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Gen AI Based Chatbot for College Enquiries

Kalaivani K [1], Livingston V [2], Mohan Raj P [3], Aravind Kumar G [4], Manoj R [5]
Assistant Professor, CST, SNS College of, Coimbatore – 641107. Email: kalaivani.k.csd@snsce.ac.in
Final Year, CST, SNS College of Engineering, Coimbatore – 641107. Email: livingston.v.personal@gmail.com
Final Year, CST, SNS College of Engineering, Coimbatore – 641107. Email: themohanoffl@gmail.com
Final Year, CST, SNS College of Engineering, Coimbatore – 641107. Email: aravindkumarcs216@gmail.com
Final Year, CST, SNS College of Engineering, Coimbatore – 641107. Email: rmanoj0126@gmail.com

Abstract – In the modern educational ecosystem, colleges and universities face a growing challenge in managing high volumes of student and visitor inquiries efficiently. Prospective students, current students, parents, and staff often seek information about admissions, courses, campus facilities, events, and administrative procedures. Traditional communication channels such as email, phone, or in-person support are often slow, inconsistent, and limited to office hours, leading to delays, reduced satisfaction, and increased workload for administrative staff.

This project presents a Gen AI-Based Chatbot for College Enquiries, leveraging Generative AI and Natural Language Processing (NLP) to deliver intelligent, real-time, and context-aware responses. The platform is designed to automate routine queries, enhance student engagement, and provide continuous support while maintaining a personalized conversational experience. Key modules include:

- **Admissions Assistant – Provides detailed guidance on eligibility, application procedures, deadlines, fees, and document requirements.**
- **Course Advisor – Offers personalized recommendations on courses, programs, specializations, and electives based on user interests.**
- **Campus Navigator – Supplies information about facilities, campus events, faculty contacts, schedules, and extracurricular activities.**
- **Digital Knowledge Repository – Maintains a continuously updated database of FAQs, policies, notifications, and historical responses to improve accuracy over time.**

The system is built using Flask for backend operations, React for a responsive frontend, MySQL for structured data storage, and OpenAI GPT models for conversational AI. The platform supports multi-language interactions, secure data management, and is optimized for scalability to handle large volumes of simultaneous queries. By offering instant, precise, and interactive assistance, this project demonstrates how AI can significantly improve operational efficiency, student satisfaction, and institutional productivity. The system reduces administrative burden, accelerates information dissemination, and provides a modern, user-friendly digital interface that bridges communication gaps between students and college administration.

Keywords: College Chatbot, AI-Powered Enquiries, Generative AI, Natural Language Processing, Student Support System, Admission Guidance, Course Recommendation, Campus Information, Digital Knowledge Base, Multi-Language Support, Educational Technology.

1. INTRODUCTION

In today's world, healthcare systems face increasing challenges in providing timely, affordable, and reliable medical services, particularly for people in rural and underdeveloped regions. Millions of patients struggle with delayed disease detection, lack of access to specialized doctors, language barriers that limit proper communication, and the repeated effort of re-entering medical history during every consultation. These issues not only affect patient satisfaction but also increase the burden on healthcare providers, who often operate with incomplete patient information, leading to inefficiency, misdiagnosis, and poor continuity of care.

Traditional healthcare models rely heavily on manual processes and fragmented applications, which are unable to integrate early disease prediction, report analysis, and real- time patient support into a single system. With the advancement of Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP), it is now possible to build intelligent digital platforms that can bridge these gaps by offering predictive healthcare services, automated consultations, and personalized recommendation.

The AI-Based Multi-Service Healthcare Platform is designed to address these challenges by introducing multiple integrated modules such as a Disease Doctor for early symptom-based predictions, a Medical Chatbot for instant consultations, an AI Dietitian for personalized nutrition guidance, and a Digital Clone the securely stores and reuses patient medical data for faster and more accurate follow-ups. By combining AI models, cloud technologies, and a user-friendly multi-language interface, the platform ensures that patients can access affordable, real-time healthcare services anytime and anywhere, while also assisting doctors with accurate data-driven insights.

