VISVESVARAYA TECHNOLOGICAL UNIVERSITY

JNANA SANGAMA, BELAGAVI

Major Project Report

On

"AI POWERED WEB HELP DESK FOR COLLEGE INSTITUTIONS"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE & ENGINEERING

Submitted By

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CERTIFICATE

This is to Certify that the 8th Semester Project titled **"AI POWERED WEB HELP DESK FOR COLLEGE INSTITUTIONS"** is a bonafide work carried out by **BHUMIKA V (4MU22CS005), KEERTHANA M(4MU22CS030)** in partial fulfillment for the award of degree of Bachelor of Engineering in Computer Science & Engineering of the Visvesvaraya Technological University, Belgaum during the year 2025-26.The project report has been approved as it satisfies the academic requirements with respect to the Project Work prescribed for Bachelor of Engineering Degree.

Signature of the Guide	**Signature of the HOD**	**Signature of Principal**
Prof .Seema Firdos	**Dr. L Lakshmi Durga**	**Dr Abhinandan K S**
Assistant Professor Department of CSE	Professor and Head Department of CSE	MRIT, Mandya

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INTRODUCTION

The motivation for developing an AI-powered student helpdesk arises from the observed challenges faced by students in their daily academic life. Students often waste valuable time standing in queues, visiting administrative offices, or searching through notice boards for information that could otherwise be made available instantly. This not only creates frustration among students but also affects their productivity and academic focus.

For administrators, the repetitive nature of handling similar queries from hundreds of students is a burden. Tasks such as answering fee-related inquiries, providing faculty contact information, or clarifying timetable changes consume unnecessary staff hours, which could otherwise be directed toward more meaningful administrative duties. By automating such routine interactions, institutions can optimize human resources while ensuring that students receive timely assistance.

Another strong motivation is inclusivity and accessibility. Many differently-abled students, such as those with visual impairments, struggle with traditional notice board systems. Similarly, students from multilingual backgrounds may face barriers when information is provided only in a single language. A voice-enabled, multilingual helpdesk system overcomes these challenges by ensuring that every student has equal access to institutional resources.

Finally, the increasing integration of AI in education provides a forward-looking motivation. Implementing intelligent helpdesk solutions aligns institutions with global trends in digital education and smart campuses. This project therefore represents not only a solution to an immediate problem but also a step toward modernizing institutional communication for the future.

LITERATURE SURVEY

1. Janapreethi S., Janapriya S., Sarulatha M., and G.R. Hemalaskhmi, "College Enquiry Chatbot," 2023 2nd International Conference on Vision Towards Emerging Trends in Communication and Networking Technologies (ViTECoN), pp. 979–8-3503-4798-2/23, 2023. IEEE. DOI: 10.1109/VITECoN56132.2023.10150578. Janapreethi S., Janapriya S., Sarulatha M., and G.R. Hemalaskhmi, "College Enquiry Chatbot," 2023 2nd International Conference on Vision Towards Emerging Trends in Communication and Networking Technologies (ViTECoN), pp. 979–8-3503-4798 2/23, 2023. IEEE. DOI: 10.1109/VITECoN56132.2023.10150578.

