2025 International Conference on Data Science, Agents, and Artificial Intelligence (ICDSAAI 2025)
28-29 March 2025, Chennai, India

# Developing a User-Friendly Conversational AI Assistant for University Using Ollama and LLama3

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2025 International Conference on Data Science, Agents & Artificial Intelligence (ICDSAAI) | 979-8-3315-3755-5/25/$31.00 ©2025 IEEE | DOI: 10.1109/ICDSAAI65575.2025.11011878

***Abstract*—This paper presents the development and implementation of an AI-driven chatbot for a university, designed to assist students and parents by providing accurate and instant information about the university. The chatbot leverages advanced LLM technologies, specifically LLama3, integrated with Ollama, to ensure high-quality natural language processing. Using LangChain, the system processes user queries by combining them with a structured prompt template, generating precise responses, and storing interactions in a database for future reference. The architecture includes modules like login, signup, and chat, ensuring a user-friendly interface. The chatbot's capability to reliably give precise responses was evaluated both manually and with volunteers in actual situations. This project showcases the uniqueness of utilizing Ollama and LLama3, which distinguishes it from conventional solutions by providing incredibly trustworthy and relevant replies. The chatbot enhances the user experience and acts as an efficient virtual assistant for the university by bridging the gap between user inquiries and institutional resources.**

**Keywords—Chatbot, Prompt Engineering, Ollama, University Chatbot, Large Language Model.**

## I. INTRODUCTION

In the past, before computers existed, it was difficult for people to find information about a particular topic. With the invention of computers, accessing information became easier, allowing people to gather data from anywhere and at any time. However, even with computers, finding the right information often required visiting multiple web pages and websites, which was time-consuming. The arrival of Artificial Intelligence (AI) changed this by making information easier to access and use. In a similar way, getting information about a company or university often means searching through several sources.

This paper presents a solution to that problem: a chatbot designed specifically for Universities. This chatbot gathers all the important details about the university in one place, making it easy for students and parents to find information about placements, fees, facilities, and more.

In today's digital world, AI tools have become dominant, with chatbots emerging as a key player due to their ability to provide quick answers, efficiently resolve user queries, and foster engaging interactions. This paper explores the creation and use of an AI chatbot for Marwadi University, which is designed to provide clear and accurate information to students, parents, and applicants. Despite the growing adoption of AI chatbots in higher education, there remains a significant research gap in understanding their long-term impact on user engagement and satisfaction, particularly in the context of Indian universities. This study aims to bridge this gap by investigating the practical implications of implementing such systems, utilizing state-of-the-art technologies like Ollama and Llama 3. The proposed chatbot uses advanced Language Learning Models (LLMs) and tools like LangChain, supported by a Django-based backend. With natural language processing (NLP), the chatbot can interact in a way that feels natural and human-like, ensuring accurate and helpful responses. The main goals are to make university information easy to access, reduce the workload on staff, and improve the experience for users. This paper also discusses the methods, technology, and practical uses of the chatbot. It addresses challenges like data security, scalability, and user interface design. By sharing these insights, this study contributes to the growing research on how AI can be used in education and provides a model that other institutions can follow.

## II. LITERATURE REVIEW

The use of chatbots nowadays in universities is necessary because it makes the interaction between the academic supports and the administrative more easy and fast, and also it provides momenta services without any delays. The NEU chatbot was created by the authors in [1] with the intention of expediting the National Economics University of Vietnam's admissions procedures. with higher performance, which was shown by the advanced deep learning models in that field, which achieved more than 97% in handling the questions compared to Rasa chatbots, which are open-source and provide this type of app.

To remain current, the system needed yearly updates by hand. In that paper [2], they did the same functionality using a new version of chatbots based on the student behavior itself, and that step helped the deep model to understand and classify the types of questions, and that made the process of understanding the behavior of humans easier, and also it made that model more trustworthy. For university-related questions, the authors of another study in [3] presented EduChat, a hybrid AI chatbot that combines rule-based systems, machine learning, and ChatGPT. Although it was limited in its ability to handle real-time updates, the chatbot's architecture allowed for effective information retrieval.

