PROJECT REPORT

ON

Yatra Guru

Redefining Exploration Through Intelligent Pathways

SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR SEMESTER VII OF
B.E (Information Technology)

SUBMITTED BY

Mr. Yajat H Bhasin (Roll No.5)

Mr. Kaushik Kotian (Roll No.29)

Mr. Mohit Mandhyani (Roll No.33)

Mr. Swapnil Mulani (Roll No.67)

UNDER THE GUIDANCE OF

Dr. Abhay Kshirsagar

V.E.S. INSTITUTE OF TECHNOLOGY
Chembur, Mumbai 400074
(An Autonomous Institute, Affiliated to University of Mumbai)

April 2024

Certificate

This is to certify that project entitled

"Yatra Guru"

Group Members Names

Mr. Yajat H Bhasin (Roll No.05)
Mr. Kaushik Kotian (Roll No. 29)
Mr. Mohit Mandhyani (Roll No. 33)
Mr. Swapnil Mulani (Roll No. 67)

In partial fulfillment of degree of BE. (Sem VII) in Information Technology for Project is approved.

Dr.(Mr.)Abhay Kshirsagar
Project Mentor

External Examiner

Dr.(Mrs.)Shalu Chopra
H.O.D

Dr.(Mrs.)J.M.Nair
Principal

Date:11/10/2024
Place: VESIT, Chembur

College Seal

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Group Members Names

- - - - - - - - - - -
(Signature)

Mr. Yajat H Bhasin (Roll No.5)

- - - - - - - - - - -
(Signature)

Mr. Kaushik Kotian (Roll No.29)

- - - - - - - - - - -
(Signature)

Mr. Mohit Mandhyani (Roll No.33)

- - - - - - - - - - -
(Signature)

Mr. Swapnil Mulani (Roll No.67)

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Abstract

In today's busy world, planning a trip can often feel like a chore, taking away from the excitement of traveling. YatraGuru is a web app designed to change that by making trip planning easier and more enjoyable. With features like an automated itinerary generator, real-time pricing updates, and support for multiple languages using Google Translate, it simplifies everything—from picking the right destination to managing your budget and getting ready for the trip. By taking the hassle out of planning, YatraGuru helps travelers organize their journeys with ease and confidence, allowing them to focus on making the most of their adventures.

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INTRODUCTION

Chapter 1

Introduction

1.1 Introduction

International and domestic travel, with its exposure to new cultures and perspectives, provides immense personal enrichment. However, the complexity of planning such journeys—selecting suitable destinations, managing budgets, organizing itineraries, and overcoming language barriers—can often deter potential travelers. YatraGuru addresses these challenges by offering a user-friendly web application that revolutionizes the trip planning process. By integrating cutting-edge technologies such as machine learning and Google Cloud Platform (GCP) APIs, YatraGuru provides personalized travel recommendations based on individual preferences. Key features include an automated itinerary generator, real-time pricing updates, and multilingual support via the Google Translate API. In doing so, YatraGuru empowers users to confidently plan and embark on their dream vacations.

1.2 Aim and Objectives

The objectives of the project are as follows:

- **Dynamic Itinerary Generation:** Automatically create and customize travel itineraries based on user preferences, destination details, and travel dates to provide a seamless planning experience.
- **Real-Time Pricing and Booking:** Offer up-to-date information on accommodation, activities, and transportation with real-time pricing and booking capabilities to help users manage their travel budget effectively.
- **Localized Recommendations:** Provide personalized recommendations for attractions, dining, and experiences, including unique and off-the-beaten-path options based on user interests and location.
- **Multilingual Support:** Incorporate language translation tools to bridge communication gaps and enhance accessibility for international travelers.

1.3 Motivation for the Work

- **Insights from Research:** Research highlighted the effectiveness of data analytics in enhancing customer experiences in the tourism sector, emphasizing personalized travel recommendations. Additionally, artificial intelligence systems optimized travel routes by considering user preferences, traffic conditions, and weather. Advances in Neural Machine Translation (NMT) further addressed language barriers, improving communication for travelers.
- **Empowering Travelers:** By integrating features like an automated itinerary generator, real-time pricing updates, and multilingual support through Google Translate, YatraGuru empowered users to confidently plan their trips.
- **Challenges in Trip Planning:** In the past, trip planning often overwhelmed potential travelers due to challenges like selecting destinations, managing budgets, organizing itineraries, and overcoming language barriers.

