# Alumni Association Platform Using Machine Learning

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**Abstract:** The Mechanical Training Platform of the Graduate Association is an innovative web platform to improve the interaction between graduates, students and academic institutions. This system is registered by graduates, interacts with other graduates and students, participates in the event at the Academy, and continues to recognize the academy news. Students can study the opportunities that graduates exhibit their work and review the text model based on whisker to summarize the explanation. Administrators can manage data for graduates and students who have approved registration and events and update the contents of academy such as events, news, and galleries. This platform integrates two improved machine learning models. A text model for text viewing to combine a chatbot for processing a user request based on LSTM with a task description.

This portal provides services to several users, including administrators, graduates, students and guests. Graduates and students can talk about and communicate with chat and reservations, and potential users can get information about the academy by exploring the gallery, news and interactions of chatbots. The administrator processes the Backend process, such as graduates management, student registration, event requests and business presentations. The main design of the system creates an effective and optimized experience for all users related to automatic functions such as chatbots, text reviews and email notifications. In addition, this system uses a stable mechanism for authentication and view to ensure security to protect user data and interactions. The project strengthens the relationship between graduates and students, encourages further interactions between graduates, students, and ALMA, as well as providing a digital platform without problems.

**Keywords:** Alumni Network, Bidirectional and Auto-Regressive Transformers , Admin, Student ,User, Long Short-Term Memory, Chat box .

## 1.INTRODUCTION

The Academic Portal using Machine Learning is an advanced web platform designed to strengthen the connection between academic institutions, their alumni, and students. It facilitates seamless communication, event coordination, and long-term engagement. The system supports four primary user roles—Admin, Alumni, Students, and Guests—each with distinct functionalities aimed at enhancing interaction and streamlining administrative processes.

The platform allows alumni and students to register and access the system after receiving approval from the admin. Once registered, alumni can book event slots, while students can explore and participate in various events. A secure one-on-one chat feature enables networking between alumni and students, fostering professional connections and mentorship opportunities.

A key feature of the portal is its job posting and application system, where alumni can post job opportunities, and students can apply for them. To assist students in understanding job descriptions, the platform incorporates a BART-based text summarization model that provides concise summaries, making it easier for students to evaluate and apply for relevant positions .In addition to job-related functionalities, the portal keeps users informed through academy updates, where alumni, students, and guests can browse gallery images, read institutional news, and access information. To enhance user assistance, the platform includes an LSTM-based chatbot, which answers common inquiries regarding fee structures, course details, and other academic-related questions.

For administrators, the platform simplifies the management of alumni and student registrations, event approvals, job postings, and academy content such as news and gallery updates. Admins can approve or reject registrations and event participation requests, ensuring a secure and verified user base. The system also automates email notifications, keeping users informed about the status of their requests.

The integration of machine learning enhances the platform's efficiency. The LSTM-powered chatbot ensures quick and automated responses to user inquiries, reducing administrative workload. The BART-based text summarization model helps students quickly grasp key details about job descriptions, improving their decision-making process. By centralizing alumni and student engagement, leveraging machine learning, and integrating features like chatbots, text summarization, and email notifications, the platform provides a secure and efficient experience.

Additionally, it paves the way for future advancements such as personalized event recommendations, in-depth analytics on user engagement, and mobile-friendly access, ensuring continuous connectivity between institutions and their global alumni and student community.

## 2.LITERATURE SURVEY

Alumni engagement has transitioned from manual processes and social media interactions to dedicated web-based platforms. Research by Briones et al. (2011) highlights how these platforms enhance communication and event management. However, many early systems lacked automation, emphasizing the need for AI-driven tools like chatbots and recommendation systems.

AI-powered chatbots have significantly improved interactions in educational platforms. Pérez-Marín et al. (2020) found that chatbots efficiently handle routine queries and automate alumni and student support. Machine learning models like Long Short-Term Memory (LSTM) networks enhance chatbot responses, improving accuracy and engagement, as supported by Hussain et al. (2019).

LSTM networks are crucial in natural language processing (NLP), excelling in text classification and chatbot applications. Hochreiter and SchmidHuber (1997) emphasized LSTM's ability to learn long-term dependencies, making them ideal for dialogue systems. Research by Sutskever et al. (2014) further validates LSTM's effectiveness in sequence prediction tasks for real-time chatbot interactions.