In research conducted by [4], the authors created an Anglo-Bangla chatbot specifically designed for universities in Bangladesh, overcoming language barriers by editing the model trained on both Anglo-Bangla and English datasets. hybrid model, which is combined deep learning with PLS-SEM to measure the importance of understanding the logic between the user of that chatbot and the types of questions delieverd by them, and they achieved high accuracy by making this combination [5]. Their results of that research highlighted the main role of trust, interaction quality, and ethical design in shaping user acceptance and how it may affect the behavior of data.

In the research [6], the author focused on analyzing the results that come out of their studies to show how it may affect the relation between humans and chatbots, the development of human-computer interaction was explored, showing how AI chatbots enhance user experiences by providing dynamic intelligence and streamlining university admissions.

All of those studies tried to build robust trust between the customers and that AI and itself. Technologically, the research in [7] introduced BARKPLUG V.2, which used Retrieval Accelerated Generation (RAG) pipelines for managing university resources. The chatbot demonstrated high accuracy and user satisfaction in domain-specific tasks. The authors of that paper [8] applied a new deep learning model combined with natural language processing (NLP) to create a bilingual chatbot, enabling effective communication in both Fijian and English. Finally, the authors in [9] and [10] concentrated on creating chatbots for significant determination and frequently asked questions, respectively.

While previous works have excelled in areas like multilingual support, FAQ handling, and academic engagement, challenges persist in adaptability, domain-specific accuracy, and user interaction modalities. This proposed research has integrated fine-tuned recent LLMs, secure user authentication, and voice-based communication into a unified framework. By addressing scalability and contextual relevance, this approach sets a new benchmark for AI-driven educational tools tailored to the University's needs.

## III. METHODOLOGY AND SYSTEM DESIGN

This section provides an in-depth explanation of the working system of the project, segmented into the following main parts: Data Description and Preprocessing, which explains the data collection process and its transformation for training, Ollama and LLama3 Implementation, showcasing the workflow and implementation, Testing Model Performance, evaluating the model's output and effectiveness, Frontend Design, and Backend Development, detailing the backend processes of the web portal. Each part highlights the methodology, tools, and processes used to build the AI chatbot system for Marwadi University, ensuring efficient performance and user accessibility. Fig. 1 illustrates the overall system architecture of the work.

### *A. Dataset Description and Preprocessing*

This phase focuses on collecting, organizing, and preparing the data required for the chatbot's functionality. For this research project, we manually gathered data from the official Marwadi University website, Google searches, and other relevant sources. The text data was categorized and stored systematically in directories and text files, each representing a specific category, as illustrated in Fig. 2. A total of 19 text files were created, with each containing approximately 800-1000 lines of data. The dataset included information about various departments, facilities, and other aspects of the university.

The manually created dataset underwent preprocessing, including text-to-embedding conversion using the all-MiniLM-L6-v2 model, to optimize compatibility with the fine-tuned Llama3 model. To ensure real-time accuracy, the dataset is updated annually.

### *B. Ollama and LLama3 Implementation*

This section provides a detailed overview of the integration of Ollama and LLama3 in the project, highlighting their role in processing user input through LangChain. Additionally, it emphasizes the advantages and uniqueness of using these technologies in comparison to older approaches.

The system begins by accepting user input, which is first sent to the LangChain framework. LangChain facilitates the combination of the input with a predefined prompt template.