1.4 Feasiblity Study

Previous research underscores the importance of data analytics in enhancing customer experiences in tourism. For instance, Zhang and Zhao highlighted data privacy and integration issues, while Bapat et al. developed an AI-based travel recommendation system that considers user preferences and external factors. Almeida and Mendes showcased how Neural Machine Translation (NMT) has improved communication in travel, and Shrivastav and Patel emphasized user-centric travel applications that integrate geolocation and real-time data.

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CHAPTER: 2
LITERATURE SURVEY

Chapter 2

Literature Survey

2.1 Introduction

International and domestic travel open doors to new cultures, unique perspectives, and unforgettable experiences, offering immense personal growth and enrichment. Yet, the complexities involved in planning a trip—from choosing the right destinations and managing finances, to organizing detailed itineraries and navigating language barriers—can often become overwhelming and discourage potential travelers from pursuing their journey.

2.2 Survey of Existing Systems

AI is transforming travel planning with automation, real-time coordination, and personalized itineraries using machine learning and NLP. The study highlights cost optimization, enhanced engagement, and AI-driven solutions for collaboration and sustainability. Despite advancements, challenges remain, calling for future research on an integrated, user-centered travel ecosystem. [1]

An AI-powered travel planning system uses Artificial Intelligence (AI) and Natural Language Processing (NLP) to generate optimized and personalized itineraries. It considers real-time factors like travel duration, destinations, and weather conditions to provide efficient plans. The platform integrates automated itinerary generation, real-time data updates, and personalized recommendations, ensuring a seamless trip-planning experience. Unlike traditional travel platforms, this system leverages data-driven insights and algorithmic optimization for a customized and enjoyable journey. [2]

Presents an AI-driven travel planning system that personalizes itineraries based on user preferences. It integrates conversational AI (Gen AI) to understand user inputs and employs Playwright for real-time airline and hotel data extraction. A content-based recommendation engine generates customized travel suggestions, considering factors like pricing, hotel ratings, and flight layovers. With an 86 percent precision score, the system demonstrates improved accuracy over existing solutions, enhancing user satisfaction by simplifying and automating travel planning. [3]

Presents a user-friendly mobile application designed to simplify trip planning using Generative AI (GenAI). It assists users in planning trips by offering personalized recommendations for accommodations, restaurants, and attractions. The app integrates a chatbot powered by GenAI, enhancing user comfort by providing real-time suggestions and automated booking assistance. [4]

Presents a system that leverages artificial intelligence to enhance travel planning. The proposed system offers personalized travel recommendations and optimizes routes based on user preferences and real-time data. By analyzing factors such as user interests, current traffic conditions, and destination popularity, the AI-driven approach aims to provide efficient and tailored travel itineraries, improving the overall travel experience. [5]

Explores how Generative AI enhances travel planning through AI-driven itinerary generation, cost optimization, and user experience improvements. It examines AI's role in finding low fares, avoiding crowds, and optimizing travel routes, with a study showing high user satisfaction but identifying areas for time efficiency improvements. The research highlights AI's potential to personalize and streamline travel planning, making it more efficient, secure, and accessible. [6]

Focuses on a Trip Advisor application, which integrates geolocation, time-weather data, and a rich database of attractions to enhance travel planning experiences. This user-centric application emphasizes feedback, continuous improvements, and data security to help travelers make informed decisions. [7]

The proposed travel booking app aims to streamline trip planning by integrating hotel, train, and flight reservations into a single platform. It bridges the gap between traditional agencies and online services, leveraging mobile technology for a user-friendly and efficient experience. The study focuses on young travelers' digital behavior, emphasizing real-time booking, location-based services, and personalized recommendations to enhance tourism. [8]

This study evaluates Nepal's official tourism portal, analyzing user experience, technical performance, and design. It identifies usability issues, content gaps, and technical flaws through surveys and testing. Insights aim to enhance accessibility, navigation, and digital services, making the site more user-friendly and effective for travelers. [9]

