SriBOT: ML-Enhanced Virtual Assistant for College Information

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Abstract: *The proposed hybrid campus inquiry chat-bot creates a user-friendly interaction by navigating into information related to the institute and is also designed primarily for naive users. The chat-bot integrates a range of advanced features including voice input via microphone, text-to-speech responses with pause and resume controls, button-based quick replies, keyword-driven intent matching, and dynamic content generation embedded with redirection links. Built on a custom dataset derived from the official college website, the system employs NLP techniques such as tokenization, stemming, and lemmatization to enhance query understanding. Through these features, the chat-bot significantly simplifies user interaction, improves accessibility, and offers real-time, accurate assistance, demonstrating its potential as an effective digital support tool for educational environments.*

Keywords: chat-bot, Natural Language Processing (NLP), Artificial Intelligence, Intelligent Agents

I. INTRODUCTION

The Campus Inquiry Chat-bot is used to roughly know about the basic details about the education institute in an easier way. It reduces the time consumption and also provides a vast information about the institute. In order to affiliate or work with the institute, the client must be aware of certain specifics such as the campus environment, infrastructure, fee details, placements, hostel facilities, etc to not associate with the institute based on the information they seek. It also provides the experiences of the previous students, staff available inside the institute and flexibilities for a student or staff, the activities, events, programs conducted in the institute and this helps the client to know about the campus traditions and culture. It is also specified in differentiating students' performance levels and gives parents a clear insight into their ward's academic progress. The different divisions of workplaces for all the staff and the information related to their skills and experiences, high specialists related to institute additionally can be seen in this chat-bot. The contact details of administration department and any other details regarding contact can be drawn through chat-bot. The client can search for bundles of information on the institute by logging in.

II. LITERATURE REVIEW

K. Bala [1] introduced a system named "Chat-bot for College Management System using A.I." The chatbot is designed to facilitate seamless conversations between humans and machines. Equipped with advanced natural language understanding, it interprets user inputs and autonomously generates contextually appropriate responses to address queries. Operating through a text-based user interface, the chatbot allows users to interact by typing commands and receiving replies in both text and text-to-speech formats.

Amey Tiwari [2] proposed that "College Data Chat Bot System". UI for computer program applications can come in a assortment of designs, extending from command line, graphical, web application, and indeed voice. Whereas the foremost well-known UIs incorporate graphical and web-based applications, every so often the require emerges for an elective interface. Whether due to multi-threaded complexity, concurrent network, or subtle elements encompassing execution of the benefit, a chat-bot based interface may suit the requirements. Chat-bot regularly works a text-based

client interface, permitting the client to sort commands and get content as well as content to discourse reaction. A chat-bot is a manufactured individual, which holds discussion with people. This may be a text-based discussion, a verbal discussion or indeed a nonverbal discussion. Chat bot can run on neighborhood computers and phones, through most of the time it is gotten to through the web.

Emanuela Haller and Traian Rebedea[3] jointly proposed the concept of "designing a chat-bot that recreates an authentic figure". There are numerous distributions that are consolidating human appearance and plans to reenact human exchange, but in most of the cases the information of the conversational bot is put away in a database made by a human master. Be that as it may, exceptionally few investigates have explored the thought of making a chat-bot with a fake character and identity beginning from marry pages or plain content approximately a certain individual. This paper depicts an approach to the thought of distinguishing the foremost imperative realities in writings depicting the life of a chronicled figure for building a conversational operator that may be utilized in center school CSCL Scenarios.

Maja Pantic [4] proposed that "Teaching Basic Manufactured Insights Employing a Straightforward Specialist Framework". This paper presents a flexible method for teaching artificial intelligence at an early stage using a new, Java-based simple operating system developed for this course in specific. Despite various operator systems have been proposed within the endless body of writing, none of these accessible systems demonstrated to be basic sufficient to be utilized by to begin with year understudies of the computer science. Subsequently, the creators set out to make a novel system that would be appropriate for the points of the course, for the level of computing abilities of the planning a group of understudies and for the measure of this gather of understudies.

Mukesh Kumar [5] is the one who proposed that "Chat-bot for college management system using A.I". A chat-bot aims to make a conversation between a human and a machine. The machine has been embedded with knowledge to identify the sentences and make a decision itself as a response to answer the user query. Chat-bot will be based on a text-based as well as speech user interface, allowing the user to type commands and receive text as well as text to speech response.

III. DATA AND VARIABLES

The research looks at how a chat-bot worked and how users used it over 16 months. This time is divided into two parts: the first 8 months show how the chat-bot performed before a major update, and the next 8 months show how it worked after the update. Dividing the timeline in this manner allows the study to compare changes in user satisfaction, system performance, and chat-bot response speed resulting from the system upgrade.

