

Gen AI Academic Guide

Abstract- "Gen AI Academic Guide" is a comprehensive academic navigator that helps users access and understand academic data. This tool uses advanced technologies such as Large Language Model (LLM), LangChain, Llama 2, Huggingface, embeddings, vector stores, Streamlit, Python, and RAG (Retrieval-Augmented Generation) to provide a user-friendly interface for accessing and processing academic information. The system is designed for academic use, using uploaded academic data to provide personalized guidance and support. By combining these technologies, users can easily navigate complex academic content, receive tailored recommendations, and access relevant resources. This report describes the design, implementation, and impact of the "Gen AI Academic Guide" on improving academic experiences and knowledge acquisition.

Architecture

The system has several components including a language understanding module, a dialogue manager, and a response generation module. The language understanding module is responsible for processing the user’s input and extracting meaning from it. The dialogue manager determines the intent of the user's query and retrieves relevant information from the database. The response generation module then generates a response to the user based on the information retrieved by the dialogue manager. Finally, the response is encoded back into natural language for the user to see.

Model Used

The model used is “LLAMA-2-chat-7B” and was created specifically for chat. We have used a quantized model of this which is built on the third generation of the GGML (Generative Multimodal Language) architecture. GGML_TYPE_Q3_K - "type-0" 3-bit quantization in superblocks of 16 blocks, each with 16 weights. Scales are quantized to 6 bits. This results in using 3.4375 bpw.

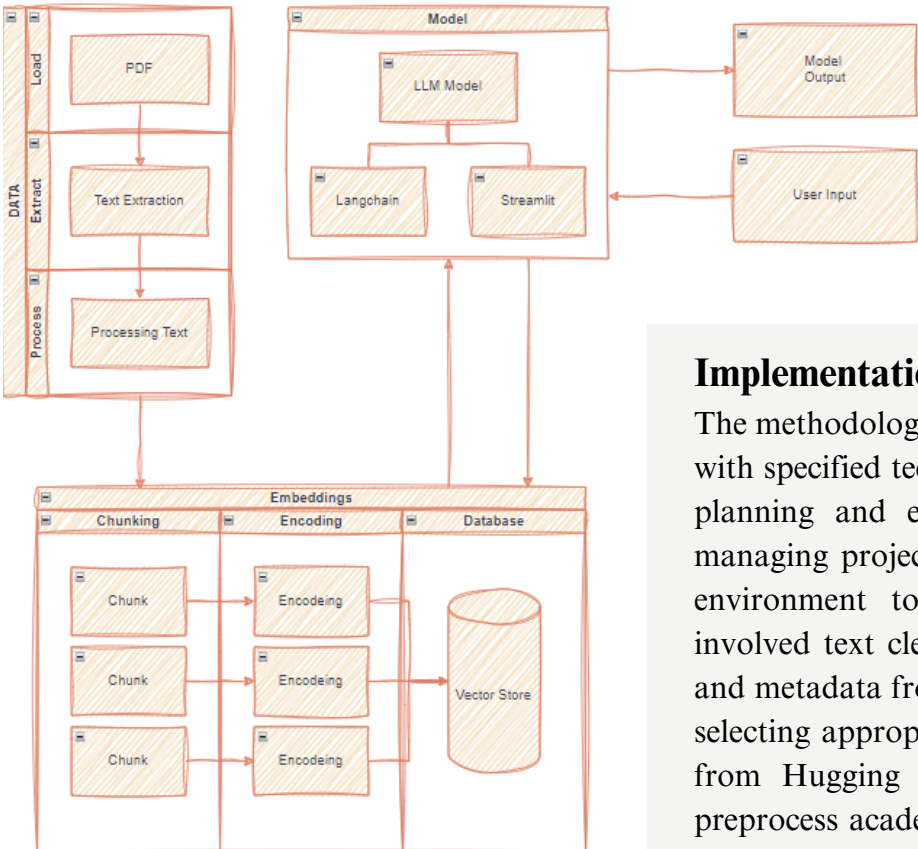


Fig 1 Architecture

Implementation

The methodology for implementing a project involving an LLM-based chatbot with specified technologies and dependencies entails a meticulous approach to planning and execution. We configured a virtual environment(venv) for managing project dependencies. Essential packages were installed within this environment to support the project's requirements. Data preprocessing involved text cleaning and transformation using PyPDF2 for extracting text and metadata from academic PDF documents. Model development comprised selecting appropriate LLM models like Llama 2 and a 3-bit quantized model from Hugging Face. Data retrieval methods were defined to fetch and preprocess academic data, leveraging Langchain and FASSI for this purpose. Model deployment and testing included integration with external systems like Streamlit for web application deployment, accompanied by monitoring tools implementation to ensure post-deployment reliability. Thorough testing was conducted to verify functionality, performance, and user experience, with the user interface developed using Streamlit and incorporating interactive features to enhance usability and engagement.