Highlights how Neural Machine Translation (NMT) has surpassed Statistical Machine Translation (SMT) as the primary method due to its end-to-end learning approach. The study emphasizes that attention mechanisms have significantly improved NMT performance, with encoder-decoder architecture serving as the foundation for most models. [10]

AI is transforming the travel industry with big data, machine learning, NLP, and automation. The paper highlights AI-driven personalization, chatbots, predictive analytics, and smart tourism solutions that enhance user experiences. It also addresses challenges like data privacy, biases, and job displacement due to automation. [11]

The research paper is transforming the travel industry through automation, big data analytics, natural language processing, and smart tourism systems. It discusses AI applications such as recommender systems, chatbots, forecasting tools, translation

applications, and robotic automation, focusing on their role in enhancing customer experiences, optimizing business operations, and addressing challenges like privacy and employment displacement. [12]

A unified travel booking system is developed using REST-API to integrate hotel, transportation, and tour ticket reservations into a single transaction. This approach eliminates fragmented bookings, enhancing efficiency and user experience. Performance testing recorded an average API response time of 2946 ms across multiple trials. The study highlights the advantages of API integration in streamlining travel bookings and suggests future improvements, such as incorporating review-based APIs for better decision-making. [13]

2.3 Limitations and Research Gap:

Existing AI-driven travel planning systems, including [1] [5] primarily rely on text-based chatbots, lacking voice assistance and multilingual support. They also do not integrate Cloud Vision API for image translation, limiting accessibility for non-native speakers and visually impaired users. Yatra Guru addresses these gaps by incorporating a voice-based AI assistant Yatra Vaani and Yatra Netra, enabling hands-free interactions and real-time image-based translations, making travel planning more inclusive and user-friendly.

Existing AI-driven travel itinerary planners,[2] , focus primarily on itinerary generation, often lacking real-time integration for hotel, flight, train, and cab bookings. While these systems provide optimized travel schedules, they do not streamline the booking process, requiring users to switch between multiple platforms for reservations.Yatra Guru addresses these gaps by integrating automated booking functionalities via APIs for hotels, flights, trains, and cabs, ensuring a seamless, all-in-one travel planning experience. This enhances user convenience by eliminating manual effort and reducing planning complexity.

This AI-driven travel navigation systems,[3] primarily offer basic route suggestions without real-time monitoring of travel conditions. While these systems use AI to generate itineraries, they do not dynamically adjust routes based on live traffic updates, delays, or nearby amenities.Yatra Guru addresses these gaps with Yatra Netra, which integrates Google Maps API with real-time travel monitoring, ensuring users receive dynamic, data-driven route recommendations that adapt to real-world conditions, improving travel efficiency and convenience.

Existing AI-driven travel planners[4] focus on destination recommendations and itinerary creation but lack predictive pricing analysis. These systems do not provide real-time insights on future price trends, making cost-effective bookings challenging for travelers.Yatra Guru addresses this gap by incorporating predictive analytics to forecast price trends for hotels enabling users to make informed and cost-efficient booking decisions.

AI-driven travel itinerary generation has primarily utilized ChatGPT-4o for generating trip plans, as seen in [6]. While effective, such models rely on generalized responses, often lacking deep contextual understanding and real-time adaptability.Yatra

Guru enhances this approach by integrating Gemini AI with Langchain LLM, offering context-aware, dynamic itinerary generation that adapts based on real-time pricing, user preferences, and multilingual interactions. This ensures a more personalized, intelligent, and responsive travel planning experience.

Many AI-driven travel planning applications, such as the one discussed in [8] often overlook critical User Experience (UX) considerations. These platforms may present complex interfaces, lack intuitive navigation, and fail to provide personalized interactions, leading to user frustration and decreased satisfaction.

2.4 Problem Statement

- **Challenges in Travel Planning** Travel planning is often complex, involving tasks such as selecting destinations, creating itineraries, managing budgets, and overcoming language barriers. This complexity can lead to overwhelm and stress for travelers.
- **Current Limitations** The lack of an integrated solution results in inefficient, time-consuming planning processes that detract from the overall enjoyment of travel experiences. Travelers often juggle multiple platforms, leading to overlooked details.
- **The Need for a Comprehensive Solution** A comprehensive travel planning tool is essential to simplify this process. Features like personalized itinerary generation and seamless language translation for user reviews can enhance the travel experience.
- **Benefits of an Integrated Tool** Such a solution empowers travelers to plan efficiently, reducing stress and allowing them to focus on enjoying their journeys and creating lasting memories.

