"College Administration ChatBot Using Python"

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Abstract

Effective communication between college administration and students plays a crucial role in the smooth functioning of academic management. In many institutions, traditional communication methods such as physical notice boards, emails, and manual announcements are still widely used. However, these methods are often time-consuming, inefficient, and unreliable, as students may overlook or miss important updates due to delays or lack of regular access. To address these challenges, this project proposes NCM BOT, a chatbot- based communication system designed to enhance and streamline information sharing within a college environment.

The chatbot enables students to easily access essential academic information, including circulars, holidays, examination timetables, and academic results, through a simple and interactive messaging interface. By providing instant responses to student queries, the system ensures that information is delivered in a timely and convenient manner. The system is developed using Python and is integrated with a messaging platform to support real-time interaction between students and the chatbot.

College administrators can efficiently manage and update academic data such as announcements, exam schedules, and student marks using simple commands or by uploading Excel files. This data is stored in a database, from which the chatbot retrieves relevant information and presents it to students immediately upon request. As a result, the system significantly reduces manual effort, minimizes communication delays, and improves the accuracy of information dissemination.

Overall, the proposed system is efficient, user-friendly, and accessible from any location, making it a practical solution for modern educational institutions. It improves communication efficiency, reduces administrative workload, and enhances the overall student experience. Furthermore, the system offers flexibility for future enhancements, such as integration with web-based dashboards and cloud-supported databases, to further improve scalability and performance.

1. Introduction

In modern educational institutions, effective communication plays a vital role in ensuring that students receive accurate, timely, and relevant academic information. Colleges and universities regularly share important updates such as examination schedules, official circulars, assignment details, academic notifications, and holiday announcements through traditional communication channels like notice boards and email messages. While these methods have been widely used for many years, they present several limitations in terms of efficiency and reliability. Students may fail to notice important updates, emails may not reach all recipients on time, and manually

maintaining and updating information often requires significant effort from administrative staff.

With the rapid advancement of technology, automated communication systems such as chatbots have emerged as an effective solution to overcome these challenges. Chatbots are capable of responding instantly to user queries and delivering information in a quick and efficient manner without requiring continuous human intervention. By automating routine information sharing, chatbots help reduce delays and improveaccessibility to essential data. This project focuses on the development of a chatbot system that functions as a digital assistant for college administration, supporting both students and staff in their daily information needs. The proposed chatbot, named NCM BOT, enables students to interact with the system using simple text-based commands or user- friendly menu options.

Through this interaction, students can conveniently check their academic marks, view official circulars, access examination timetables, and download important forms whenever required. At the same time, college administrators are provided with an easy and efficient way to update and manage information through the chatbot interface, ensuring that data remains current and accurate.

Overall, the system helps reduce communication gaps between the administration and students while significantly improving the efficiency of academic information sharing. It provides a centralized platform where students can access all necessary academic details in one place, thereby enhancing convenience, reducing confusion, and supporting a smoother academic experience.

2. Technology Stack

The development of the chatbot system involves the use of several technologies that work together to ensure smooth operation, efficient data handling, and reliable performance. Each technology plays an important role in building a system that is easy to use, scalable, and capable of handling academic information accurately. Python is used as the primary programming language for developing thechatbot system. It is widely preferred for automation and chatbot development due to its simple syntax, readability, and strong support for various libraries. Python allows faster development and easier maintenance of the chatbot logic, making it suitable for handling user requests, processing data, and interacting with the database.

SQLite is used as the database management system to store essential information such as student marks, academic announcements, circulars, and examination timetables. Being a lightweight and serverless database, SQLite is easy to configure and integrates seamlessly with Python applications. It provides efficient data storage and retrieval while requiring minimal system resources.

The Telegram Bot API is utilized to create, deploy, and manage the chatbot. This API enables communication between users and the chatbot by allowing the system to send and receive messages in real time. Telegram provides a secure and widely accessible messaging platform, making it convenient for students to interact with the chatbot from anywhere using their mobile devices or computers.

Pandas and Excel integration are used for handling structured data uploads and management. Administrators can upload Excel files containing student marks, exam schedules, or other academic details. These files are processed using Pandas, which helps in reading, cleaning, and organizing the data before storing it in the SQLite database. This approach simplifies bulk data updates and reduces manual data entry errors.