The growing demand for intelligent healthcare solutions highlights the urgent need for a single, integrated platform that can provide multiple medical services without requiring patients to switch between different applications or repeatedly share their information. Existing telemedicine systems mainly focus on video consultations, while most AI- based health apps provide only symptom checking or diet recommendations in isolation, failing to deliver a comprehensive healthcare experience. Furthermore, many platforms lack multi-language support, making them inaccessible to a large section of the population in regions like India, where linguistic diversity is vast. The proposed AI-Based Multi-Service Healthcare Platform is unique because it not only combines disease prediction, report analysis, chatbot-based consultation, and diet planning into one ecosystem but also introduces a Digital Health Clone that stores, updates, and reuses patient data to reduce redundancy and enhance continuity of care. By incorporating machine learning algorithms, natural language processing techniques, and scalable cloud integration, the platform ensures faster diagnosis, personalized treatment suggestions, and reliable support in local languages, even in low-resource environments with limited internet connectivity. This holistic approach has the potential to significantly reduce healthcare inequality, empower patients with proactive medical insights, and assist doctors in delivering accurate and efficient care, thereby transforming the overall healthcare landscape

2. EXISTING SYSTEM

Traditional college information systems rely heavily on manual processes and fragmented communication channels for handling student and visitor inquiries. These methods are often time-consuming, inefficient, and prone to errors, making it difficult for colleges to provide timely and accurate information. Students and parents face challenges such as long response times, repeated queries, and limited access to real-time guidance.

1. **Manual Query Handling and Record Management**
   Student inquiries are often handled manually via email, phone calls, or in-person visits, making it difficult to track and retrieve historical query data. Maintaining records manually increases the risk of lost information, repeated responses, and inefficiency in updating institutional knowledge.
2. **Limited Digital Appointment and Support Scheduling**
   Support for campus guidance, counselling sessions, or administrative appointments is mostly offline or managed through phone calls. Students often need to wait for office hours or visit the campus physically, causing delays and inconvenience.
3. **Lack of AI-Powered Assistance and Real-Time Responses**
   Traditional systems provide limited or no options for automated, real-time query resolution. Students and parents must rely on staff availability for information, which can result in delays, misinformation, or inconsistent responses.
4. **Inefficient Communication and Lack of Centralized Knowledge**
   Information is scattered across multiple sources, including notice boards, PDFs, emails, and websites. The absence of a centralized digital knowledge base creates confusion, reduces transparency, and decreases satisfaction for both students and administrative staff.

Limitations of the Existing System

- **Time-Consuming:** Manual handling of student inquiries through emails, phone calls, or in-person visits slows down information delivery and increases administrative workload.
- **Error-Prone:** Human-based data entry and repeated responses often lead to inaccuracies, inconsistencies, and miscommunication.
- **Lack of Integration:** Existing systems do not provide a centralized platform for managing student queries, admissions information, course guidance, and campus details.
- **Poor User Experience:** Delayed responses, limited access to real-time support, and lack of automated digital services reduce satisfaction for students, parents, and staff.

3. PROPOSED SYSTEM

The **Gen AI-Based Chatbot for College Enquiries** provides an intelligent, automated, and modern approach to managing student and visitor queries in educational institutions. By integrating **Generative AI**, **Natural Language Processing (NLP)**, and a centralized digital knowledge base, the system enhances efficiency, reduces manual workload, and improves the overall experience for students, parents, and administrative staff. Unlike traditional enquiry systems that rely heavily on email, phone calls, and in-person visits, this platform automates critical tasks such as query handling, admission guidance. Course recommendations, campus information retrieval, and appointment scheduling, thereby minimizing delays and inefficiencies in communication.

A key innovation of this system is its **AI-powered conversational module**, which can understand and respond to diverse queries in real-time. Users can receive instant guidance on admission procedures, eligibility criteria, course selection, faculty contacts, campus events, and institutional policies. This not only helps students gain timely and accurate information but also enables administrative staff to focus on more complex tasks, improving overall operational efficiency. To further streamline academic workflows, the system automates scheduling of counselling sessions, campus visits, or administrative appointments. Instead of relying on manual coordination, the chatbot intelligently synchronizes available slots with staff schedules and sends automated reminders and notifications to both students and staff, ensuring timely and organized interactions.

Another limitation of traditional systems is the lack of a centralized knowledge repository, which often leads to inconsistent responses and confusion. The proposed chatbot addresses this with a **Digital Knowledge Base**, which stores frequently asked questions, historical queries, institutional updates, and policy documents. This ensures consistent, accurate, and context-aware responses while continuously learning and improving over time. For administrative staff, the system provides a **centralized dashboard** with an intuitive interface to manage student queries, monitor engagement, track frequently asked questions, and analyse trends. AI-driven insights allow staff to identify common issues, optimize resource allocation, and enhance student support services.