Security in alumni networks is essential due to sensitive user data. Anderson et al. (2016) identified risks such as data breaches and identity theft, advocating for encryption and strong authentication measures. Machine learning models, as explored by Shafiq et al. (2019), enhance security by detecting anomalies and potential threats in real time.

Modern alumni platforms leverage machine learning for personalization and automation. Smith et al. (2018) found that personalized content and event recommendations boost engagement. Automated features like email notifications, event reminders, and AI-driven chatbots streamline administrative tasks, improving user participation and networking opportunities.

By integrating machine learning, alumni engagement platforms become more efficient and secure. AI-driven chatbots, automation, and enhanced security measures improve user experience, fostering stronger relationships between institutions and their alumni community.

## 3.METHODOLOGY

3.1 Backend Development:

The Admin Module is responsible for overseeing key platform operations, including alumni and student registrations, event bookings, and job postings. Administrators can approve or reject requests, update academy content such as news and gallery images, and manage event details. Automated email notifications keep users informed about the status of their applications, while admins can access and review alumni, student, and event data for better platform management.

The Alumni Module allows alumni to register, log in, explore profiles, and interact with students and fellow alumni through a one-on-one chat system. They can book events, post job opportunities for students, and receive automated email updates on event and job application statuses. This module fosters networking and career opportunities within the alumni community.

The Student Module enables students to register, log in, and explore job postings shared by alumni. They can apply for jobs, use a BART-based model to summarize job descriptions, and engage in one-on-one chats with alumni for mentorship. Students also receive email notifications regarding their job applications, ensuring seamless communication.

The User Module caters to guests and visitors, allowing them to explore academy news, achievements, and upcoming events without needing an account. Guests can interact with an LSTM-based chatbot for general inquiries about courses, fees, and other details. If interested, they can register as alumni or students to access additional features, ensuring a smooth transition into the platform.
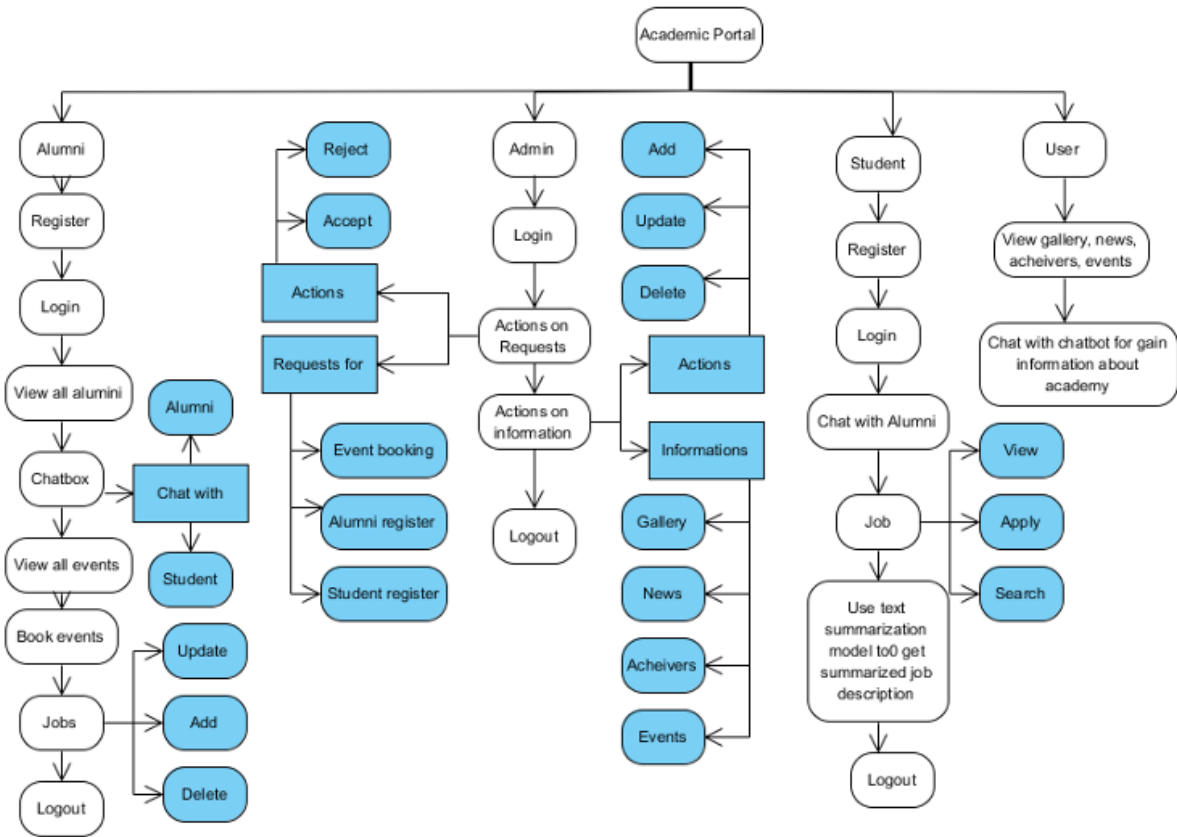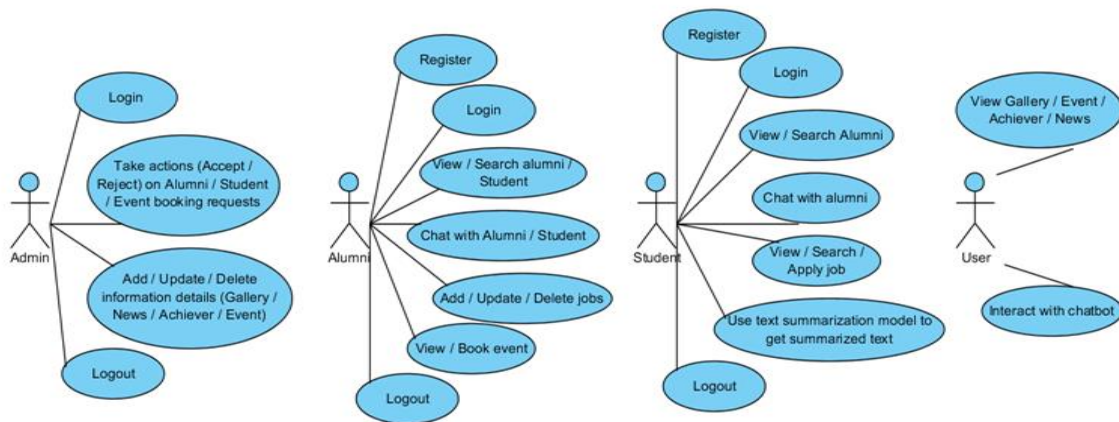
Fig 1: Project Flow