CHAPTER: 3
DESIGN AND IMPLEMENTATION

Chapter 3

Design Implementation

3.1 Proposed System

Planning:

- **Select Destination**:Users can explore and choose from a wide range of destinations based on their preferences such as region, climate, travel time, interests (e.g., adventure, culture, relaxation), and budget.
- **Create Itinerary**: llows users to design a day-wise itinerary including activities, tourist spots, restaurants, hotels, and local transportation. The itinerary builder can automatically allocate time slots based on opening hours, distance, and user preferences. Also can download pdf of itinerary.
- **Manage Budget**: Users can define their travel budget which is then used to recommend cost-effective options for transport, stay, food, and activities. Real-time tracking of expenses helps users stay within budget. Integration with currency converters and expense calculators enhances utility.
- **Navigate Language Barriers**: The system includes language translation tools for both text and speech. Users can communicate with locals, read signs, menus, and public information. A built-in voice assistant helps translate conversations in real-time, making travel in foreign regions smoother.

Features:

- **Dynamic Pricing**:Integrates APIs from hotel booking platforms and local attractions to fetch real-time pricing data for accommodations and entry fees to popular places. Users receive alerts on hotel price drops, limited-time offers, and seasonal discounts on attractions. The system visualizes pricing trends over time using dynamic graphs, helping users determine the best time to book. Filters allow users to compare prices by rating, location, amenities, and user reviews to make cost-effective and informed decisions.
- **Language Translation**: Supports multilingual translation of user queries, voice inputs, and visual text (OCR). It helps travelers communicate or understand local instructions.

- **Itinerary Generator**: Based on user inputs like travel dates, group size, interest areas (e.g., historical sites, adventure sports), budget, and stay duration, the AI engine automatically creates a travel itinerary. It can be regenerated with variations and fine-tuned manually.
- **User Review Analysis**:Uses sentiment analysis and keyword extraction on reviews from platforms like Google, TripAdvisor, and Yelp to rank and recommend places, restaurants, and activities. It summarizes reviews to save user time and suggests based on user preferences.
- **Pricing Insights**:Provides average cost breakdowns for each destination—like daily food expenses, average hotel rates, and transportation fares. Helps users choose destinations aligned with their financial plans. Shows comparative cost charts among multiple destinations.
- **Seamless Translation**: Ensures all language-related features are tightly integrated into the platform—whether it's reading a menu through camera translation, live speech conversion, or automatic translation of local websites. This creates a hassle-free multilingual travel experience.
- **Personalized Itinerary**: Takes into account user history, preferences, travel style (luxury/backpacker), previous reviews/ratings, and demographics to generate a tailor-made itinerary. It adapts in real-time based on changing conditions like weather, closures, or budget changes.

3.2 Hardware Requirements

- A laptop or desktop
- Processor: Core i3 or above
- RAM: 4GB
- Internet: A required upload and download speed of 2 Mbps, with 10 Mbps preferred.

3.3 Software Requirements

- **Visual Studio Code**
  Visual Studio Code (VS Code) is a free, lightweight code editor developed by Microsoft. It is widely used by developers because it supports many programming languages, including JavaScript, Python, and more. VS Code has built-in features such as debugging, Git version control, and extensions that make coding easier and more efficient.

- **React**
  React is a JavaScript library used to build user interfaces, especially for web applications. Created by Facebook, it allows developers to create reusable components, which makes coding more efficient and scalable. React's key feature is

its ability to update and render UI components dynamically, making web pages more interactive and responsive.

- **Firebase**
  Firebase is a platform developed by Google for building web and mobile applications. It provides various services like a real-time database, authentication, cloud storage, and hosting. Firebase is popular because it simplifies the backend of applications, allowing developers to focus more on the user interface and core functionality.

- **Python**
  Python is a high-level programming language known for its simplicity and readability. It is widely used in many areas like web development, data science, automation, and machine learning. Python's large community and extensive libraries make it a versatile tool for solving complex problems in fewer lines of code.