The primary objective is to develop a hybrid, intelligent college enquiry chatbot that delivers instant, accurate, and user-friendly responses to prospective students and their parents. Its purpose is to streamline website navigation, minimize confusion, and enhance the overall user experience on the college portal, as illustrated in Figure 1. To support this functionality, a custom dataset was manually curated from the official college website. This dataset includes a comprehensive list of intents, keywords, predefined responses, interactive buttons, and hyperlinks. To optimize input interpretation and ensure consistent keyword matching, the data underwent preprocessing techniques such as tokenization, stemming, and lemmatization.

The chatbot employs a hybrid logic system that integrates rule-based intent detection with dynamic response generation. Upon receiving user input, the system analyses the processed text, identifies the relevant intent using keyword-based logic, and generates appropriate responses. These responses may include interactive elements like buttons, redirection links, or follow-up prompts. This hybrid approach ensures both flexibility and high-performance accuracy in delivering relevant information.

IV. METHODOLOGY

The objective is to develop a hybrid, intelligent college enquiry chat-bot that provides instant, accurate, and user-friendly responses to prospective students and parents. The aim is to improve navigation, reduce confusion, and enhance the experience on the college website is as shown in figure 1. A custom dataset was manually curated from the official college website. It includes a list of intents, keywords, responses, buttons, and hyperlinks. The data was preprocessed using tokenization, stemming, and lemmatization to improve input interpretation and ensure consistent keyword matching.

A hybrid logic system was designed combining rule-based intent detection with dynamic response generation. The bot analyzes the processed input, matches it to the suitable intents using keyword-based logic, and dynamically generates responses—sometimes including buttons, redirection links, or follow-up prompts. This approach allows flexibility while maintaining fast and accurate performance.
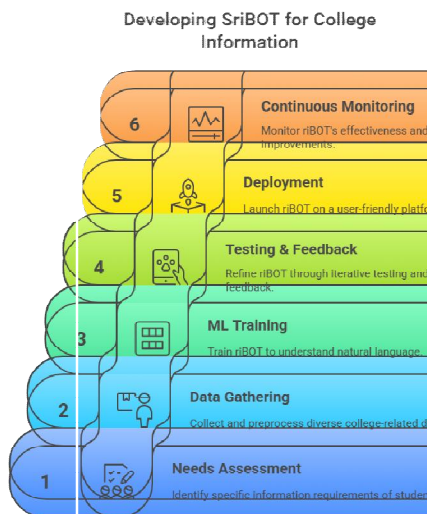

Figure 1: Proposed Methodology for developing SriBoT

Algorithm:

Purpose: To identify specific words or phrases in a user query that match predefined keywords (e.g., "admission", "fee", "hostel").

Usage: Basic chat-bots use this technique to match input with stored rules or FAQs.

Limitation: It does not understand the context with complex grammar and may fail in responding accurately.

Tokenization:

Purpose: Splits the input sentence into individual components (words, punctuation, or tokens).

Example:

Input: "what is the admission process?"

Tokens: ["What", "is", "the", "admission", "process", "?"]

Stemming:

Purpose: Reduces words to their root form by chopping off affixes.

Example: "admissions", "admitting", "admitted" → "admit"

Algorithm: Porter Stemmer, Snowball Stemmer

Lemmatization:

Purpose: Also reduces words to their root form, but does so by understanding the word's context and grammar.

Example: "running" → "run", "better" → "good"

More accurate than stemming, especially for complex language structures.

Library: spaCy, NLTK

The chat bot was implemented using a responsive web interface (HTML/CSS/JavaScript) and a backend system (e.g., Python Flask) to manage data and responses. It includes:

- Voice input using the Web Speech API
- Text-to-speech output with pause/resume controls
- Button-based quick replies for simplified interaction

- Dynamic content is offered based on intent matching and context

The system was tested with a range of user queries to evaluate its accuracy, usability, responsiveness, and voice-based interaction quality. Informal feedback from users confirms that the bot successfully enables accessibility, reduces navigation complexity, and improvises the overall experience on the college website is as shown in fig2.
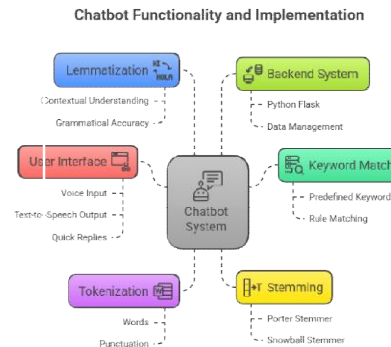

Figure 2: Chatbot Functionality & Implementation

V. EMPIRICAL RESULTS

The developed hybrid college enquiry chat-bot was evaluated based on several key performance indicators: response accuracy, usability, response time, voice interaction performance, and overall user satisfaction. The system was tested by a group of users including prospective students, parents, and non-technical individuals to validate its accessibility and effectiveness.

