

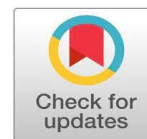
STUDENTIFY: A Database-Driven Student Information Chatbot System

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Abstract: The Student Information Chatbot is an intelligent system designed to provide instant and accurate responses to student queries by leveraging a structured database. Traditional student support systems often rely on manual handling, which leads to delays and inefficiencies. This proposed system automates the process using a chatbot interface integrated with a backend database that stores academic, administrative, and general student-related information. The chatbot is capable of handling queries related to student details, course information, attendance, results, and notifications. It uses Natural Language Processing (NLP) techniques to understand user queries and fetch relevant data from the database in real time. The system ensures fast response, improved accessibility, and reduced workload for administrative staff. Developed using modern technologies such as Python for backend processing and MySQL for database management, the chatbot provides a scalable and user-friendly solution. This paper discusses the system architecture, implementation, and benefits of deploying a database-driven student information chatbot in educational institutions.

Keywords: Student Chatbot, Database Management, NLP, Student Information System, Automation, Query Processing, Artificial Intelligence

1. INTRODUCTION

Efficient management of student information is essential in modern educational institutions. With the increasing number of students and academic data, traditional methods of handling student queries are becoming inefficient and time-consuming. Students often depend on administrative staff or websites to access information related to courses, attendance, results, and other academic details. This process leads to delays, limited accessibility, and increased workload for staff. To overcome these challenges, a Student Information Chatbot using Database is proposed. This system automates the process of handling student queries by integrating a chatbot interface with a structured database. The chatbot uses Natural Language Processing (NLP) to understand user queries and provide accurate responses instantly. The integration of database technology ensures that the information provided is reliable, updated, and retrieved in real time.

1.1 STUDENT INFORMATION MANAGEMENT

Student information management involves storing, organizing, and retrieving student-related data such as personal details, academic records, attendance, and examination results. Traditional systems rely on manual record-keeping or static web portals, which are not efficient for real-time access. The proposed chatbot system improves this process by connecting directly to a database, allowing instant retrieval of student information. This ensures better data management, reduces redundancy, and improves overall efficiency.

1.2 CHATBOT TECHNOLOGY

A chatbot is an AI-based software application that interacts with users through text or voice. In this system, the chatbot acts as a virtual assistant for students, answering their queries automatically. The chatbot uses Natural Language Processing (NLP) techniques to understand the intent of user queries and generate appropriate responses. This enables smooth and human-like interaction, making it easier for students to access information without technical knowledge.

1.3 DATABASE INTEGRATION

Database integration plays a crucial role in the proposed system. A structured database such as MySQL is used to store all student-related information securely.

When a user enters a query, the chatbot processes it and retrieves the relevant data from the database. This ensures that the responses are accurate, consistent, and up-to-date. Database integration also allows easy data management and scalability.

1.4 AUTOMATION AND EFFICIENCY

Automation is one of the key advantages of the student information chatbot. By eliminating manual processes, the system reduces the workload of administrative staff and minimizes human errors. Students can access information anytime and from anywhere, improving convenience and accessibility. The system also ensures faster response times compared to traditional methods.

1.5 OBJECTIVE OF THE SYSTEM

The main objectives of the proposed system are:

To automate student query handling

To provide real-time information access

To reduce administrative workload

To improve accuracy and efficiency

To ensure 24/7 availability of student services.

2. LITERATURE REVIEW

The development of student information systems and chatbot technologies has gained significant attention in recent years due to the need for automation and efficient data management in educational institutions. Various research works have focused on improving student support systems through digital platforms, artificial intelligence, and database integration. This section reviews the existing technologies and approaches relevant to the proposed system.

2.1 TRADITIONAL STUDENT INFORMATION SYSTEMS

Traditional student information systems are mainly based on manual processes or static web portals. These systems require students to search for information manually or approach administrative offices for assistance.

Such systems suffer from several drawbacks, including delays in response, lack of real-time interaction, and increased workload for staff. Although web-based portals improved accessibility to some extent, they still lack interactive communication and instant query resolution.

2.2 CHATBOT-BASED SYSTEMS IN EDUCATION

Chatbots have been widely adopted in the education sector to provide automated assistance to students. These systems simulate human conversation and help users by answering frequently asked questions. Most early chatbot systems were rule-based, meaning they responded only to predefined queries. While these systems reduced manual work, they lacked flexibility and were unable to handle complex or unexpected queries effectively.

2.3 NATURAL LANGUAGE PROCESSING IN CHATBOTS

Natural Language Processing (NLP) plays a vital role in enhancing chatbot performance. NLP enables the chatbot to understand user input in a natural, human-like manner and extract meaningful information. Recent research shows that NLP-based chatbots provide better accuracy and user experience compared to rule-based systems. However, the effectiveness of NLP depends on proper training and integration with backend systems.

2.4 DATABASE-DRIVEN INFORMATION SYSTEMS

Database-driven systems are essential for managing large volumes of structured data. Technologies such as MySQL, Firebase, and cloud databases are commonly used to store and retrieve student information. Integrating chatbots with databases allows dynamic data retrieval, ensuring that users receive accurate and up-to-date information. This approach significantly improves the efficiency and reliability of student information systems.

