
EDUBOT: ENHANCING STUDENT EXPERIENCE THROUGH AN AI-POWERED CONVERSATIONAL ASSISTANT**Chinmay Girish Deshmukh*¹, Sejal Ramakant Ovhal*², Swarupa Shivanand Patil*³,
Kiran Pandurang Solanke*⁴, Prof. M. M. Gund*⁵**

*^{1,2,3,4,5}Department of Artificial Intelligence and Machine Learning Engineering, Rajarambapu Institute of Technology (Polytechnic), Pune, Maharashtra, India.

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ABSTRACT

In today's digital age, having an intelligent and responsive AI assistant can greatly enhance the user experience on a college website. Educational users can receive intelligent AI help through their established digital platform according to their institutional needs. Users can obtain timely correct college information through this AI College Chatbot system. Gemini API within Next.js retrieves data from structured lab.ts and faculty.ts files to remove the requirement for standard database systems.

The bot system promptly answers user inquiries to provide immediate support for both faculty profiles and laboratory schedules and admission details and infrastructure descriptions. Fast user experience and server-side rendering along with API optimizations in Next.js guarantee optimal response times. A system architecture designed for flexibility enables the setup to manage lightweight components. Users gain permission to modify structured files by employing this different database method which provides both reliability features and flexibility advantages. The simple user interface enables the chatbot to deliver prompt access to benefit-related student information which also extends to workers and visitors at the college grounds. The project team builds an advanced information service system and enhanced accessibility options that will serve college needs through autonomous functionality and student engagement capabilities. New students together with faculty members receive immediate access to essential information through the AI chatbot which maintains an efficient system operation.

Keywords: AI Chatbot, Next.js, Gemini API, Natural Language Processing (NLP), Server-side Rendering (SSR), File-based Data Retrieval, Scalable Architecture, Real-time Responses, Conversational AI.

I. INTRODUCTION

In today's digital era, students, faculty, and visitors often seek quick and accurate information about college facilities, faculty, courses, and other campus-related queries. People from all groups who use digital resources can access precise information about facilities and faculty members and courses at the college by traversing the campus. AI-based chatbots in educational institutions help speed up their information delivery procedures. The current AI Chatbot system delivers reliable quick solutions to all college users through advanced web frameworks. Next.js together with Gemini API enables database-independent data retrieval through the bot by accessing the lab.ts and faculty.ts files. The modern design principles keep the system lightweight with update-friendly features and maintenance mechanisms that ensure accurate high-performance operations. The bot processing engine immediately serves requests after which it translates user demands into data retrieval operations from static files using NLP processing. The system provides speedily delivered essential information about educational staff members together with laboratory facilities and enrollment practices and comprehensive campus details. Server-side rendering (SSR) supports performance optimization through its deployment process that maximizes speed for large-scale user service. The chatbot technology allows higher education institutions to execute effective main AI assistance points through the elimination of intricate database processes for request handling. The user-friendly interface becomes accessible through its navigation system which enables simple interaction with the system. The service enables the college domain to enhance its accessibility features by delivering information to student applicants and faculty employees and visitors needing facility communications. The AI Chatbot for College application seeks to establish a new method for accessing and managing educational institution data through its systems. The information access solution provides efficient and fast data delivery to

students as well as faculty members and visitors leading to superior digital engagement through improved user experiences.