Fig 2 Landing Page



Fig 3 Admin Page

User Interface (UI)

The primary landing page, Fig. 2, has two choices, which are an admin page and a user page. The admin interface (Fig. 3) allows the admin to make database updates. The main chat-assistant interface is shown in Fig 4.

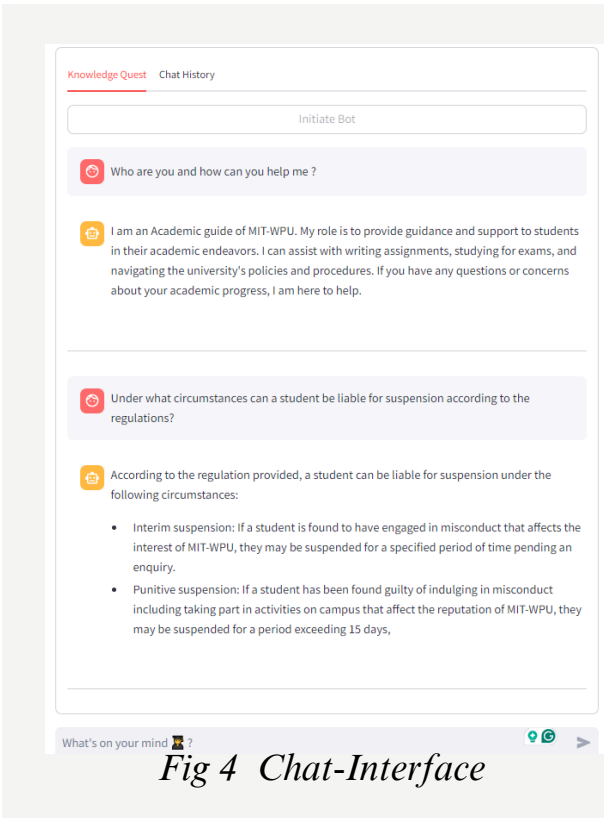


Fig 4 Chat-Interface

Result and Analysis

We evaluated our results by comparing each expected result to our generated answer separately, as well as using the BLEU score for the text output. The BLEU (Bilingual Evaluation Understudy) metric measures the quality of machine-translated text against one or more reference translations. Based on this comparison, we generated a pie chart and bar graph to provide a clear visual representation of the results.