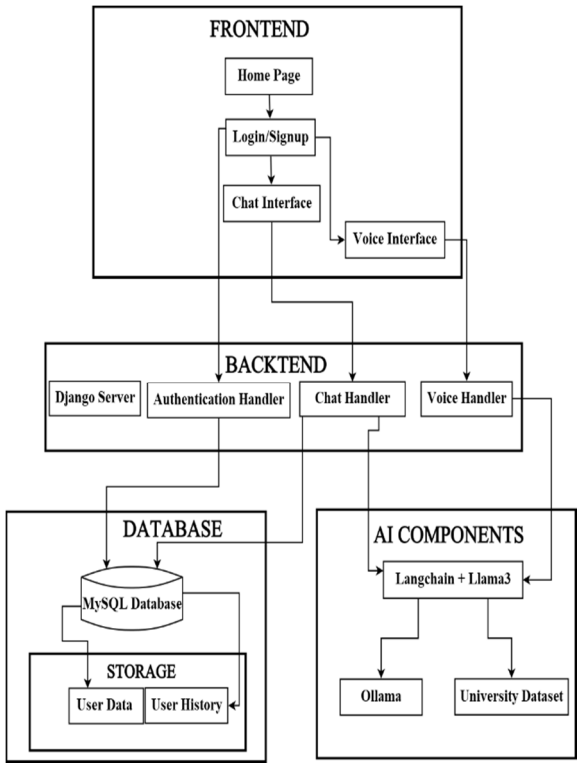


Fig.1. System Block Diagram

This structured prompt ensures that the input aligns with the context and format required by the language model. Once combined, the formatted input is processed by the core LLM, LLama3, with the help of Ollama.

Ollama acts as a lightweight and efficient interface for deploying and interacting with LLama3. By utilizing Ollama, the research work achieves enhanced flexibility, better deployment efficiency, and optimized performance. LLama3, being a state-of-the-art language model, generates highly accurate and context-aware responses based on the user input and the combined prompt. The generated response is then returned to the user, displayed on the interface, and simultaneously stored in the database for future reference.

The architecture, depicted in Fig. 3, illustrates the flow of data from user input to the final output. This distinguishes

itself from conventional systems by providing better natural language understanding and answer generation by utilizing the enhanced capabilities of Ollama and LLama3. Real-time interaction solutions are assured by the unique mix of these tools.

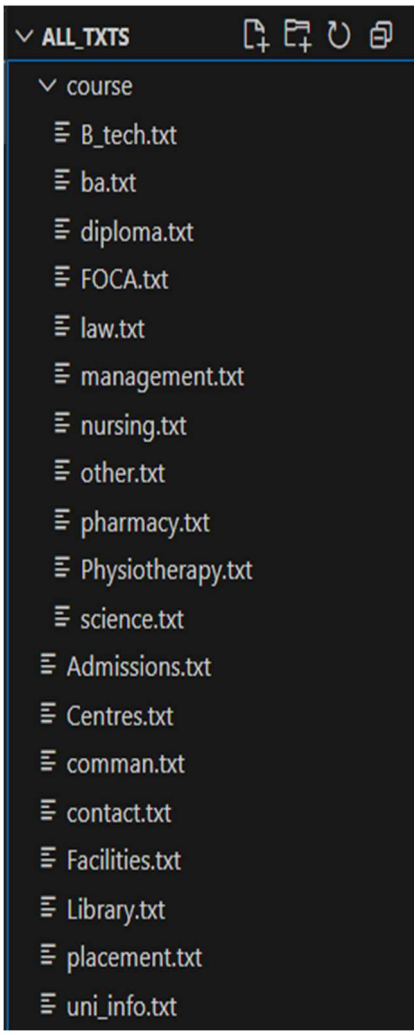


Fig. 2. Sample Dataset Files

### C. Testing Model performance

This part shows the procedures carried out to assess the chatbot's correctness and performance. The chatbot's performance and accuracy were tested using manual question-and-answer validation. Initially, we conducted manual testing by asking the chatbot various questions related to its context. The bot responded accurately to most queries, showcasing its capabilities and the effectiveness of the prompt design and LLM integration. To validate the performance, we conducted real-world testing with 10 university students. These participants were asked to pose any five questions related to Marwadi University.

The chatbot demonstrated exceptional performance, accurately answering all questions posed by 10 participants. This validates its reliability within the intended domain. Table I summarizes the results, where "Tester" represents the user, "Qs" denotes the Number of Questions, "Rs" signifies the Number of Responses, and "C. Rs" indicates the Number of Correct Responses.