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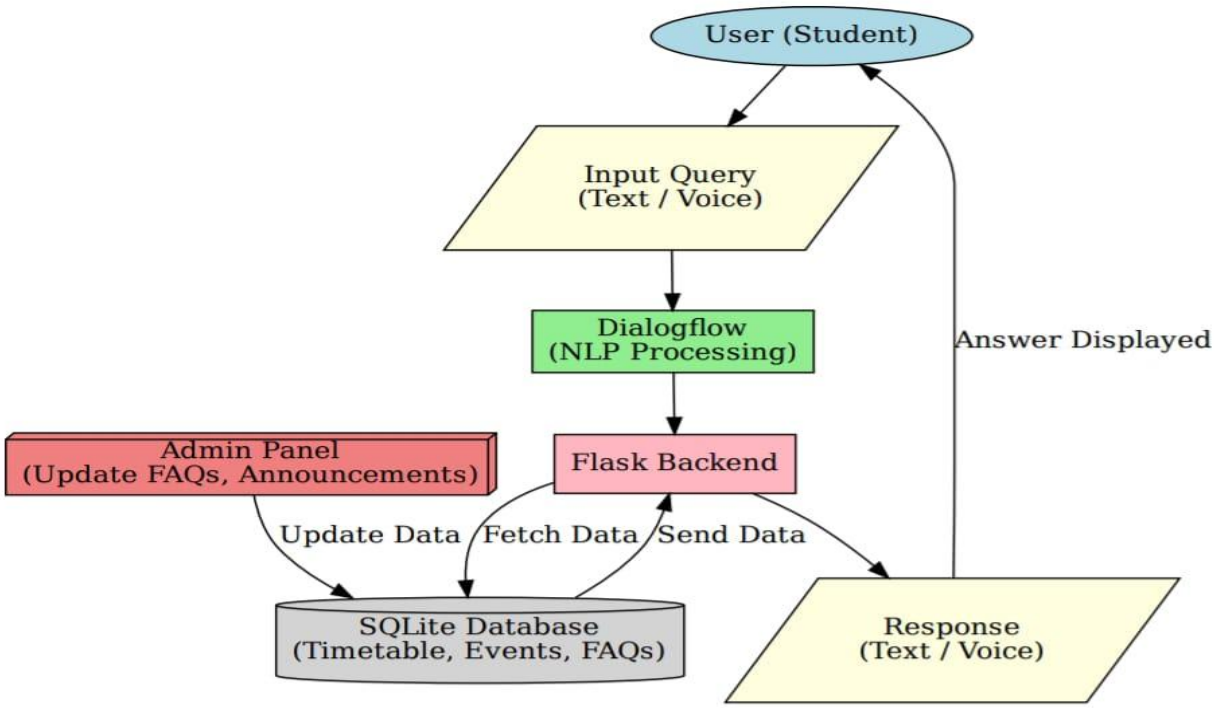
OBJECTIVES

The primary objective of this project is to design and develop an **AI-powered web-based student helpdesk system** that can resolve student queries instantly, reduce administrative workload, and enhance accessibility. To achieve this overarching goal, the project has been divided into the following specific objectives:

1. **Centralization of Information**: To create a single, unified platform where students can access all essential information such as fees, timetables, syllabus, faculty details, and event updates.
2. **Instant Query Resolution**: To implement an AI-driven chatbot that can process natural language queries and deliver accurate responses in real time.
3. **24/7 Availability**: To ensure that students can access the helpdesk at any time, without being restricted by office hours or staff availability.
4. **Voice-Based Interaction**: To integrate speech-to-text and text-to-speech functionalities so that differently-abled students and those preferring voice interaction can use the system effectively.
5. **Multilingual Support**: To make the system accessible to students from diverse linguistic backgrounds by supporting multiple languages.
6. **Reduced Administrative Burden**: To minimize repetitive queries directed to staff, allowing administrators to focus on more critical tasks.
7. **Future Integration**: To provide a foundation for future integration with institutional ERP systems, enabling features such as real-time exam schedules, attendance, and personalized student data.

By fulfilling these objectives, the project seeks to enhance communication, improve accessibility, and modernize institutional support systems.

PROPOSED METHODOLOGY



The system is designed to provide **automated support for institutional queries** using AI (NLP) and a web-based interface.

Components of the System

1. **User (Student / Faculty / Staff)**
    - The **end-user** of the system who submits queries.
    - Queries can be in **text or voice** format.
    - Users receive responses through the same interface.
2. **Input Query (Text / Voice)**
    - The starting point where users input their questions.
    - The query is captured via the **web interface**.
3. **Dialogflow (NLP Processing)**
    - This is the **AI module** that interprets user queries.

- Uses **Natural Language Processing** to:
  - Understand intent and context.
  - Match the query with relevant information in the Knowledge Base.
- Can handle both text and voice inputs.