Together, these technologies form a reliable, efficient, and user-friendly system for managing and distributing college- related information. Their combined use

ensures smooth communication, accurate data handling, and effective automation of routine academic processes.

3. Literature Review

The use of chatbot technology in education has gained significant attention in recent years. Many researchers have explored how automated messaging systems can improve communication between institutions and students. Chatbots are increasingly used to provide instant responses, reduce administrative workload, and deliver information efficiently.

According to several studies, chatbots integrated with messaging platforms such as Telegram, WhatsApp, and Facebook Messenger can simplify the process of information sharing in educational institutions. These systems allow students to access important details like schedules, academic results, announcements, and institutional updates without visiting the college office physically.

Research on educational chatbots has shown that automation can significantly improve response time and reduce delays in communication. Traditional methods such as notice boards and manual announcements are often inefficient and may not reach all students on time. Chatbots provide a real-time communication channel that ensures information is delivered instantly.

Previous systems developed for academic management mainly focused on web-based portals. Although these systems are useful, they often require students to log in to websites, which may not always be convenient. Messaging-based chatbot systems overcome this limitation by allowing students to access services directly through widely used messaging applications.

Another important aspect highlighted in earlier research is the role of lightweight databases such as SQLite in small-scale educational applications. These databases provide efficient data storage and retrieval mechanisms without requiring complex server configurations. When combined with programming languages like Python, they create a powerful and flexible system for managing student data.

Several studies have also emphasized the importance of user-friendly interfaces in educational technology systems. Chatbots that use simple commands and interactive menus improve user experience and encourage more students to use the system regularly.

Based on the analysis of existing research and systems, it is clear that chatbot-based solutions can effectively improve the accessibility of academic information. However, many institutions still lack a simple and centralized system that integrates marks, circulars, exam timetables, and official forms in one platform.

Therefore, the proposed system, NCM BOT, aims to address these limitations by developing a Telegram-based chatbot that provides students with easy access to academic information while allowing administrators to update data efficiently. This system combines automation, simplicity, and accessibility to enhance communication within educational institutions.

4. Proposed System

The proposed system introduces a chatbot- based solution to improve communication in colleges. The chatbot allows students to interact with the system using a messaging platform. Students can select options from a menu to access information such as marks, circulars, holidays, exam timetables, and downloadable forms.

The administrator has the ability to update information through commands or by uploading files such as Excel documents. The system stores this information in a database and retrieves it whenever students request it.

The proposed system provides several advantages over the existing system.

It automates communication processes, reduces manual effort, and ensures that students receive information instantly. The chatbot is available at any time, allowing students to access information whenever needed.

This system is designed to be simple, efficient, and scalable. It can be expanded in the future to include additional features such as attendance tracking, assignment submissions, and notifications 3. Objectives of the Project

The main objective of this project is to develop a chatbot that simplifies communication between college administration and students. The system aims to provide quick access to important academic information and reduce manual processes.

The key objectives include:

To develop a chatbot for sharing college- related information.

To provide students with instant access to academic details.

To allow administrators to update information easily.

To reduce communication delays between students and administration.

To create a centralized system for academic announcements.

To improve efficiency in managing student information.

By achieving these objectives, the system will help improve the overall communication process in educational institutions.

5. Existing System

The existing system used in many colleges relies on traditional communication methods. These include notice boards, emails, and manual announcements. While these methods have been used for many years, they are not always effective in delivering information quickly.

In the current system, administrators manually update information on notice boards or send messages through different communication channels. Students need to check these sources regularly to stay updated. If a student misses a notice, they may not receive important information on time.

Another limitation of the existing system is the lack of automation. Most processes require manual effort from staff members. Managing student data, updating schedules, and sharing announcements can be time- consuming.

Therefore, there is a need for an automated system that can provide quick and reliable communication between students and college administration.

6. Methodology

The proposed system, NCM BOT, is developed to improve communication between college administration and students through an automated chatbot platform. The system is designed using Python programming language and integrated with a messaging platform to provide real-time access to academic information such as marks, circulars, holidays, exam timetables, and downloadable forms.

The development of the system follows a structured approach consisting of several stages including system design, database creation, chatbot integration, and testing. Initially, the requirements of the system were analyzed to understand the needs of both students and administrators. Based on this analysis, the system architecture was designed to ensure efficient data flow between the user, chatbot, and database.

