

Smart AI-Based Student Doubt Solver Chatbot Using NLP for Diploma Colleges

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Abstract - This paper proposes a lightweight AI-powered chatbot designed specifically for diploma students to resolve academic doubts instantly without continuous internet dependency. Unlike conventional systems, the model uses a hybrid approach combining keyword matching and a localized dataset tailored to diploma curricula. The chatbot supports bilingual interaction (English and Tamil), improving accessibility for regional learners. A simple web-based interface enables real-time query handling with minimal computational requirements. Experimental usage shows effective response generation for common academic questions, reducing reliance on faculty for repetitive queries. The system promotes self-learning and can be easily adapted for different departments with minimal modifications.

Keywords: artificial intelligence, chatbox system, natural language processing, student support system

I. INTRODUCTION

In diploma-level education, students frequently encounter difficulties in understanding academic concepts and clearing doubts outside classroom hours. Due to limited time and availability of faculty members, it is not always possible for students to receive immediate assistance. This often leads to delays in learning and reduced academic performance. Students may rely on peers or online resources, which may not always provide accurate or relevant information.

With the rapid advancement of Artificial Intelligence (AI), chatbot technology has emerged as an effective solution for providing instant support. Chatbots are capable of simulating human conversation and delivering quick responses to user queries. In the field of education, they can serve as virtual

assistants, helping students access information anytime and anywhere.

This paper proposes a lightweight AI-powered chatbot designed specifically for diploma students. The system uses a hybrid approach combining keyword matching and a localized dataset tailored to academic subjects. It also supports bilingual interaction in English and Tamil, improving accessibility. The proposed system aims to promote self-learning, reduce dependency on faculty, and provide efficient academic support.

II. LITERATURE REVIEW

Several research works have explored the use of chatbot systems in the field of education to improve student support and learning efficiency. Most existing educational chatbots are developed using advanced Natural Language Processing (NLP) and machine learning techniques, enabling them to understand user queries and provide intelligent responses. These systems are often designed to handle a wide range of queries and are trained on large datasets to improve accuracy.

However, many of these systems require high computational power and continuous internet connectivity, which may not be suitable for small-scale institutions such as diploma colleges. Additionally, existing chatbots are generally developed using global datasets and lack customization for specific academic curricula. This results in less accurate responses for domain-specific queries.

Another limitation observed is the lack of support for regional languages, which reduces accessibility for students who are more comfortable communicating in their native language. Furthermore, some systems are complex to implement and maintain.

The proposed system addresses these limitations by offering a lightweight, customizable, and bilingual chatbot specifically designed for diploma-level education.

III. PROPOSED SYSTEM

The proposed system is a smart AI-based chatbot designed to assist diploma students in resolving academic doubts. The system is developed using a simple architecture that includes user interface, processing module, and response generation module.

The chatbot allows users to enter queries through a web-based interface. The system processes the input using keyword matching and basic NLP techniques to identify the intent of the query. Based on the identified keywords, the chatbot retrieves relevant answers from a predefined dataset.

Key features of the proposed system include:

- Instant response to student queries
- Support for English and Tamil languages
- Lightweight design with minimal resource requirements
- Easy customization for different departments

The system architecture ensures efficient communication between the user and the chatbot, providing accurate and quick responses.

IV. METHODOLOGY

The working of the proposed chatbot system follows a simple and efficient process. Initially, the user enters a query through the interface. The input is then processed by the system using basic Natural Language Processing techniques such as tokenization and keyword extraction.

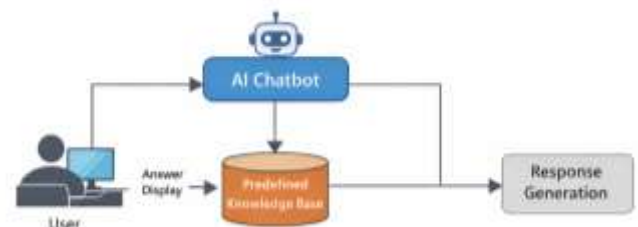
After processing the input, the system compares the extracted keywords with the predefined dataset stored in the database. If a match is found, the corresponding response is retrieved and displayed to the user. If no exact match is found, the system provides the closest possible answer or a default response.

The overall process can be summarized as:

Input → Text Processing → Keyword Matching → Response Retrieval → Output Display

This approach ensures quick response generation while maintaining simplicity in implementation.

Proposed System Architecture



V. RESULTS

The proposed chatbot system was tested with multiple sample queries related to diploma-level subjects. The system was able to provide accurate and relevant responses for most of the predefined questions. The response time was minimal, ensuring a smooth user experience.

Sample outputs demonstrate that the chatbot can effectively handle frequently asked academic questions. The bilingual feature also allowed users to interact in both English and Tamil, improving usability.

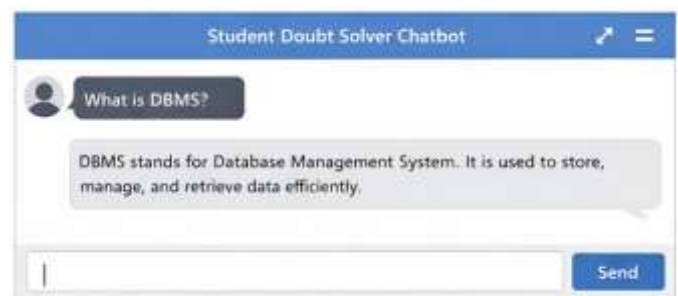


Fig-1: Chatbox Interface

VI. CONCLUSIONS

This paper presented a lightweight AI-powered chatbot designed to assist diploma students in resolving academic doubts efficiently. The proposed system uses a hybrid approach combining keyword matching and a localized dataset to deliver quick and relevant responses without requiring continuous internet access. The inclusion of bilingual support enhances usability for regional learners, making the system more accessible and practical.

The results demonstrate that the chatbot can effectively handle common academic queries and reduce dependency on faculty for repetitive questions. Overall, the system promotes self-learning and improves student support. Future work can focus on integrating voice interaction and advanced NLP techniques to further enhance accuracy and user experience.

VII. REFERENCES

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