Fig 2: Use Case Diagram



3.2 Chatbot Development (LSTM-Based):

The Data Collection and Preprocessing phase involves gathering intents and responses from a predefined dataset (JSON or Excel). User queries and intents are extracted, tokenized using TensorFlow's Keras library, and padded to maintain uniform input size for LSTM training.

Label Encoding converts text-based intents into numerical labels using LabelEncoder, followed by one-hot encoding for multi-class classification.

The Model Architecture includes an input layer, an embedding layer to capture semantic meaning, an LSTM layer for long-term dependencies, and a final dense layer with softmax activation to classify user intents.

During Model Training, the model is compiled with categorical cross-entropy loss and the Adam optimizer. The chatbot is trained on padded queries and encoded intents over multiple epochs.

Saving the Model and Tokenizers ensures reusability by storing the trained model, tokenizer, and label encoder for real-time predictions.

In Intent Prediction and Response Generation, user inputs are preprocessed, tokenized, and padded before predicting the intent. The most likely response is selected from the dataset, with variability introduced for a more natural conversation.

The Chatbot Features include handling user names, conversation context, and personalized responses. It recognizes special commands and user inputs to enhance interaction.

Finally, Testing and Deployment ensure accuracy in intent recognition and response handling. Once validated, the chatbot is integrated into the alumni network platform to assist users with inquiries related to events, academy details, and general queries.

3.3 Text Summarization Development (BART-Based):

The BART model is a powerful sequence-to-sequence model for text summarization, designed to generate concise summaries from dialogues. It takes dialogues as input and extracts key points efficiently.

Dataset Preparation involves loading dialogues and summaries from CSV files, cleaning unnecessary tags, handling missing values, and performing Exploratory Data Analysis (EDA). The dataset is then converted into a Hugging Face Dataset object for efficient processing.