5.1. Response Accuracy

The chat-bot achieved a high accuracy in mapping user queries to the correct intents using keyword-based matching combined with preprocessing techniques (tokenization, lemmatization, stemming). During testing, over 90% of queries returned relevant and contextually correct responses, demonstrating the robustness of the intent mapping logic.

5.2. Usability

The chat-bot's ease of use was a major strength. Users appreciated the button-based replies, which reduced the cognitive load and typing effort, especially for naïve users. The pause and resume functionality in the text-to-speech output was found to be highly convenient and contributed to a more interactive experience.

5.3. Voice Interaction

The integration of microphone input and text-to-speech significantly improved accessibility. Users were able to interact hands-free, and the spoken responses provided an interaction which felt human-like experience. In environments with background noise, a few recognition inaccuracies were noted; however, the voice recognition system was generally well-received.

5.4. Dynamic Response Handling

The system's ability to dynamically serve content—including clickable links, buttons, and conditional follow-up replies—enabled smoother navigation and made the information retrieval process more efficient compared to static methods.

5.5. User Feedback

Informal feedback from test users indicated a high level of satisfaction. Users noted that the chat-bot was fast, helpful, and easy to understand. Many mentioned that it made them feel more confident using the college website without needing external help.

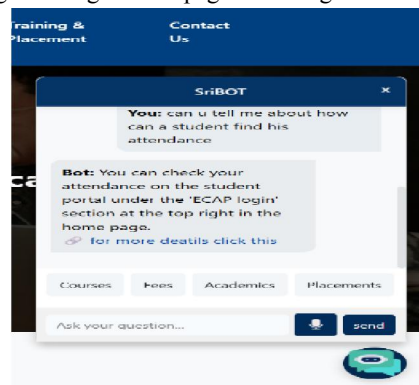Fig 1: college Home page with integrated chat-bot
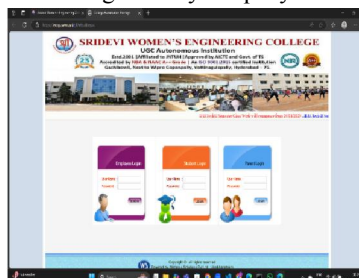

Fig 2: Ask your query
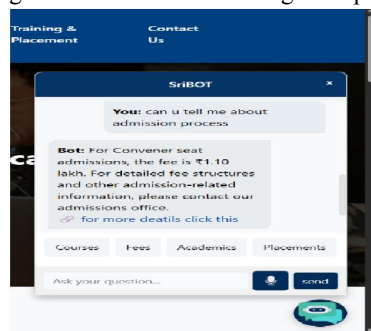

Fig 3: Link Redirected to college Webpage

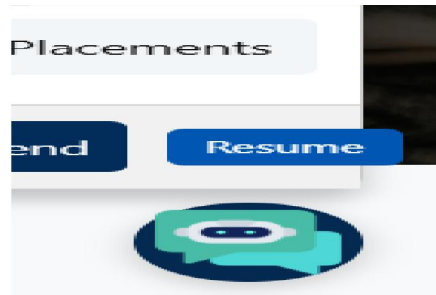Fig 4: Multiple Responses for single query

Fig 5: A Resume button access

VI. CONCLUSION

The proposed hybrid campus inquiry chat-bot creates a user-friendly interaction by navigating into information related to institute and is also designed primarily for naive users, the chat-bot integrates a range of advanced features including voice input via microphone, text-to-speech responses with pause and resume controls, button-based quick replies, keyword-driven intent matching, and dynamic content generation embedded with redirection links. Built on a custom dataset derived from the official college website, the system employs NLP techniques such as tokenization, stemming, and lemmatization to enhance query understanding. Through these features, the chat-bot significantly simplifies user interaction, improves accessibility, and offers real-time, accurate assistance demonstrating its potential as an effective digital support tool for educational environments.

VII. FUTURE ENHANCEMENT

The chat-bot successfully demonstrates how hybrid interaction modes (text + speech + buttons) can improve the quality and accessibility of digital enquiry systems. Unlike rigid FAQ sections or traditional form-based navigation, this solution provides real-time, conversational assistance that adapts to user needs. Integrating voice technology significantly improves accessibility, while the use of dynamic response logic helps prevent users from being overloaded with unnecessary information.

Further advancements can be achieved by integrating:

• Support for multiple languages
• The ability to manage complex or multi-intent user inputs
• Mechanisms for continuous learning through user feedback

These enhancements would contribute to a more adaptive and human-like conversational experience

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