Built on **Python (Flask backend), React (frontend), MySQL (database), and OpenAI GPT models**, the system is scalable and adaptable to institutions of all sizes. Its API integration capabilities allow seamless expansion, including the addition of multi-language support, advanced analytics, and integration with existing student management systems. By addressing the key challenges of manual query handling, fragmented communication, delayed responses, and lack of centralized information, the **Gen AI-Based Chatbot for College Enquiries** sets a new benchmark in educational support systems. It empowers students with real-time guidance, reduces administrative workload, and ensures a seamless, transparent, and user-friendly experience for all stakeholders.

Advantages of the Proposed System

- **Reduces Manual Work**: Automates patient registration, **Advantages of the Proposed System**
- **Reduces Manual Work:** Automates handling of student and visitor queries, appointment scheduling, and information retrieval.
- **Enhances Administrative Efficiency:** Speeds up response times using AI-driven insights and automated workflows.
- **Improves User Experience:** Provides instant, accurate, and context-aware responses to admissions, course, campus, and policy-related queries.
- **Increases Transparency:** Keeps students and parents informed about application status, appointment confirmations, and campus events.
- **Supports Data-Driven Decision Making:** Uses analytics from query trends and engagement patterns to help administrators optimize support services and resource allocation.

4. SYSTEM ARCHITECTURE

The **Gen AI-Based Chatbot for College Enquiries** is built on a modular and scalable architecture that integrates student query handling, admissions guidance, course recommendations, campus information, and appointment scheduling into a unified platform. It consists of multiple layers that work together to provide a seamless experience for students, parents, and administrative staff. The system comprises a **User Interface Layer**, **Application Layer**, **AI & NLP Module**, **Database Layer**, and **API & Integration Layer** to manage queries, appointments, knowledge base, and communication efficiently.

The **User Interface Layer** provides an interactive and responsive web-based platform designed for three primary users:

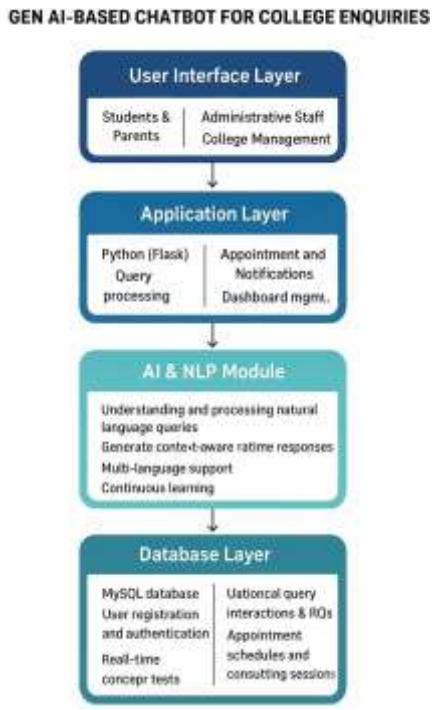
- **Students and Parents:** Can ask questions about admissions, courses, campus facilities, events, and policies, and receive instant AI-generated responses.
- **Administrative Staff:** Can monitor queries, track frequently asked questions, manage appointments, and ensure accurate information dissemination.
- **College Management:** Can access analytics, trends, and reports to optimize student support services and improve decision-making.

Workflow of the Healthcare Website

- **User Registration & Authentication → Students, parents, and staff register with secure login credentials and role-based access to the system.**
- **Query Submission & Interaction → Users submit questions regarding admissions, courses, campus facilities, events, or policies. The AI-powered chatbot processes the query and provides real-time, context-aware responses.**
- **Appointment Scheduling → Students can book appointments or counselling sessions with administrative staff or faculty members based on availability. Automated notifications and reminders are sent to both parties.**
- **Knowledge Base Access → The system retrieves information from a centralized digital knowledge base containing FAQs, historical queries, course details, and institutional policies to provide accurate responses.**
- **Analytics & Feedback → All interactions and query trends are recorded in the database. Administrators can analyse this data to identify common issues, optimize processes, and improve student support services.**

Technologies Used

- **Frontend:** HTML, CSS, JavaScript, React.js, Tailwind – for building a responsive, interactive, and user-friendly interface.
- **Backend:** Python (Flask) – to handle server-side logic, routing, and integration with AI models.
- **Database:** MySQL – for storing user data, query history, appointments, course information, and knowledge base entries.
- **AI & Analytics:** Generative AI and NLP models – to process queries, provide real-time responses, multi-language support, and personalized guidance.
- **APIs & Integrations:** Email/SMS notification APIs for appointment and query updates, integration with college management systems for scheduling, and analytics dashboards for administrators.