II. LITERATURE SURVEY

The research paper discusses an AI-driven chatbot system which helps students and faculty members along with visitors to quickly obtain college-related information [1]. Natural language processing functions through integration of the Gemini API within a Next.js framework. The system obtains details from files in structured formats such as labs.ts and faculty.ts to operate without needing a typical database. The authors suggest building an AI Chatbot for College which employs Next.js and Gemini API to deliver immediate answers on frequently asked questions. The system undergoes evaluation to establish how efficiently it provides students with college information together with how quickly the system responds [2]. This research paper [3] investigates an AI chatbot solution particularly designed for university applications. Through the combination of NLP and a structured file-based system the chatbot produces quick answers for standard questions alongside features for simplified maintenance and scalable operation. The authors describe [4] how they developed a Chatbot system that improves performance via server-side rendering (SSR) in Next.js. The optimization of response systems through structured data files occurs concurrently with an evaluation of multiple user query handling efficiency. The research has engineered an AI automated chatbot solution designed for universities that integrates fast automated replies with precise data retrieval features. Different optimization methods enable the authors to improve system accuracy as well as responsiveness. An AI chatbot system created by the authors applies file-based storage operations with NLP algorithms to maximize information search functions [6]. Geneve Research answer that the designed system handles queries effectively but they also evaluate if it serves educational functions. This research paper [7] compares different chatbot architectures for college-related information retrieval. The chatbot performs in real-time throughout multiple integration and NLP model tests which use Next.js and Gemini API. The research team created a system that implements AI chatbot technology for under-resourced settings through a simplified design providing quick service to college websites. The research defines model optimization methods and describes data structure retrieval methods with real-time system assessment techniques. The development of educational AI chatbot applications happens through Next.js Gemini API integration with NLP techniques. A thorough examination of artificial college data occurs first before the authors test specific user query capabilities of the system.

III. PROPOSED SYSTEM

The AI Chatbot provides fast college problem solutions at university by using Next.js framework along with Gemini API for response retrieval. The chatbot operates independent of traditional databases because it obtains its data from the files labs.ts and faculty.ts. Users can input their voice directly into the system for it to return essential information in response to the request. Users gain two key features from the system's NLP capabilities because they both identify crucial terms and determine user goals during their question submissions. The system responds quickly and reliably since it retrieves data from systematically organized files stored in the system. The fast page loading speed of Next.js server-side rendering allows it to respond to multiple user requests with excellent performance. The system enables the chatbot to modify structural data files which eliminates the need for complex database procedures during maintenance operations. The system sends requested information through a basic interface to users once it finishes executing their requests. The user experience gets better because the system combines context-aware capabilities and query improvement functions into a new release of enhanced features. The automatic framework provides answers to users about staff member information together with laboratory availability information plus enrollment processes and educational campus statistics. All college members gain benefits from the AI Chatbot for College because it offers immediate access and both speedier communication services and automatic operational capabilities.

IV. SYSTEM OVERVIEW

A college query real-time AI chatbot operates through the combination of Next.js and Gemini API and Natural Language Processing (NLP). The system receives video data from camera inputs or recorded videos used to obtain video frames for analysis purposes.

The chatbot accepts user questions through its chat interface so students and other users together with faculty members can inquire about school programs and staff as well as laboratory departments and campus information.

1. Through NLP techniques the chatbot understands user input to determine essential terms and purpose before it retrieves appropriate data.
2. The system retrieves data through structured files which include labs.ts and faculty.ts instead of typical database methods. Through the use of easily modifiable files and minimum maintenance requirements the system ensures speedy response times.
3. Additional Features: The chatbot provides query logging together with feedback collection and personalization which lead to improving its user-friendly intelligence throughout different stages of development.
4. The Gemini API provides natural human responses which the chatbot generates from processing user information.
5. The system displays immediate responses which ensures the users can maintain an uninterrupted interaction. SSR-based performance in Next.js websites provide faster response times especially during concentrated traffic.
6. Real-time performance optimization occurs in the system because it implements minimal architectural approaches to deliver better operational efficiency. This system maintains its performance regardless of increased simultaneous queries because scalability brings no degradation to operational levels.

Gemini API functions as the front-end and backend framework of Next.js. Through its natural language processing abilities and its file system structure users can manage lightweight databases easily.

