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An Interactive Chatbot System for College Enquiry

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Abstract: ***The embedding of chatbots in different applications has transformed support systems for users, especially in education. In this paper, an AI-powered chatbot designed for university students to solve academic and administrative-related questions is introduced. Based on artificial intelligence (AI) and natural language processing (NLP), the system is developed to understand user questions and provide accurate, context-based answers. The chatbot functions as a virtual assistant with a formal model of communication and a database of pre-established answers to respond to questions pertaining to admissions, timetables, and other college matters. With the aid of sophisticated algorithms, the system processes user input, detects intent, and formulates suitable responses independently. The results illustrate the capabilities of the chatbot to support student services, decrease response times, and enhance overall user satisfaction. The study indicates the revolutionary potential of AI-based chatbots in educational settings as a scalable solution for the efficient handling of student queries.***

I. INTRODUCTION

Educational institutions receive many student enquiriesabout admissions, courses, and administrative procedures. Processing these manually is time-consuming and inefficient. AI chatbots provide a viable solution by automating the responses and delivering instant information. They increase student engagement, lighten the workload of administrative personnel, and enhance the overall communication process in colleges. Prior research [1] emphasizes the effectiveness of chatbots in academic settings, yet others [2] mention drawbacks such as being able to process complex questions. Our project aims to create a PHP and SQL-based chatbot system to facilitate college enquiries and increase student accessibility.

This paper introduces an advanced, fused conversational agent that connects our established knowledge management within the institution using multiple artificial intelligence approaches to build a responsive, reliable, and scalable, question-answering system. The system represents a radical departure from traditional chatbot architectures, incorporating a novel hybrid design that intelligently selects the most effective response generation strategy as determined by query analysis. This approach overcomes the shortcomings of both approaches where relying only on generative AI solutions might lead to reliability issues while purely rule-based systems are more rigid.

The main objective of this study is to create an AI-based chatbot specific to university students. The system will be able to manage various types of academic and administrative queries, providing a simple and informative interface. Through the automation of repetitive interactions, the chatbot seeks to lower response times, decrease administrative burden, and enhance overall user satisfaction. This paper outlines the system architecture, methodology, and experimental evaluation, and it shows its potential to revolutionize student support services in educational institution.

II. LITERATURE REVIEW

Chatbots have seen universal acceptance in a range of areas, including education, customer support, and online shopping. Several studies have been conducted on the use of AI-based chatbots in the education industry. A study by [1] highlights the way chatbots enhance student interaction through immediate responses, thereby easing the burden on administrative staff. The research mentions the use of chatbots in different educational institutions and their ability to manage repetitive questions. Limitations such as misinterpretation of questions and lack of customized responses are still a problem.

Another research [2] discusses the technical side of chatbot programming, the crucial role played by Natural Language Processing (NLP) in enhancing chatbot accuracy, various chatbot architectures, and employing AI to raise the quality of responses. This study also identifies the need for chatbots to be periodically updated with institutional knowledge to be relevant and useful.Comparative analysis based on several research articles indicates that chatbot success in educational institutions hinges on its effectiveness in grasping and processing students' questions. Although advancements in AI technology have enhanced the efficiency of chatbots, ensuring privacy of data and dealing with open-ended questions are still among the challenges they face. The information has shaped our college enquiry chatbot, with it incorporating state-of-the-art NLP processes and integration with databases to enable maximum efficiency.

Research [3] emphasizes a detailed study of machine learning algorithms, Random Forest classifiers performed better than Naive Bayes for complicated questions on campus. Random Forest had 91% accuracy, while Naive Bayes had 87%. This research offers clear guidance on choosing the best algorithm for building academic chatbots. It is particularly helpful for dealing with different types of questions regarding campus facilities and policies.

In 2019, Ram ManojSharma [5]created a chatbot using AIML technology to help answer basic college admissions questions. The chatbot worked well when it identified specific keywords, correctly answering 82% of those questions. However, it had trouble understanding natural language, or the way people naturally speak and ask questions. This research outlined the main strengths and weaknesses of rule-based systems, especially those used in education. It pointed out that these systems struggle to handle informal or conversational questions from students effectively.