Preprocessing includes tokenization using BartTokenizer, padding/truncation for uniform sequence length, and batching via DataCollatorForSeq2Seq. The dataset is split into training, validation, and test sets.

The Model Architecture uses BART's pre-trained facebook/bart-large-xsum checkpoint with an encoder for bidirectional context understanding and a decoder for generating summaries token by token.

Training is managed by Seq2SeqTrainer with defined hyperparameters. The model is fine-tuned over multiple epochs, optimizing based on validation loss to generate high-quality summaries.

3.4 Frontend Development:

The **User Interface Implementation** focuses on building front-end components for alumni, admin, and guest interactions. The front end is designed to communicate with back-end APIs, enabling seamless data retrieval and submission. This ensures users can efficiently navigate and perform necessary actions within the system.

A Chatbox **for** Alumni is developed to facilitate real-time, secure communication among alumni. Messages exchanged within the chatbox are stored in the database and displayed in a user-friendly interface, ensuring smooth and effective interaction.

The Chatbot Integration involves embedding an LSTM-powered chatbot into the front end, making it accessible to both registered users and guests. The chatbot assists users by answering queries related to the academy, available courses, and upcoming events, enhancing user engagement and support.

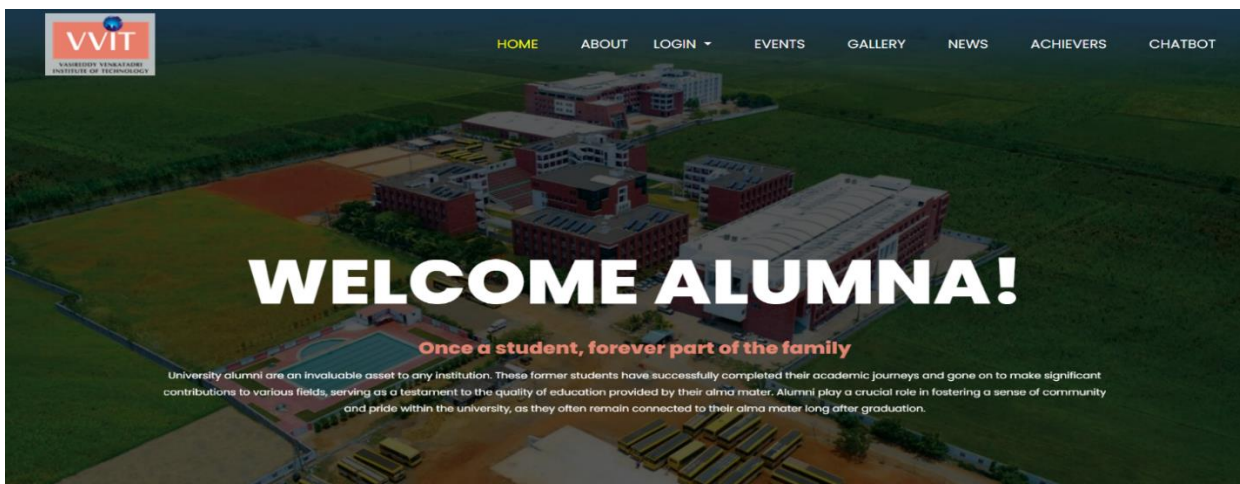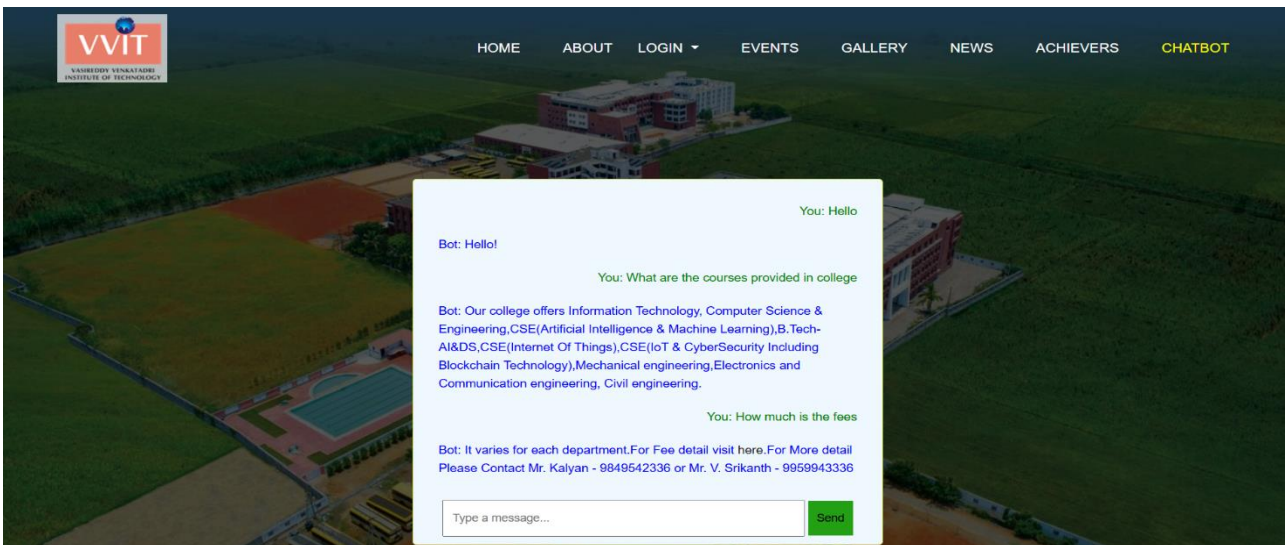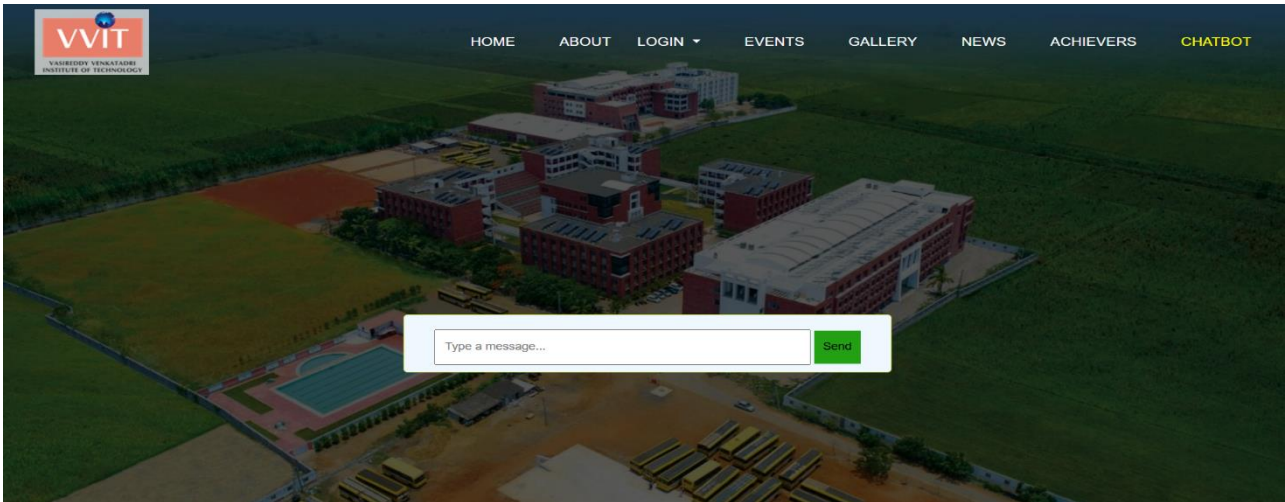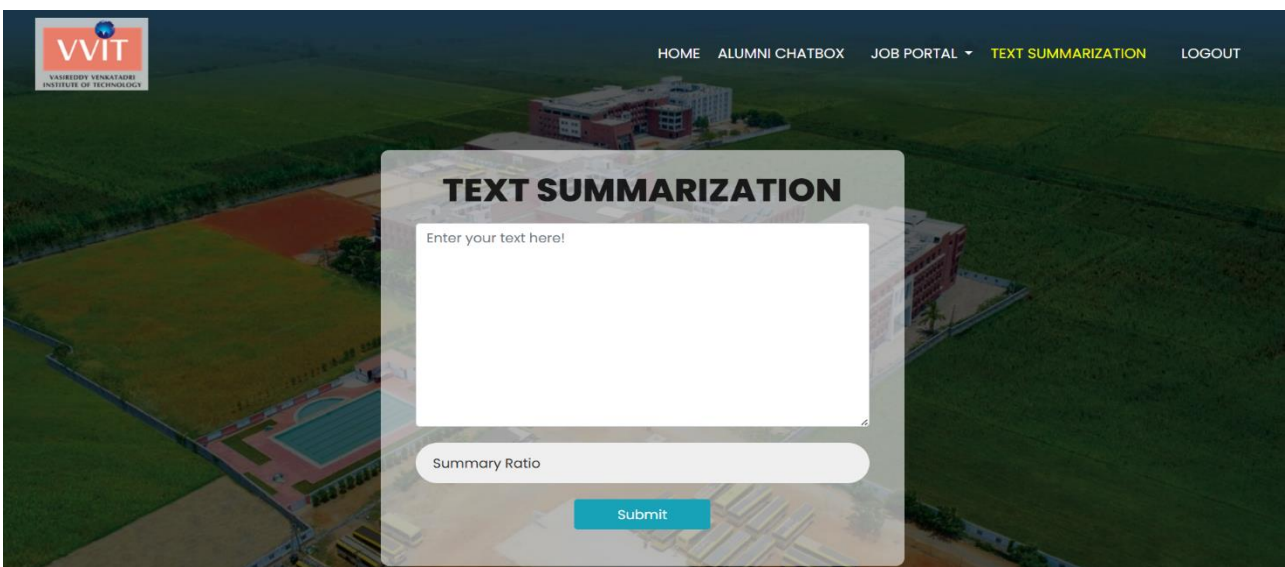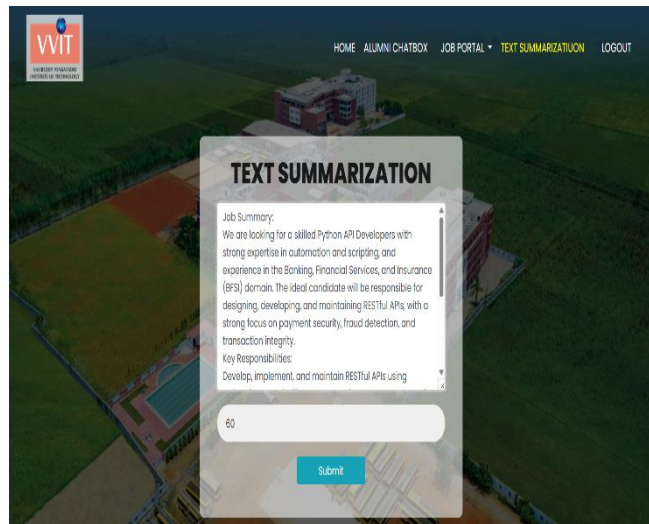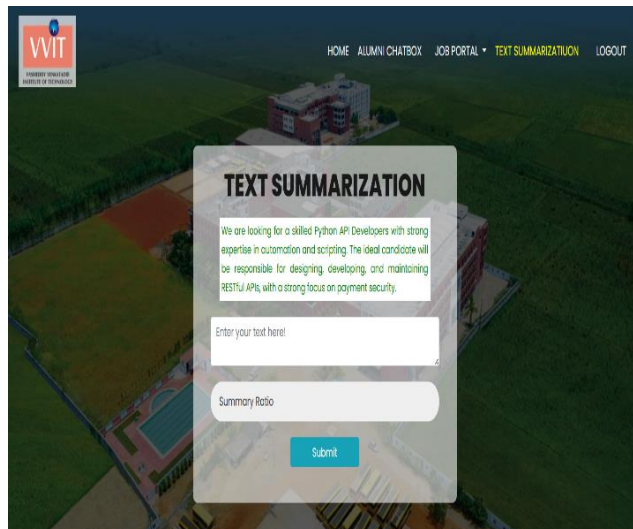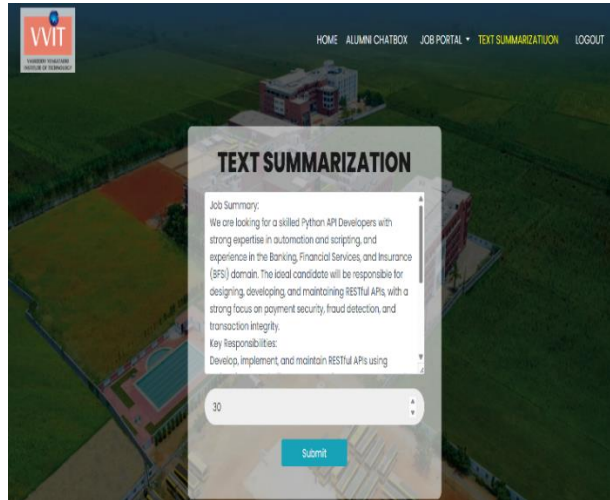## 4.RESULT AND DISCUSSIONS