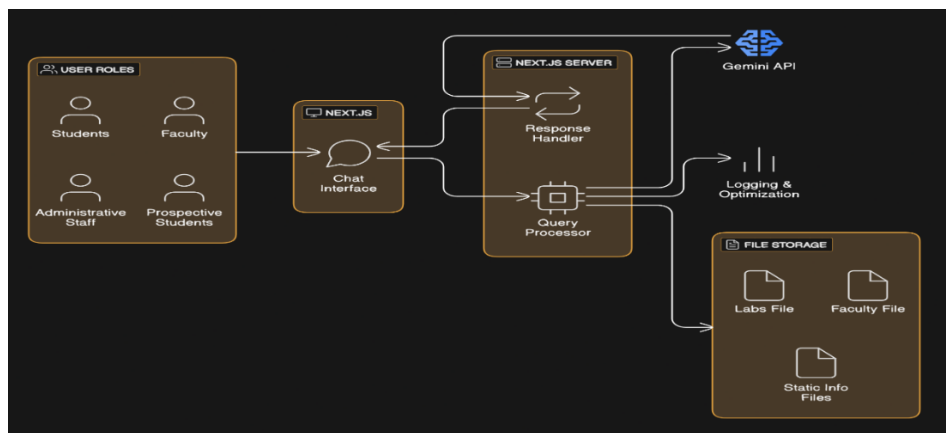


Fig 1: System Architecture

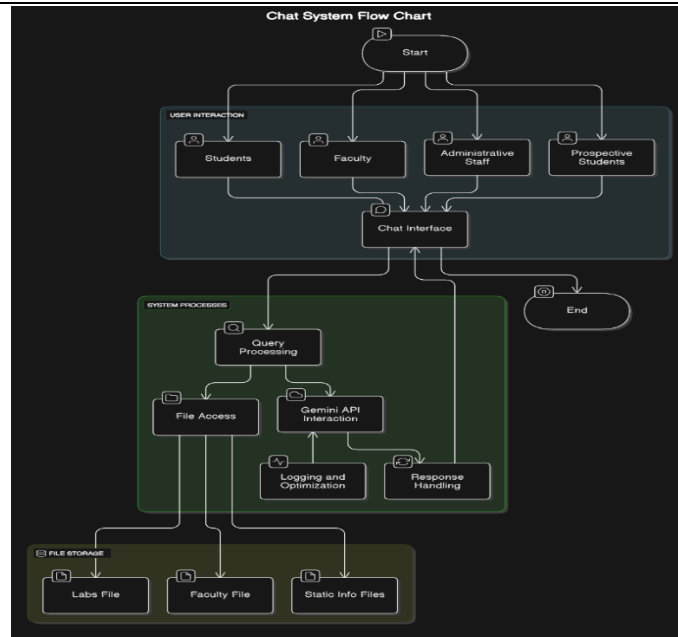


Fig 2: Use Case Diagram

- Technology Details for AI Chatbot for College:

Next.js provides SEO-friendly features that allow developers to construct scalable web applications based on React framework logic. SSR and SSG capabilities found in this framework make it appropriate for developing our college AI chatbot. The choice to use Next.js for web application development yields both fast query handling and high-performance rates together with user-friendly UX features.

NUMPY:

Google's Gemini API serving through state-of-the-art artificial intelligence models enables the chatbot to analyze and create intelligent responses. Gemini uses NLU to understand user language then retrieves data-based responses through its natural language understanding capability. The system lacks any database so Gemini functions as the essential component delivering appropriate context-based information static data files:

As no database exists the system retrieves its data from preloaded static files. The information files maintain structured content including different college aspects.
- academics.ts – Provides information about academic programs, departments, and curricula.

The achievement.ts file contains lists of significant college accomplishments together with faculty recognition awards and student awards recognition.

This file includes admission-related information which includes admission procedures alongside eligibility specifications and application deadlines.

This section contains information about the facilities such as campus infrastructure as well as libraries and sports centers and hostels and other facilities.

faculty.ts provides complete records about teaching staff which include their names alongside their positions and affiliated departments.

The generalInformation.ts file maintains fundamental information about the college by presenting historical background combined with mission statement along with core values.
- labs.ts – Provides insights into laboratory availability, equipment, and research opportunities.
- Staff placement records can be accessed through placements.ts as well as recruiter details together with placement statistical data.
- partnerships.ts – Contains information about collaborations, MoUs, and industry-academic tie-ups.
- studentAwards.ts – Highlights student achievements, competition wins, and academic excellence awards.