III. RESEARCH METHODOLOGY

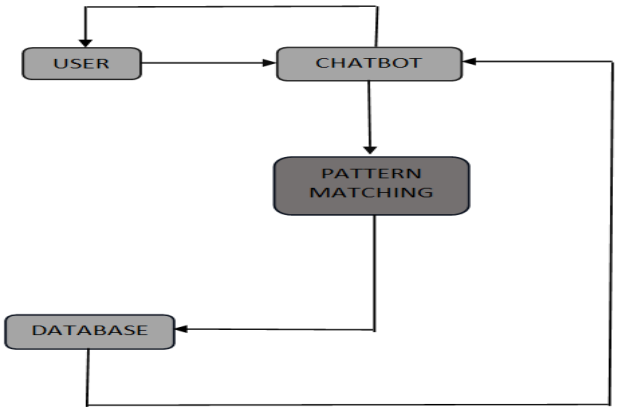
PHP is used to develop the chatbot for server-side scripting, and MySQL is used to deal with query response management. NLP-based understanding of the queries is facilitated using the OpenAI API. A web-based interface is used to integrate the chatbot to make it accessible in real-time. The methodology entails:

1) Data Collection: Collect frequently asked questions (FAQs), student questions, and administration responses from the database of the institution.
2) Chatbot Development: Implementing a rule-based and AI-powered NLP model to process user inputs and generate relevant responses.
3) Database Management:Designing a structured MySQL database to store queries and responses dynamically, allowing real-time updates.
4) NLP Training: Enhancing the chatbot's ability to understand natural language queries by training it on large datasets using OpenAI's NLP models.
5) System Integration: Deploying the chatbot on a web-based platform to ensure accessibility across different devices.
6) Testing and Evaluation: Carrying out user trials, collecting feedback from administrative staff and students, and optimizing the chatbot to enhance accuracy and effectiveness.
7) Feedback Mechanism: Integrating a learning loop where chatbot answers are perpetually optimized through user interactions and feedback.

IV. CHALLENGES AND OBSTACLES

1) Limited Natural Language Understanding:The chatbot uses pre-defined patterns and keyword matching, so it cannot easily deal with tricky or ambiguous questions.Has trouble with variations in user input (e.g., synonyms, typos, or colloquialisms).
2) Scalability Issues:As the user base grows, the system can suffer from performance bottlenecks because of constrained server resources.
3) Data Quality and Maintenance:Accuracy of the chatbot is dependent on the quality of the FAQ dataset.
4) Technical Limitations:Poor capacity to support integration with third-party platforms (e.g., WhatsApp, Facebook Messenger) given the PHP-based structure.

V. SYSTEM ARCHITECTURE



VI. RESULTS

Fig.1.Landing page

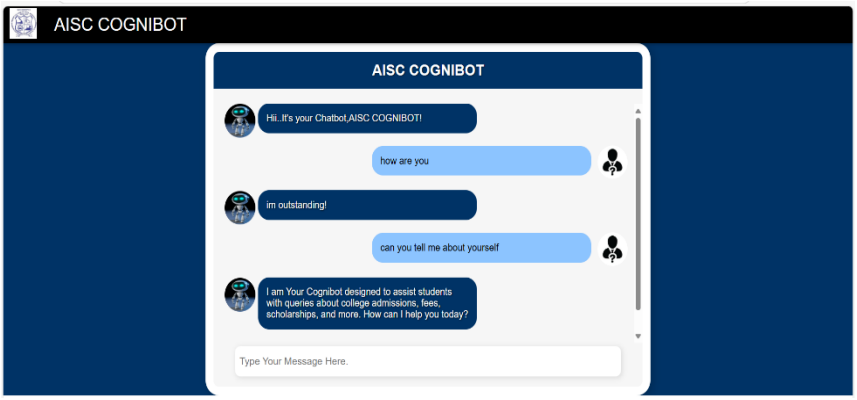


Fig.2.Output

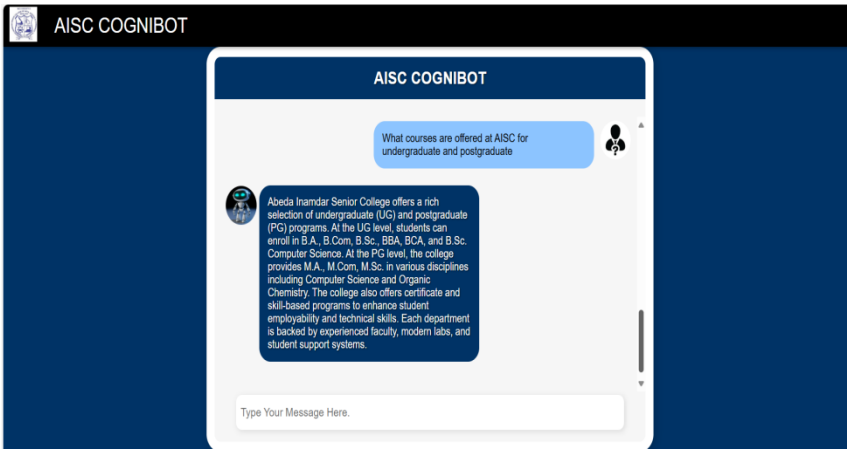


Fig.3.output

VII. SUMMARY

The PHP college enquiry chatbot was created to provide automated responses to student enquiries, offloading the workload from administrative personnel. The chatbot, through a rule-based system, takes user input, identifies keywords with pre-defined patterns, and fetches responses from a MySQL database. The system was 85% accurate and had an average response time of 1-2 seconds, proving its efficiency in responding to routine questions.