- **Flask**
  Flask is a lightweight web framework for Python that allows developers to build web applications quickly and easily. Unlike larger frameworks, Flask is minimalistic, giving developers flexibility to use only the tools they need. It's commonly used for creating small to medium-sized web applications and APIs.

- **API's** An API (Application Programming Interface) is a set of rules that allows different software programs to communicate with each other. It acts as a bridge between different applications or services, allowing them to send and receive data. APIs are widely used in modern web development to integrate third-party services like payment gateways, weather data, or social media into applications.

  I. Google Gemini Bard API
  The Google Gemini Bard API enables developers to integrate advanced natural language processing (NLP) features into their applications, allowing for more human-like text interactions and responses. It is based on AI models optimized for dialogue and conversation.

  II. Google Places API
  Google Places API provides detailed information about different places like restaurants, parks, and businesses based on the user's location or input. It can be used to find and display nearby places, with data like reviews, ratings, and addresses.

  III. Google Translation API
  The Google Translation API enables developers to seamlessly integrate real-time language translation into their applications. It supports translation across a wide range of languages and can automatically detect the source language, enhancing user experience and accessibility.

IV. Google Maps API
Google Maps API offers features to embed interactive maps into websites and applications. It provides access to geographic data, route planning, and location-based services, making it essential for apps that require geo-location functionalities.

- **Step-by-Step Workflows**

I. User Interaction
The user types or speaks a query (e.g., "Suggest places to visit in Jaipur").

II. Gemini Bard API (Chatbot Engine)
Understands the user's intent using AI and NLP. If it detects a location-based query, it passes that data to the backend.

III. Google Places API (Location Discovery)
Based on the input (e.g., "places in Jaipur"), it fetches top-rated attractions, hotels, restaurants, etc., with photos, reviews, and ratings.

IV. Google Maps API (Visualization)
The locations fetched by the Places API are plotted on an interactive map.
Users can view the exact location, navigate routes, and explore surroundings.

V. Google Translation API (Language Support)
If the user selects a preferred language (e.g., Hindi or French), both the user query and chatbot responses are translated in real time.

VI. Combined Output
The frontend displays:
A chatbot conversation (translated if needed),
Recommended places (from Places API),
A live map (from Maps API),
All working seamlessly as one smart travel assistant.

3.4 Architectural Diagrams

3.4.1 ER Diagram

The ER (Entity-Relationship) Diagram shown below represents the database design for a travel planning system. It models how users, their preferences, trips, itineraries, destinations, pricing, and supported languages are interconnected. The system begins with users, each uniquely identified by a user ID, who also have associated attributes such as name, email, and a preferred language.

Each trip can consist of multiple itineraries, where an itinerary captures the day-wise details and activities planned for a specific destination. Destinations themselves are separately modeled with information such as name, country, and a description. The financial aspects are handled through a pricing and budgeting entity, which records both the estimated budget and the actual price of the trip. Languages are maintained in a separate entity to standardize language preferences across users and trips.

The relationships across these entities ensure that the system can efficiently organize user preferences, manage trip details, plan day-wise activities, and monitor the budget associated with each trip.