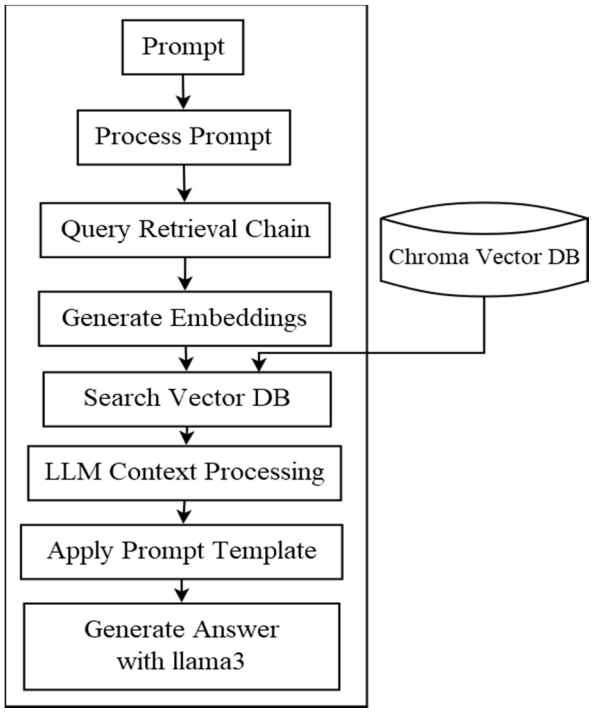


Fig. 3. Ollama prompt process Diagram

TABLE I. TESTER PERFORMANCE SUMMARY

| Tester | No. Qs | No. Rs | No. C. Rs |
|---|---|---|---|
| Tester_1 | 5 | 5 | 5 |
| Tester_2 | 5 | 5 | 5 |
| Tester_3 | 5 | 5 | 5 |
| Tester_4 | 5 | 5 | 5 |
| Tester 1 | 5 | 5 | 5 |
| Tester 1 | 5 | 5 | 5 |
| Tester 1 | 5 | 5 | 5 |
| Tester 1 | 5 | 5 | 5 |
| Tester 1 | 5 | 5 | 5 |
| Tester 1 | 5 | 5 | 5 |
| **Total** | 50 | 50 | 50 |

### D. Front End

The frontend serves as the user interface, providing an intuitive and accessible platform for interacting with the chatbot. The interface includes key pages such as Home, Login, Signup, Chat, and Talk. The Home page (Fig. 4) features a menu bar with three options: Home, Login, and Signup, accompanied by the MU Bot logo. A welcome message introduces the user to the chatbot, followed by two primary options (chat and talk).

Access to these options requires the user to be logged in. Unauthenticated users are redirected to the Login page. The Login page enables users to log in with their username and password, while new users can create accounts via the Signup page. The Signup form verifies password confirmation and checks for unique usernames before creating a new account.

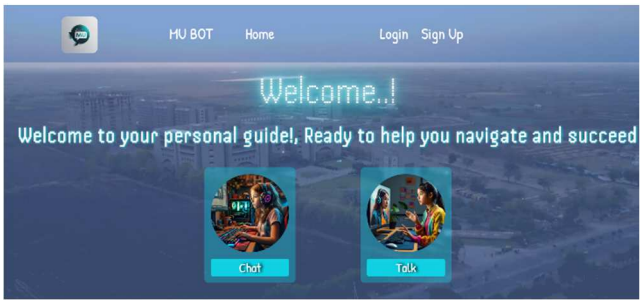


Fig. 4. Home Page

The Chat section displays a history of previous interactions and provides a text box for new prompts (As shown in Fig. 5). In the Talk section, users can interact using voice commands via a microphone icon. The system transcribes the user's speech, displays the transcription for confirmation, and processes the input. Talk sections include a 3D bot model at the center of the interface, enhancing user engagement. The bot's responses are displayed on the screen and read aloud. Fig. 6 depicts the interaction and response using voice.

### *E. BACK END*

The backend, developed using Django and MySQL, handles user authentication, data processing, and interaction management. The database is hosted on XAMPP, ensuring seamless connectivity and data management. In the Signup process, the system validates password confirmation and checks for unique usernames. If the criteria are met, a new user is added to the database, and a success message is displayed. The Login process verifies the entered username and password against the database, granting or denying access based on the results. Users can log out via a dedicated logout option. Fig. 7 shows the User Database for storing user account details.

