (GMT) **Learning hours:** 20 mins

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THANK YOU

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