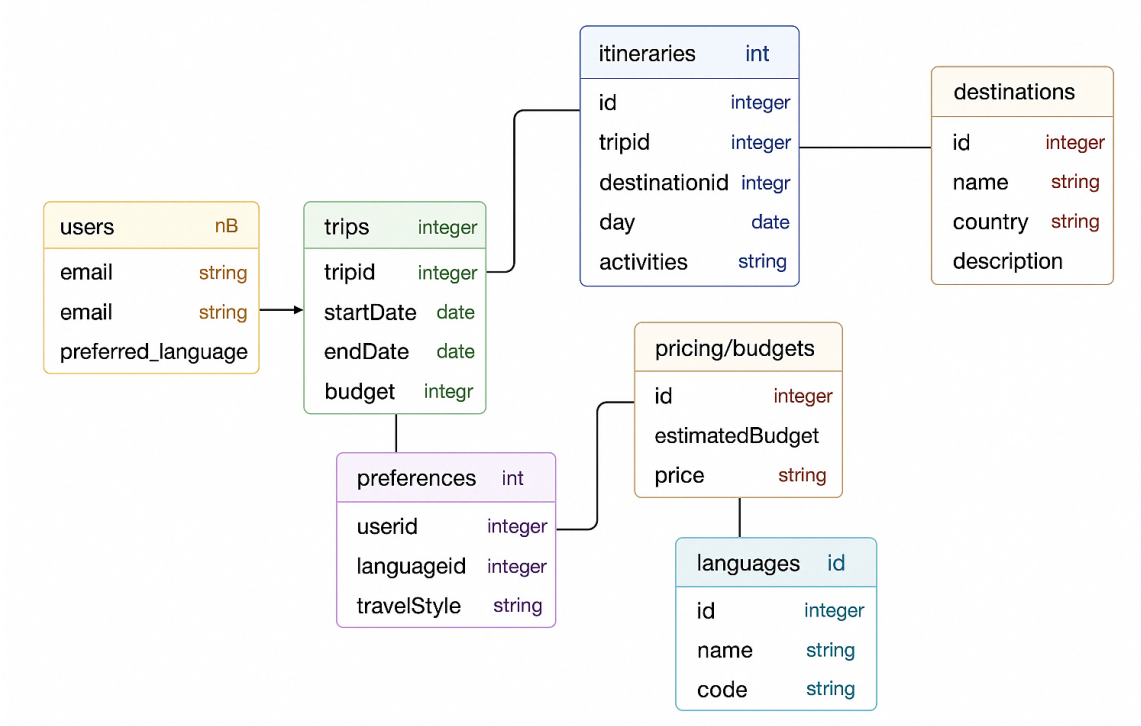


Figure 3.1: ER Diagram

3.4.2 Sequence Diagram

The sequence diagram represents the trip planning workflow involving key entities: User, YatraGuru, DestinationService, BudgetService, and ItineraryGenerator. The process begins when the User initiates the trip planning. YatraGuru responds by interacting with DestinationService to fetch a list of possible destination options. Once the options are retrieved, the DestinationService sends the destination list back to YatraGuru, who then shares it with the User. In parallel, YatraGuru communicates with BudgetService to calculate the estimated trip budget, and the resulting budget details are provided to the user.

Based on the information received, the User provides feedback. They can either accept the proposed itinerary or request modifications. If modifications are needed, YatraGuru sends the request to the ItineraryGenerator to update the travel plan. The ItineraryGenerator processes the changes and returns a revised itinerary. This updated plan is then presented to the User for final review. This iterative flow ensures that the User is actively involved in customizing their trip according to their preferences, enabling a user-centric and flexible trip planning experience.