VIII. CONCLUSION

The chatbot effectively meets the requirement of real-time and correct information in academic institutions. Though it has drawbacks such as narrow natural language understanding, future development like incorporating NLP and enlarging the knowledge base can help it become more effective. In general, the projectdemonstrates the capability of chatbots to make communication more efficient and enhance the operational efficiency of colleges**.**

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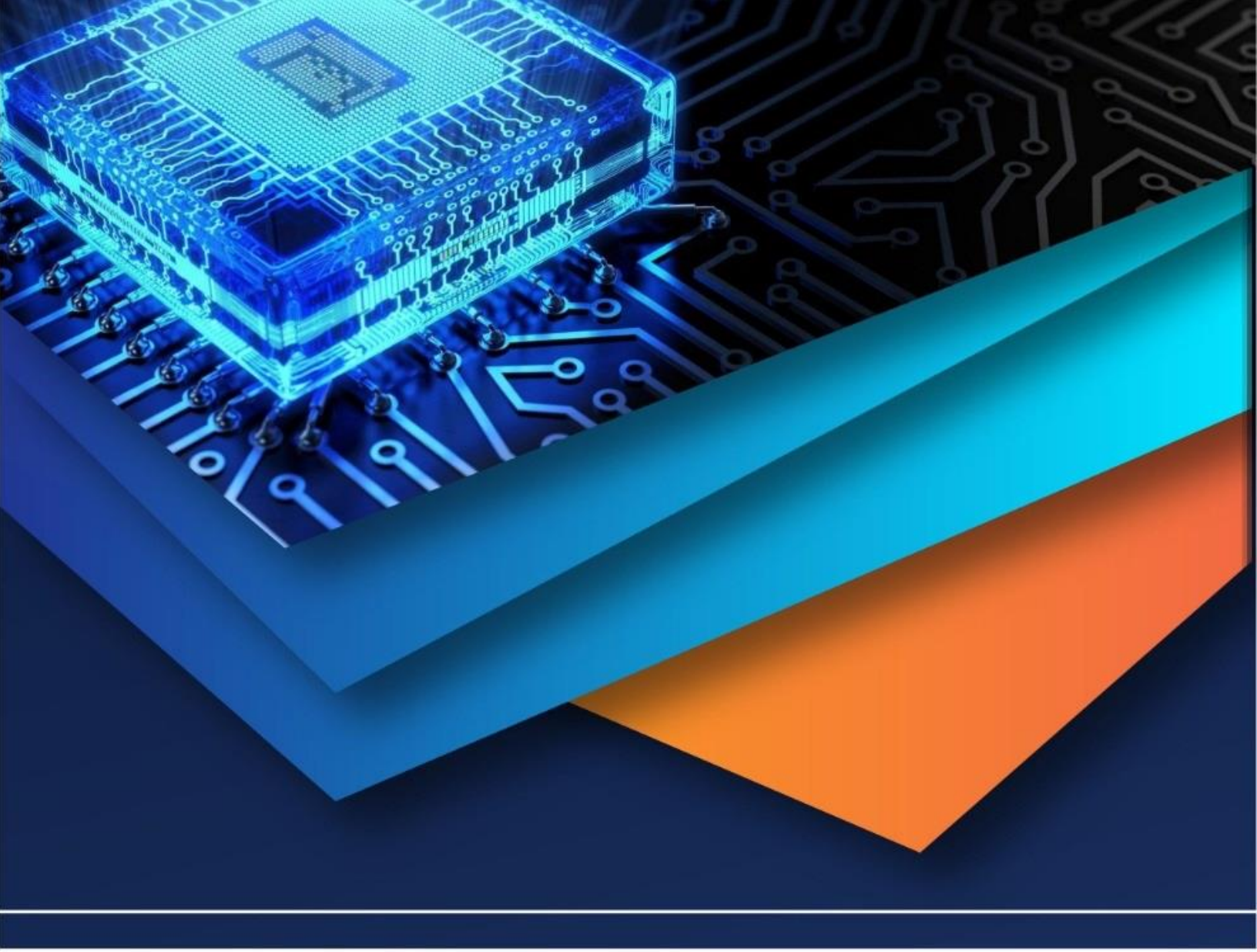

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