2.5 LIMITATIONS OF EXISTING SYSTEMS

Despite advancements, existing systems still have certain limitations:

Lack of proper integration between chatbot and database

Limited ability to handle complex queries

Dependency on manual updates

Security and data privacy concerns

Limited scalability in some systems

2.6 NEED FOR PROPOSED SYSTEM

From the literature review, it is evident that there is a need for an integrated system that combines chatbot technology with database management. The proposed Student Information Chatbot using Database aims to overcome the limitations of existing systems by providing real-time responses, accurate data retrieval, and improved user interaction. This system enhances automation, reduces manual effort, and ensures efficient management of student information..

3. EXISTING SYSTEM

Traditional student information systems mainly depend on manual processes and static portals. Students must visit administrative offices or browse multiple web pages to find required information.

Limitations:

Time-consuming process

No real-time interaction

High workload for staff

Limited accessibility (office hours only)

Prone to human errors

Some institutions use basic chatbots, but they are mostly rule-based and do not integrate effectively with databases, leading to limited functionality.

4. PROPOSED SYSTEM

The proposed system is a Student Information Chatbot using Database, designed to automate the process of handling student queries efficiently. The system integrates chatbot technology with a structured database to provide accurate and real-time responses. Unlike traditional systems, this chatbot can understand user queries using Natural Language Processing (NLP) and fetch relevant information directly from the database. The system ensures 24/7 availability, reduces manual workload, and enhances user experience.

4.1 SYSTEM OVERVIEW

The system consists of a chatbot interface, NLP processing unit, backend server, and a database. Students interact with the chatbot through a simple user interface by typing their queries.

The chatbot processes the input, identifies the intent, and retrieves the required data from the database. The response is then displayed to the user in a clear and understandable format.

4.2 USER INTERFACE MODULE

The user interface module allows students to interact with the chatbot easily. It can be implemented as a web application or mobile application. The interface is designed to be simple and user-friendly, enabling students to ask questions related to attendance, results, courses, and other academic details without any technical complexity.

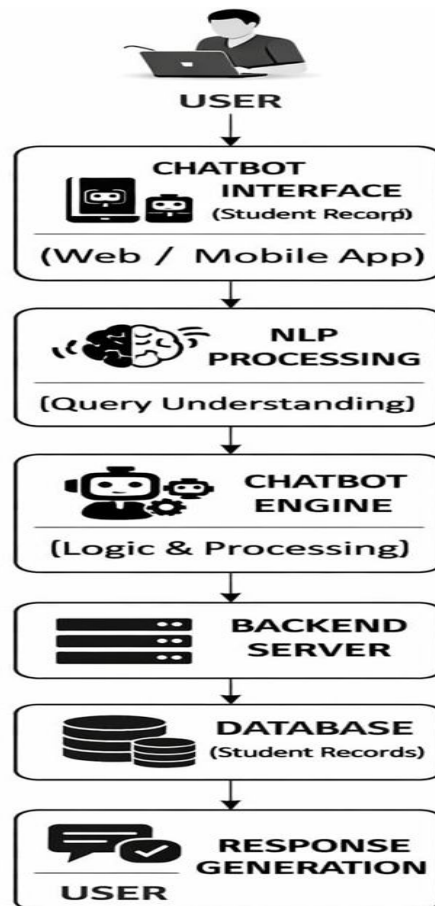


Figure.1 Block Diagram

4.3 CHATBOT ENGINE

The chatbot engine is the core component of the system. It receives user queries and processes them to generate appropriate responses. It works by identifying keywords and mapping them to specific queries stored in the system. The chatbot engine ensures smooth communication between the user and the backend system.

4.4 NLP PROCESSING MODULE

The Natural Language Processing (NLP) module helps the chatbot understand the meaning of user queries. It analyzes the input text, identifies intent, and extracts relevant keywords. This allows the system to handle different variations of questions and provide accurate responses, improving user interaction and satisfaction.

4.5 DATABASE MODULE

The database module stores all student-related information such as:

- Student details
- Attendance records
- Marks and results

Course information

A structured database like MySQL is used to ensure efficient data storage and retrieval. The chatbot fetches data from this database based on user queries.

4.6 RESPONSE GENERATION

Once the required data is retrieved from the database, the response generation module formats the output and sends it back to the user.

The response is presented in a clear and concise manner, ensuring that students can easily understand the information provided.

4.7 ADVANTAGES OF PROPOSED SYSTEM

Provides instant responses

Reduces manual workload

Ensures accurate data retrieval

Available 24/7

Improves user experience Easy to maintain and scalable

5. CONCLUSION

The Student Information Chatbot using database provides an efficient and automated solution for handling student queries. By integrating chatbot technology with a structured database, the system ensures quick and accurate responses. It reduces the workload of administrative staff and improves accessibility for students. The system is scalable, user-friendly, and suitable for modern educational institutions aiming to digitize their services. Overall, the chatbot enhances efficiency, accuracy, and user satisfaction.

6. FUTURE WORK

The proposed system can be further enhanced by integrating advanced technologies such as voice-based interaction and machine learning for improved query understanding. Future improvements may include mobile application development, multi-language support, and cloud-based database integration for better scalability. Additionally, incorporating AI-based analytics and personalization can enhance user experience and make the system more intelligent and efficient.

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