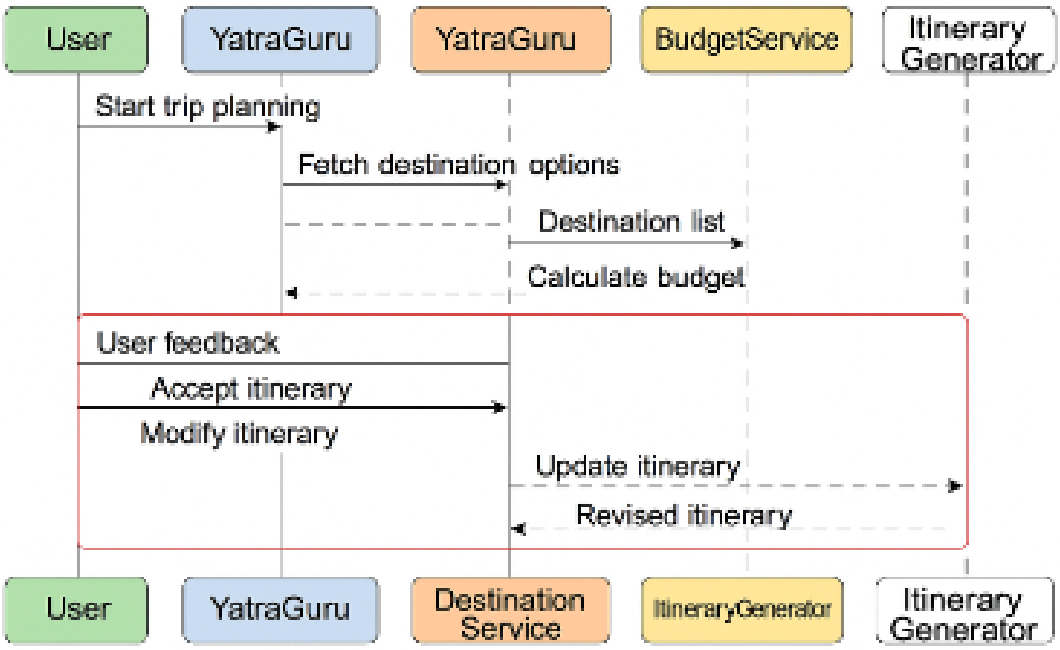


Figure 3.2: Sequence Diagram

3.4.3 Flow Chart Diagram

The flow chart diagram illustrates the workflow of a travel planning system, highlighting both backend processes and user interactions. The diagram is divided into two main sections: the backend processes at the top and the user interface activities at the bottom.In the backend processes, the system begins by fetching destination data, which provides a list of potential travel options. Simultaneously, it calculates the user's travel budget based on input or stored financial information, and translates relevant content into the user's preferred language for better accessibility. Once destination and budget data are gathered, the system proceeds to generate a travel itinerary tailored to the user's interests and constraints.

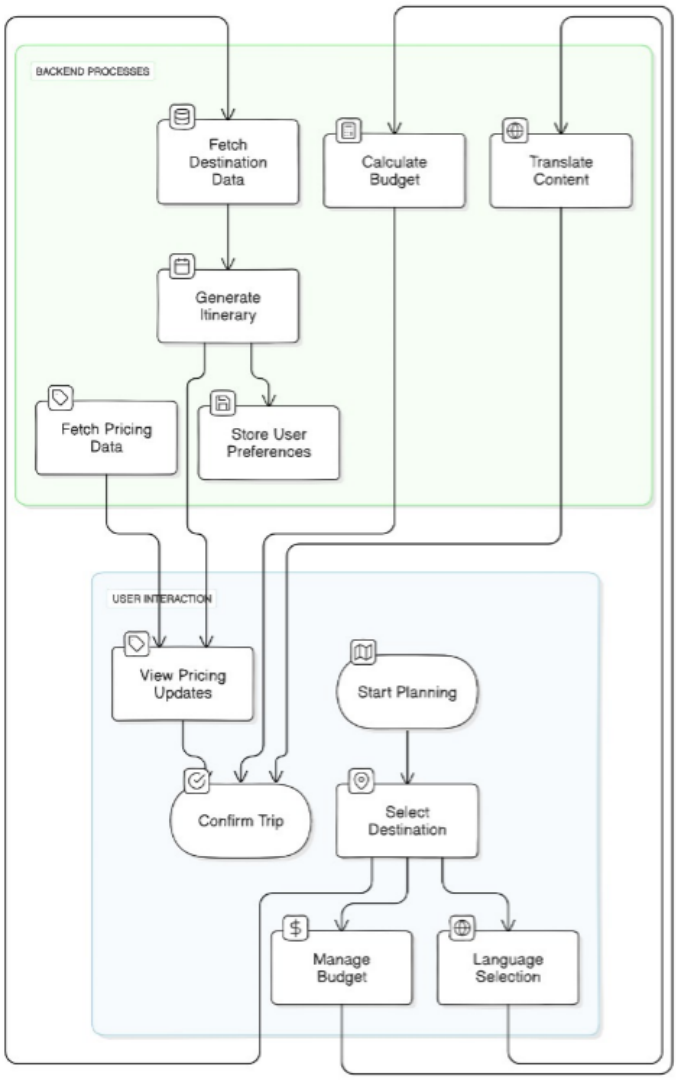


Figure 3.3: Flow Chart Diagram

3.5 Methodology

3.5.1 Create Trip

The **Create Trip** feature harnesses AI to enhance travel planning by providing personalized itinerary recommendations based on user inputs. Google Places Autocomplete API simplifies destination selection, while AI algorithms dynamically generate and adjust itineraries considering factors such as trip duration, budget constraints, and group size. The system leverages AI-powered optimization to recommend suitable travel plans, improving efficiency and customization. Secure user authentication through Google Sign-In ensures a seamless, personalized experience, while API integration facilitates real-time location data and itinerary updates, making the trip planning process more intelligent and user-centric.