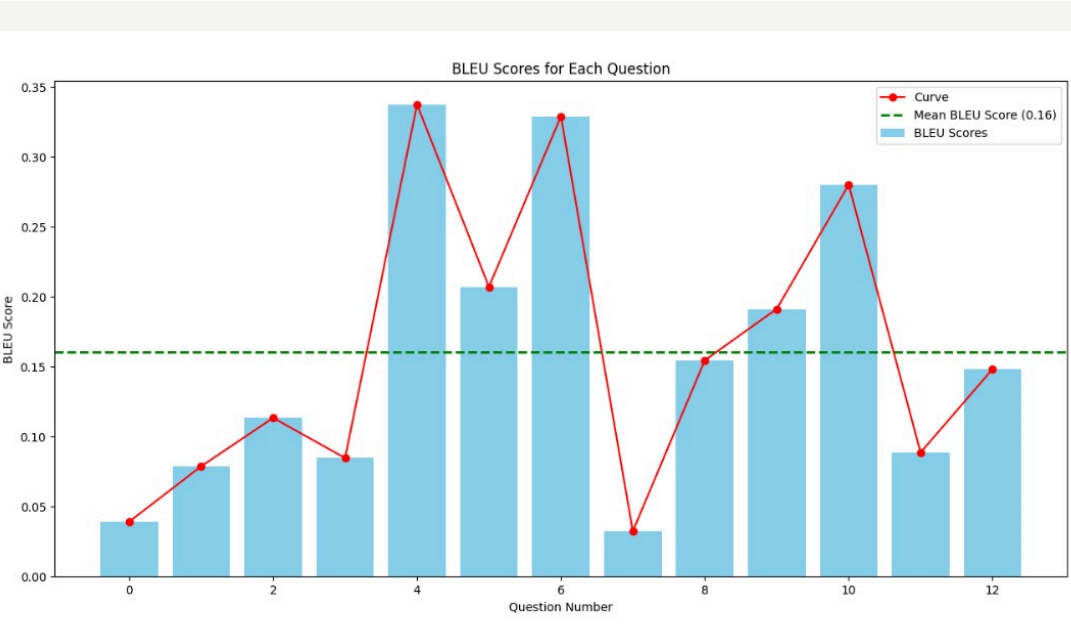


Fig 7 BLEU Bar Graph

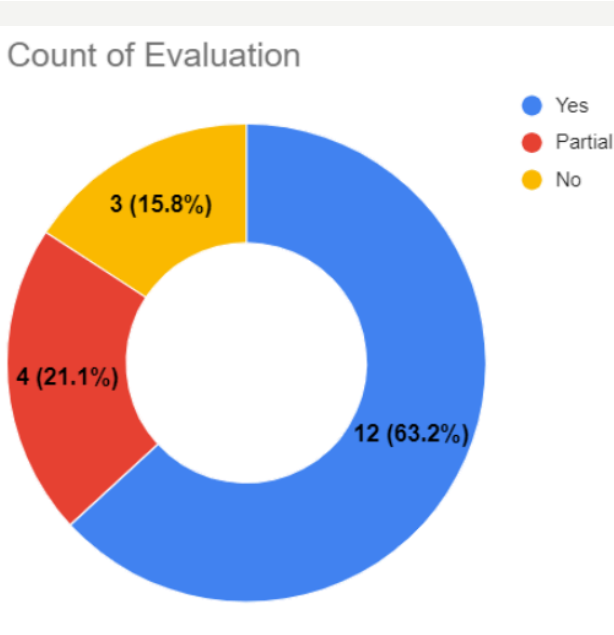


Fig 6 Pie chart of correct Answers

Question	Expected answer	Generated answer	Evaluation
2	In what situations must students produce their ID card?	Students must carry and produce their ID cards whenever demanded by the authorities for identification purposes.	Yes
3	What are the consequences for a student absent without leave for five consecutive days?	A student absent without leave for five consecutive days stands Based on the information provided in the context.	Yes
4	What are the borrowing privileges for different categories of students?	Postgraduate students can borrow up to five books at a time. Undergraduate students can borrow up to three books at a time. Teaching staff members can borrow up to ten books for a month.	Yes
5	What processes are followed for result declaration?	Result declaration involves verifying and confirming prerequisite. The processes followed for result declaration are as follows: 1. Verification of marks 2. Confirmation of prerequisite.	Yes
6	What is the policy regarding fines for overdue books?	An overdue fine of Re. 10 per day will be levied after the due date. For each item that is overdue, a fine of Rs. 10 per day will be levied.	Yes
7	Where are Semester term end examinations held?	Semester term end examinations are conducted at designated centers. Semester term end examinations are held at the college.	Yes
8	What is the deadline for locking marks of formative assessments?	Marks and attendance must be locked in the ERP system within the deadline. The deadline for locking marks of formative assessments is 10th day of the month.	Yes
9	Under what conditions are conduct and course certificates issued?	Conduct and course certificates are issued only after the student has completed the course and is found to be of good conduct.	Yes
10	Is loitering allowed during class hours?	No, loitering is strictly prohibited during class hours.	Yes
11	What is the stance on smoking, alcoholic drinks, or drugs on campus?	Smoking and the use or possession of alcoholic drinks or drugs are strictly forbidden on the college campus.	Yes
12	What is the role of the Ethics Committee in the college?	The Ethics Committee imparts value-based education to students. The Ethics Committee also provides guidance and support to students.	Yes
13	What is the refund policy for withdrawal requests?	For withdrawal requests received before the commencement of the semester, a refund of 50% of the fee will be provided. If a student submits a withdrawal request within the semester, a refund of 25% will be provided.	Yes
14	When was MIT Group of Institutions founded?	The MIT Group of Institutions was founded in the year 1983 by MIT Group of Institutions.	Partial
15	Can students leave the classroom during class hours?	No, students must obtain permission from the teacher before leaving the classroom during class hours.	Partial
16	What are the requisites that students need to fulfill for leave applications?	Students must ensure they have a compatible device with camera. Based on the information provided in the context, the requisites are: 1. A compatible device with camera. 2. A valid reason for leave.	Partial
17	How should students handle leave applications, especially during college exam hours?	Students requiring leave must submit an application in the prescribed format. As an Academic Guide of MIT-WPU, I would advise students to submit their leave applications well in advance.	Partial
18	Can I use cell phones for telephonic communication during the college Exam hours?	The guidelines mentioned in the data emphasize strict regulation of mobile phone usage during exams. The reason for this policy is to ensure that students are not distracted by their phones during the examination.	Partial

Fig 5 Evaluation Dataset

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Conclusion

Imagine having a tireless acquaintance at your side who is always willing to help and available to you for any queries or worries you may have. This is not merely a science fiction idea; the GEN AI assistant is real. This amazing AI-powered chatbot is built to easily understand your natural language inquiries. This intelligent assistant provides instant access to a vast wealth of knowledge, regardless of the topic you’re looking for, like college rules. This chatbot is a trailblazing example of intelligent systems as AI technology develops, giving you the confidence to confidently navigate the intricate college regulations.