1. **Fig 1. System Architecture**

5. MODULES

The AI-Driven College Enquiry Chatbot is structured into multiple functional modules; each designed to simplify and optimize different stages of college information management and query resolution. These modules work together to improve efficiency, reduce manual workload, and provide a seamless experience for students, parents, faculty, and administrators.

Sign Up Module
Allows new users (students, parents, faculty, admins) to register with details like name, email, phone number, and role. Form validation prevents duplicate accounts and ensures accurate data entry. Regularly check validations, update password encryption methods, and verify secure role-based redirection.

Sign In Module
Users log in using credentials, supported by JWT-based authentication. Students and parents see their personalized dashboard, while faculty and admins access their respective management panels. Test login flows after updates, rotate JWT secrets, and monitor for suspicious login attempts.

Home Page Module
Displays quick access sections such as Chatbot Interface, Course Details, Admission Guidelines, Events, FAQ, and multilingual support. Ensure dynamic content loads correctly, optimize responsiveness, and fix broken links after updates.

Chatbot Interaction Module
The AI-powered chatbot interacts with users in real-time to answer queries regarding admissions, courses, fees, events, hostel facilities, and general college information. It uses natural language processing to understand questions and provide accurate responses. Regularly update the knowledge base and refine AI response accuracy.

Admission & Course Management Module
Provides information about eligibility criteria, application procedures, course details, and deadlines. Students can track their application status, while administrators and faculty can update admission notices, course information, and application-related data.

Faculty & Department Management Module
Facilitates management of faculty profiles, department information, office hours, and contact details. Ensures accurate and up-to-date information is available to users for smooth communication and guidance.

Notification & Alerts Module
Sends real-time updates to students, parents, and staff regarding application deadlines, events, exams, announcements, and urgent notices. Critical alerts ensure timely communication and reduce information delays.

Analytics & Dashboard Module
Administrators can monitor chatbot usage, query trends, frequently asked questions, and response performance. AI-powered analytics provide insights into student interests, common queries, and operational efficiency, enabling better decision-making and system improvements.

User Management & Role-Based Access Module
Ensures secure access by assigning specific roles (students, parents, faculty, admins). Students and parents can ask queries and view relevant information, faculty can update course and department details, and administrators oversee the overall system operations.

Data Storage & Security Module
All user interactions, queries, and profiles are securely stored in encrypted databases. The system ensures compliance with privacy standards, protecting sensitive student and institutional information from unauthorized access.

Fig 2. Overview

6. RESULT

The **GEN AI-Based Chatbot for College Enquiries** provides an intelligent and accessible solution to streamline information access for students, staff, and prospective applicants by integrating natural language understanding, personalized query responses, multi-language support, and real-time information retrieval into a single user-friendly platform. By leveraging advanced generative AI and natural language processing techniques, the chatbot delivers accurate and context-aware answers to a wide range of college-related queries, from admissions and courses to campus facilities and events, empowering users to make informed decisions quickly. The system supports conversational interaction in multiple languages, breaking communication barriers for diverse users and enhancing inclusivity. With AI-driven personalization, the chatbot tailors responses based on user profiles and previous interactions, improving relevance and engagement.

Its cloud-based architecture ensures remote accessibility, scalability, and cost-efficiency, while analytics from user interactions provide valuable insights to continuously improve response accuracy and coverage. Faculty, administrative staff, and prospective students benefit from reduced query handling time, enhanced user satisfaction, and streamlined communication across departments.

7. CONCLUSION & FUTURE WORKS

In conclusion, the **GEN AI-Based Chatbot for College Enquiries** provides a comprehensive and intelligent solution to the challenges faced by educational institutions in managing and disseminating information efficiently. By leveraging advanced generative AI, natural language processing, and cloud computing technologies, the chatbot delivers fast, accurate, and context-aware responses to a wide variety of college-related queries. This system not only assists prospective students with admission procedures, course information, scholarship details, and campus life but also supports current students and staff with administrative processes, event notifications, and academic guidance. Its multi-language support ensures accessibility for users from diverse linguistic and cultural backgrounds, enhancing inclusivity and bridging communication gaps.
The chatbot reduces the workload on administrative staff, shortens response times, and provides a consistent user experience across platforms. Its ability to personalize interactions based on user profiles and previous queries empowers students to make informed decisions regarding their academic journey. Moreover, analytics generated from user interactions enable institutions to identify frequently asked questions, monitor engagement trends, and optimize information dissemination strategies.

This project represents a step toward the future of smart educational ecosystems, where AI-driven platforms play a pivotal role in improving accessibility, personalization, and decision-making for students and staff alike.

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