In the next stage, a database was created using SQLite to store important academic data such as student marks, announcements, exam schedules, and form details. SQLite was selected because it is lightweight, easy to implement, and suitable for small to medium-scale applications.

After the database design, the chatbot was developed using Python and integrated with the messaging platform using the bot API. The chatbot acts as the interface between users and the system. Students interact with

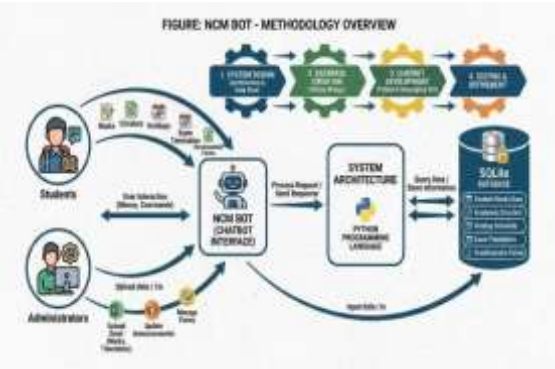
the chatbot through menu options and commands to access the required information.

The administrator plays an important role in managing the system. Admin users can upload Excel files containing student marks and exam timetables directly through the chatbot. These files are processed automatically, and the data is stored in the database. Similarly, administrators can update circulars, holidays, and upload official forms that students can download when needed.

When a student requests information, the chatbot processes the request, retrieves the relevant data from the database, and sends the response back to the user instantly. This automated process reduces manual effort and ensures that students receive accurate and timely information.

Finally, the system was tested to ensure that all features such as marks retrieval, timetable viewing, circular updates, and form downloads function correctly. The testing process helped identify and fix errors, improving the reliability and performance of the chatbot system.

The methodology used in this project ensures that the system is simple, efficient, and user-friendly while meeting the requirements of both students and college administration.



7. Data Flow Diagram (DFD) Explanation

The Data Flow Diagram (DFD) represents how data moves within the NCM BOT system and how different components interact with each other. It shows the flow of information between the user, the chatbot system, the administrator, and the database. At the first level, the main entities involved in the system are the Student, Administrator, Chatbot System, and the Database. The student interacts with the chatbot to request information such as marks, circulars, holidays, exam timetables, and official forms. The chatbot receives the request and processes it accordingly.

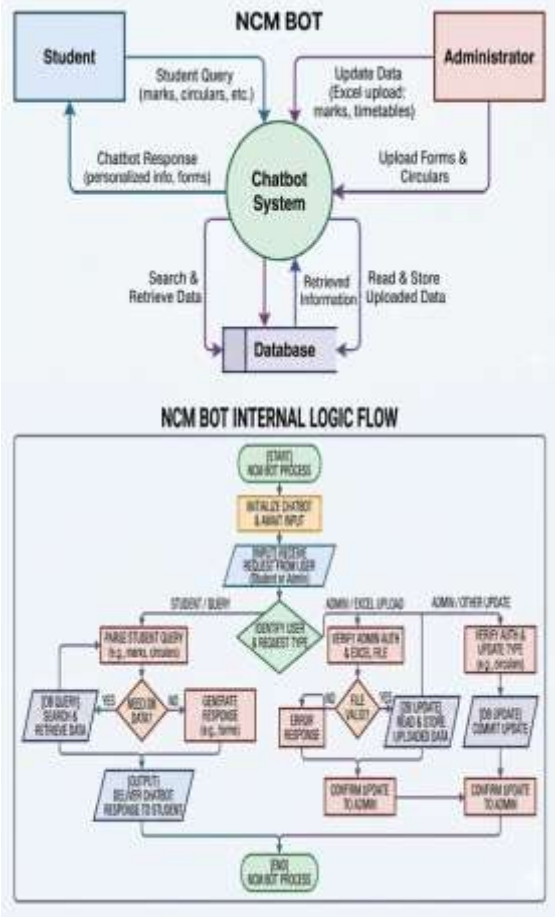
When a student sends a request, the chatbot checks the database to retrieve the required information. For example, if a student enters a register number to view marks, the chatbot searches the database for the corresponding record and sends the result back to the student. This process ensures that students receive accurate and personalized information quickly.

The administrator is responsible for updating the system with new data. The admin uploads Excel files containing marks and exam timetables through the chatbot interface. The system reads the uploaded files and stores the data in the database. Similarly, the administrator can update circulars, holidays, and upload important forms such as gate pass forms, leave forms, and bonafide certificates.