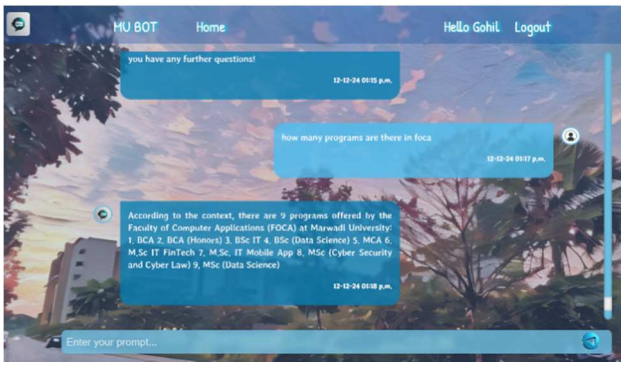


Fig. 5. Chat Section

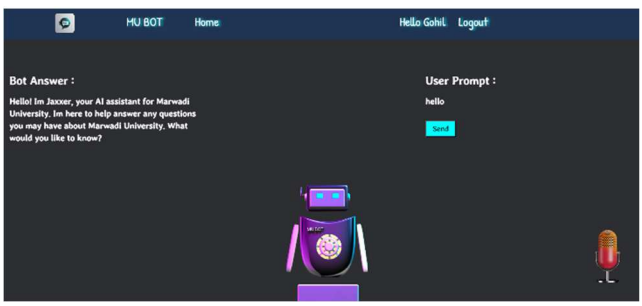


Fig. 6. Talk Section

Prompt processing for both Chat and Talk sections involves integrating the user input with LangChain and Llama3. For the Chat section, the user's text prompt is processed by the backend server, combined with LangChain, and sent to the Llama3 model for generating a response. The response is displayed on the user interface and stored in the database.

| | id | name | password |
|---|---|---|---|
| Edit Copy Delete | 1 | Gohil | aa |
| Edit Copy Delete | 27 | Jayrajsinh | aa |
| Edit Copy Delete | 29 | user | aa |
| Edit Copy Delete | 30 | Jay | 4445 |
| Edit Copy Delete | 31 | Viraj Jani | 17 |

Fig. 7. User's Database

In the Talk section, the user's speech is transcribed and verified. The transcription undergoes the same processing steps as text input, ensuring consistent results. The bot's responses are both displayed on the interface and read aloud. The system stores all interactions in the database, enabling future reference and analysis (Fig. 8).

| | msg_id | who | data | date |
|---|---|---|---|---|
| Edit Copy Delete | 1 | user | Hello | 2024-12-11 21:45:07 |
| Edit Copy Delete | 2 | bot | Hello! Im MuBot, your AI assistant here at Marwadi... | 2024-12-11 21:45:57 |
| Edit Copy Delete | 3 | user | Tell me the fees Structure of BCA Course. | 2024-12-11 21:47:14 |
| Edit Copy Delete | 4 | bot | The fee structure for the BCA program at Marwadi U... | 2024-12-11 21:47:59 |
| Edit Copy Delete | 5 | user | Who is the Dean of FOCA Department ? | 2024-12-11 21:49:38 |
| Edit Copy Delete | 6 | bot | The Dean of the Faculty of Computer Applications (... | 2024-12-11 21:50:22 |

Fig. 8. Promte Response

This robust backend ensures secure user authentication, efficient prompt processing, and seamless integration between the chatbot's various functionalities, delivering a reliable and user-friendly experience.

## IV. CONCLUSION AND FUTURE WORK

To wrap up, this project showcases a unique method for developing an AI-powered chatbot tailored to academic environments, using technologies like Ollama, LLama3, and LangChain. By gathering data manually, organizing it properly, and designing a user-friendly interface, the system is able to provide real-time, accurate, and context-aware responses for both students and parents. The system's software is structured to provide secure logins, make the process smoothly changed , and efficient data handling, making the chatbot an effective tool for improving communication at the university. What sets this project apart is its incorporation of modern technologies, which offer clear benefits compared to older methods. It strikes a balance between manual precision and automation, ensuring both flexibility and reliability. By solving important challenges in conversational AI, this chatbot lays the foundation for future innovations in university communication systems.

This work makes the response between the user and the chatbot and the real user experience more accurate and finds the way to build the chatbots with enhanced real-time and dynamic capabilities. By using this way, we are looking to the

future to make it automate learning by itself based on reinforcement learning, which is the most advanced technique in AI, and also, we will try to monitor the response and measure the time for each and every request.

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