4. **Flask Backend**
   - The **backend server** that connects the frontend to the database and AI module.
   - Responsibilities:
     - Fetching data from the database.
     - Sending responses back to the user.
     - Processing updates from the **Admin Panel**.
   - Built using **Python Flask**, a lightweight web framework.
5. **Admin Panel**
   - Interface for administrators or staff.
   - Admins can:
     - Update FAQs and knowledge base entries.
     - Make announcements or share events.
   - The **updated data** is sent to the database via the Flask backend.
6. **SQLite Database**
   - Central data repository storing:
     - Timetable information
     - Events and announcements
     - FAQs
     - Chat history
   - Supports CRUD operations (Create, Read, Update, Delete) via the Flask backend.
7. **Response (Text / Voice)**
   - After processing, the system returns a response to the user.
   - Responses can be **text-based** or **voice-based** depending on input type.
   - Provides **instant answers** if available; otherwise, queries can generate a support ticket.
8. **Data Flow / Working Process**
   1. **User submits a query** via the web interface (text or voice).
   2. The query is sent to **Dialogflow** for **NLP processing**.
   3. **Dialogflow** analyzes the intent and searches for a matching response in the **SQLite Database**.

4. If a match is found:
    - The **Flask backend** fetches the response from the database.
    - The response is displayed to the user in text or voice format.
5. If the answer is not available:
    - Admin can update the **knowledge base** via the **Admin Panel**.
    - The backend stores new entries in the **SQLite Database** for future queries.
6. Users receive **instant answers**, and the system improves over time as the **knowledge base expands**.

9. **Key Features Highlighted by the Architecture**

- **AI/NLP Integration**: Automates understanding and answering of queries.
- **Admin Control**: Admins can update FAQs and manage announcements.
- **Centralized Database**: All data is stored securely in SQLite for fast access.
- **Voice & Text Support**: Users can interact using both modes.
- **Web-Based System**: Accessible via browser, enabling wide usability.

SYSTEM REQUIREMENTS

Software Requirements

The proposed system requires the following software components:

- **Operating System:** Windows / Linux (server deployment), Android/iOS (mobile app).
- **Programming Languages:** Python (NLP, backend), JavaScript (frontend), Java/Kotlin (Android), Swift (iOS).
- **Frameworks:** Django/Flask (backend), React/Angular (frontend), TensorFlow/PyTorch (AI models).
- **Databases:** MySQL/PostgreSQL (relational data), MongoDB (unstructured data), Vector Database (e.g., FAISS, Pinecone).
- **APIs and Tools:** REST/GraphQL APIs, Speech-to-Text (Google/DeepSpeech), Text-to-Speech (gTTS/Amazon Polly).
- **Version Control:** GitHub/GitLab for collaborative development.

3.1.4 Hardware Requirements

- **Minimum Requirements (Client-Side):**
- **Processor:** Dual-core 2.0 GHz
- **RAM:** 4 GB
- **Storage:** 256 GB HDD / 128 GB SSD
- **Network:** 4G Internet / Wi-Fi connectivity
- **Recommended Requirements (Server-Side):**
- **Processor:** Quad-core 3.0 GHz or higher
- **RAM:** 16 GB or more (for AI model processing)
- **Storage:** 1 TB SSD (fast data retrieval and logging)
- **GPU (Optional):** NVIDIA GPU (for deep learning models)
- **Network:** High-speed broadband with minimum 100 Mbps bandwidth

EXPECTED OUTCOME

System Configuration:

- Processor: Intel Core i5 / i7
- RAM: 8 GB or higher
- Storage: 512 GB SSD or HDD
- Operating System: Windows 10 / 11
- Software Environment:
  - Frontend: HTML, CSS, JavaScript
  - Backend: Python / Flask or Node.js
  - Database: MySQL / SQLite
  - AI Libraries: TensorFlow, NLTK, or OpenAI API (for NLP)
  - Web Server: Apache or Flask built-in server

Dataset Used:

- A custom institutional query dataset containing frequently asked questions (FAQs) by students and staff, such as:
  - Admission procedures
  - Fee payment queries
  - Exam schedules
  - Leave application processes
  - IT or library-related support
- The dataset was preprocessed to train or fine-tune the AI query response model.
- Testing Environment:
- System tested on both local environment and web-hosted platform.
- Multiple test cases were executed to validate accuracy, response speed, and escalation functionality.

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