The database plays a crucial role in storing and managing all the information used in the system. It maintains records of student marks, announcements, exam schedules, and uploaded documents. Whenever a user requests information, the chatbot retrieves the data from the database and sends it back to the user.

The DFD helps in understanding how the system processes user requests and how data flows between different components. It also illustrates the interaction between the administrator and the chatbot system for updating and maintaining the data.

Overall, the Data Flow Diagram provides a clear view of the system structure and helps in understanding the working process of the NCM BOT application.



8. Implementation

The implementation of the proposed College Information Telegram Bot (NCM BOT) is carried out using Python and the Telegram Bot API. The system is designed to provide an efficient platform where students can access academic information such as marks, circulars, holidays, exam timetables, and official forms directly through Telegram.

The backend of the system is developed using Python, which acts as the core programming language responsible for handling user requests, processing data, and interacting with the database. The python- telegram-bot library is used to establish communication between the Telegram server and the application. SQLite is used as the database management system to store student marks, timetable details, circular notifications, holiday information, and form file identifiers.

The implementation process begins with the creation of a Telegram bot using BotFather, where a unique bot token is generated. This token is integrated into the Python application to enable secure communication with the Telegram API. After setting up the bot, various commands and message handlers are implemented to manage different functionalities such as marks retrieval, timetable viewing, and form downloads.

The system allows the administrator to upload data through commands such as marks and timetable uploads using Excel files. These Excel files are processed using the Pandas library, which reads the data and stores it in the database in a structured format. Students can then retrieve their academic information by simply interacting with the bot.

The user interface is implemented through Telegram reply keyboards, which provide easy navigation between different options such as marks, circulars, holidays, exam timetables, and forms. This approach ensures that students can access information quickly without requiring technical knowledge.

The bot is designed to run continuously on a hosting platform to ensure 24/7 availability. Error handling mechanisms are included to prevent system crashes and ensure smooth operation. Overall, the implementation of the system demonstrates how messaging platforms can be effectively used to provide academic services in a simple and efficient manner.

9. Results and Discussion

The NCM BOT system was developed and tested to evaluate its performance in delivering academic information to students efficiently. After implementation, the chatbot was able to successfully perform all the intended functions such as providing student marks, displaying circulars, showing holiday announcements, presenting exam timetables, and allowing students to download important forms.

During testing, the administrator was able to upload Excel files containing student marks and examination schedules without difficulty. The system processed the uploaded files correctly and stored the data in the database. Students were then able to retrieve their marks by entering their register number, and the chatbot responded instantly with the correct information.

The circular and holiday update features also worked effectively. When the administrator updated new announcements, the information was immediately available to students through the chatbot interface. This demonstrates that the system can provide real-time communication between the administration and students.

Another important result observed during testing was the ease of use of the system. The chatbot interface is simple and interactive, allowing students to navigate through options such as marks, timetable, and forms using buttons. This reduces confusion and makes the system user-friendly even for users with limited technical knowledge.

The form download feature was also successfully implemented. Students were able to select options such as gate pass, leave form, TC form, bonafide certificate, and OD form, and the chatbot provided the corresponding files uploaded by the administrator.

Compared to the traditional method of sharing information through notice boards or manual communication, the proposed system provides faster access to information and reduces administrative workload. Students do not need to visit the college office to obtain basic academic information, which saves time and improves efficiency.

However, during the testing phase, some challenges were observed, such as handling incorrect register numbers entered by students and ensuring that the uploaded Excel files follow the correct format. These issues were addressed by improving error handling and providing clear instructions for data upload.

Overall, the results show that the NCM BOT system effectively improves communication between students and the college administration. The chatbot provides quick access to academic information and ensures that updates are delivered efficiently and reliably.

10. Conclusion

The NCM BOT chatbot system provides an efficient solution for improving communication between college administration and students. By automating the process of sharing academic information, the system reduces manual effort and ensures that students receive updates quickly.

The chatbot allows students to access important information such as marks, circulars, holidays, and exam timetables through a simple interface. Administrators can update data easily using commands or file uploads. This makes the system practical and user-friendly.

Overall, the project demonstrates how chatbot technology can be used to enhance communication in educational institutions. The system can be further improved by adding additional features and integrating advanced technologies in the future.

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