Structured data storage systems provide the chatbot instant access to needed information while minimizing the requirements for complex database search operations.

Server-Side Processing:

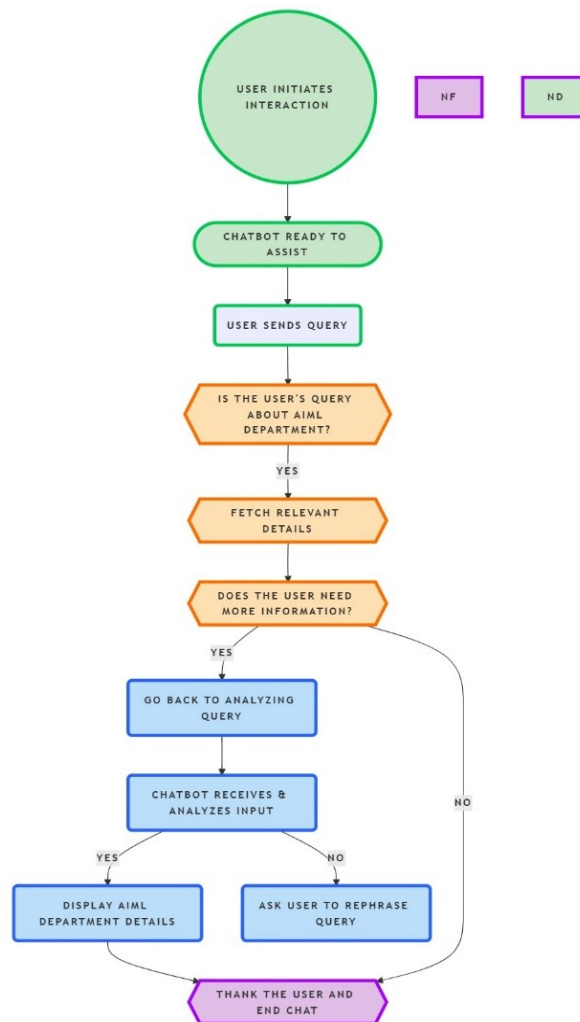
All user queries directed to the Next.js backend system gets processed efficiently. The backend retrieves both essential static files and Gemini API results swiftly while ensuring efficient computing power which results in fast responses.

Frontend & UI:

An interface that promotes user interaction exists due to the combination of Next.js with Tailwind CSS in developing the front-end design. The user can start chats through the interface which triggers real-time response generation.

Performance Optimization:

The system performance optimization method selects these functions due to its ability to cache static files and retrieve Gemini API data.