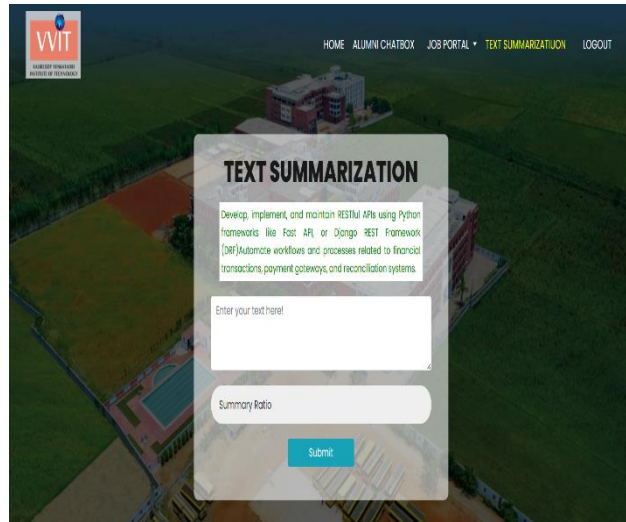Fig 3: Home Page

Fig 4:Chatbot
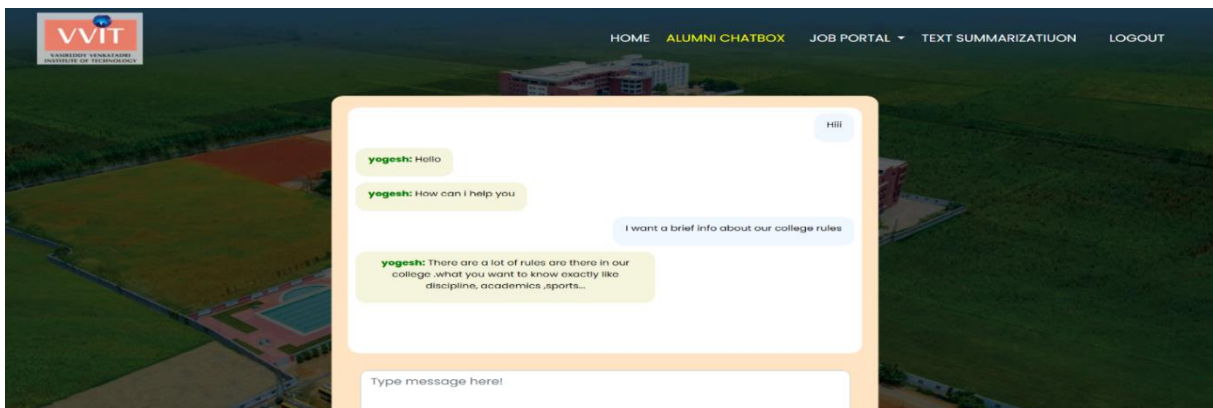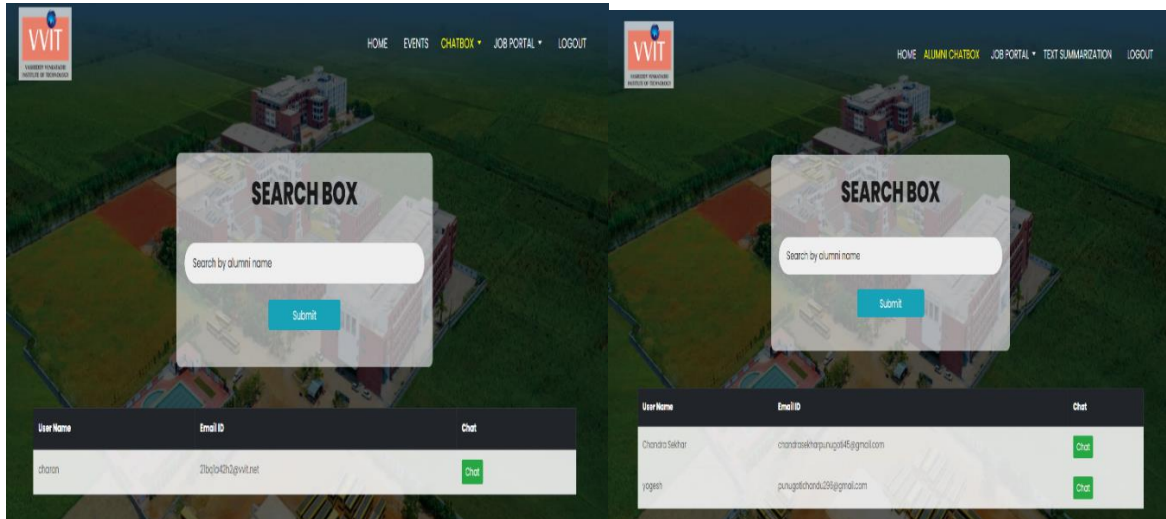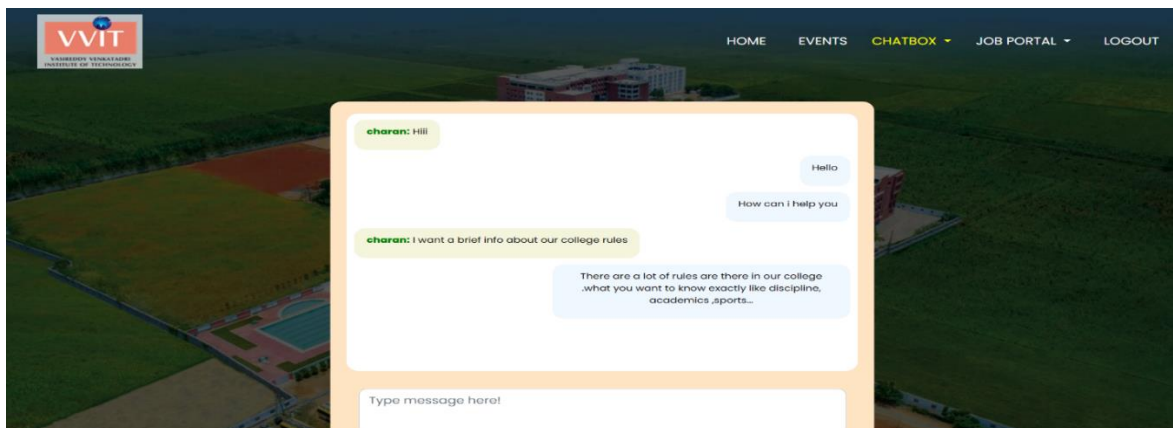


Fig 5:Text-Summarization Model

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Fig 6:Chatbox

## 5.CONCLUSION

Academic Portals using machine learning provide comprehensive solutions to the challenges of institutions as they maintain ongoing alumni and student commitment. By integrating machine learning, particularly LSTM-based chatbots and whisker-based text overview models, the platform automates routine tasks such as query treatments, event management, employment, and communications, significantly reducing the manual effort required by administrators. This system improves the user experience through personalized interactions, optimized alumni and student data management, and efficient event and application processes.

In addition, the use of advanced techniques in machine learning ensures that the chatbot provides accurate and context-related answers, but the textual overview model helps students to quickly understand job descriptions and improve their graduates and students commitment and satisfaction.The secure design of the platform, combined with automated features such as notifications and personalized recommendations, promotes a sense of community and long-term connection between graduates, students, and their alma maters.

This project not only addresses the current gap in the commitment of graduates and students, but also forms the basis for future scalability and improvement, including: With machine learning integration, the platform will grow beyond traditional systems and provide the latest, efficient and user-friendly solutions for academic institutions to maintain permanent relationships with alumni and students.

Future enhancements for the Alumni Network portal include: Mobile App Integration for Android & iOS, enabling on-the-go access and push notifications. Advanced Analytics to track alumni engagement and predict user behaviour. Enhanced NLP Chatbot using models like BERT/GPT-3 for better query handling and multilingual support; Social Media Integration with LinkedIn, Facebook, and Twitter to boost alumni connectivity and engagement. These improvements will enhance functionality, scalability, and user experience.

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