V. RESULT

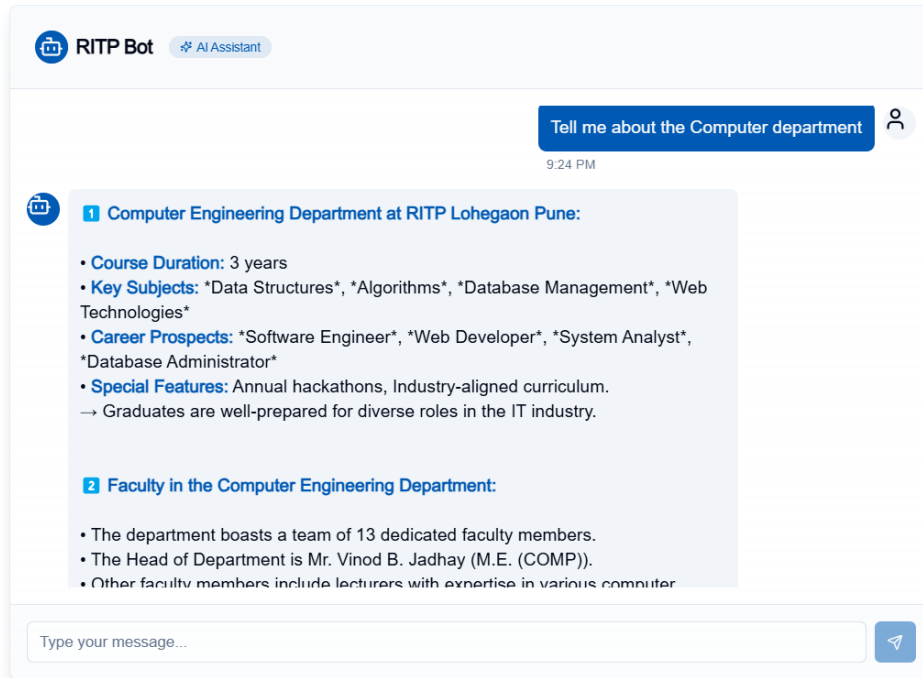


Fig 3: Screenshot 1

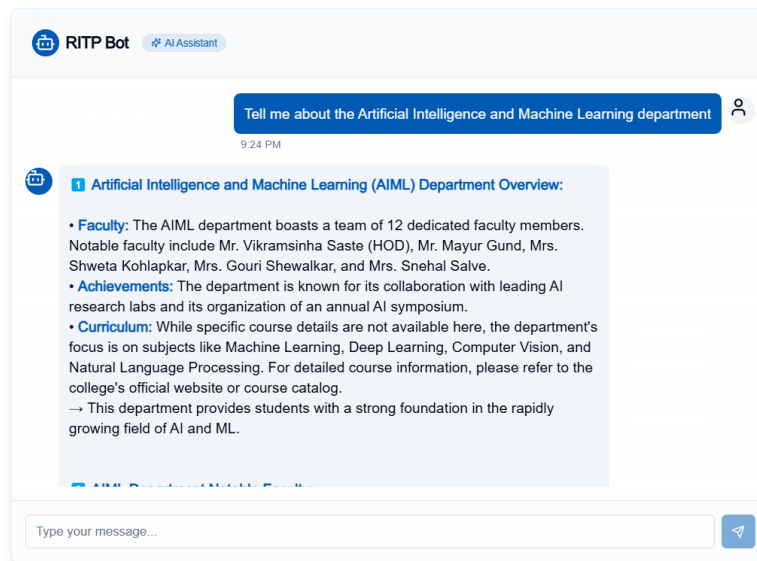


Fig 4: Screenshot 2

Advantages

1. Enterprises and students who visit with academic staff members can get timely correct answers through the automated system for admissions instructions and placement advice and facility information.
2. The continuous operation of the chatbot enables immediate support for users during any time of day or night considering human availability has no relevance.
3. The system makes repetitive queries automatic so both staff workloads decrease and professionals can focus on fundamental responsibilities.
4. The user interface of the system delivers an easy dialogue-based system to access details without requiring time-consuming page navigation.
5. The chatbot system promotes high scalability because it can connect with many users simultaneously which meets requirements of growing student populations and rising information demands of any institution size.

6. Operation speed becomes possible in this system because it obtains data from static files which results in instant responses.

VI. FUTURE SCOPE

The AI chatbot has become essential for college operations by improving student service using technological improvements. Upcoming technological advancement plans for the system will incorporate voice-related assistance along with personalized responses in addition to language adaptability features for optimal student service. The system becomes accessible through mobile apps and student portals and social media platforms at all times no matter where students are located. Students experience simplified life because the system enables automatic forms processing and exam scheduling and counseling assistance. The chatbot system delivers instant analytics which assists colleges to detect student issues being frequently submitted to enhance their services. Through this system the institution would simultaneously check attendance along with allowing reservations for rooms and delivering vital scheduling information to all students.

VII. CONCLUSION

AI-powered chatbots distributed across the college website deliver real-time information to students as well as faculty and staff members who achieve a transformative advancement in communication operations. The automatic chatbot system achieves operational excellence by handling standard academic inquiries and admission questions and placement questions with effectiveness. The information access function operates properly because the bot uses static files that combine academics.ts, admissionInfo.ts, faculty.ts and placements.ts. The AI chatbot evolves into an advanced student guidance platform through personalized services equipped with voice technology analytics to become a strong academic guidance system.

VIII. REFERENCES

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