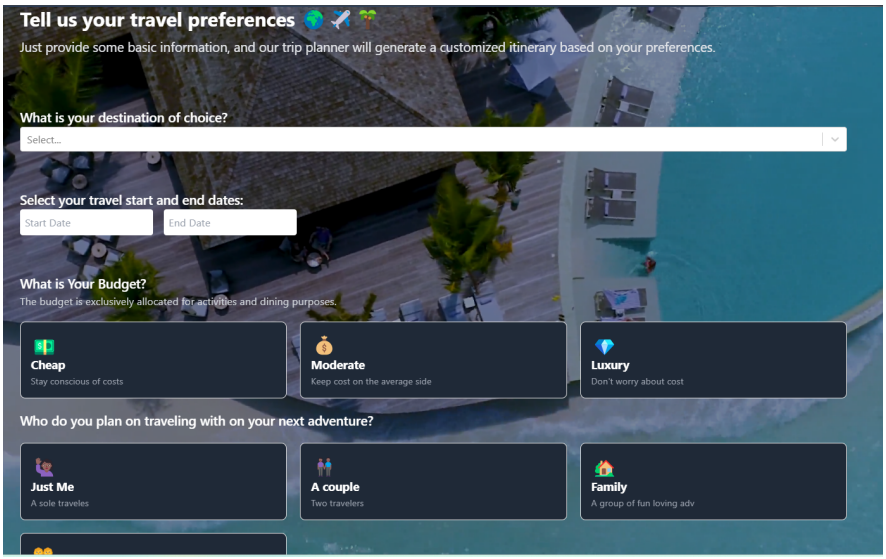


Figure 3.4: Create Trip Interface

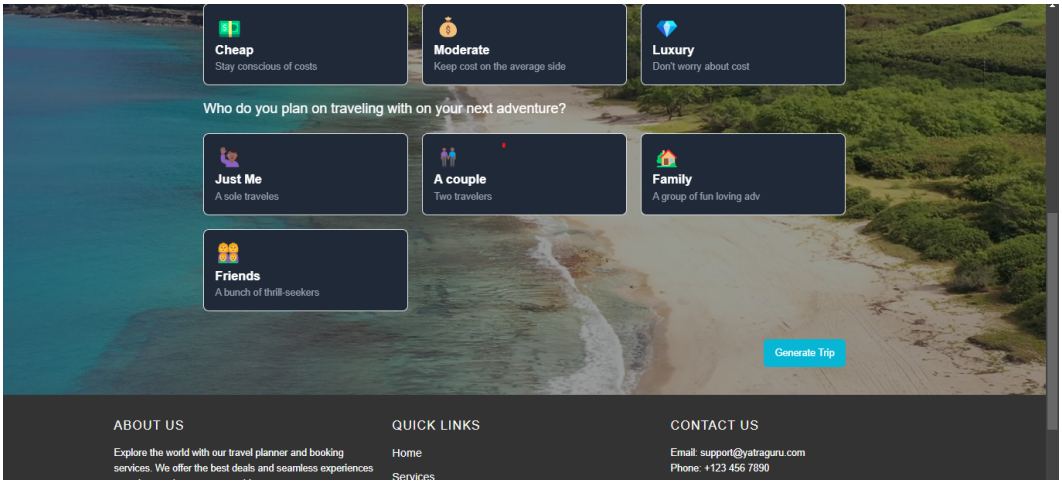


Figure 3.5: Create Trip

3.5.2 View Trip

– **View Trip**: The system retrieves and displays trip itineraries using Firebase Firestore, dynamically fetching ‘tripId‘ via ‘useParams‘. The ‘GetTripData‘ function ensures real-time data access with AI optimizing retrieval, predicting relevant details, and improving query efficiency. The interface renders bookings, destinations, accommodations, and activities, with currency formatted in INR for consistency. AI personalizes recommendations based on user preferences, history, and real-time factors like weather and price changes. API-driven enhancements, including AI-powered translation and itinerary suggestions via Google Maps and OpenAI models, refine the experience. A PDF export mechanism using ‘html2canvas‘ and ‘jsPDF‘ ensures structured trip documentation. AI optimizes layout for readability, while toast notifications provide real-time feedback on data fetching, errors, and exports. A background video enhances UI but is excluded from screenshots for clarity.

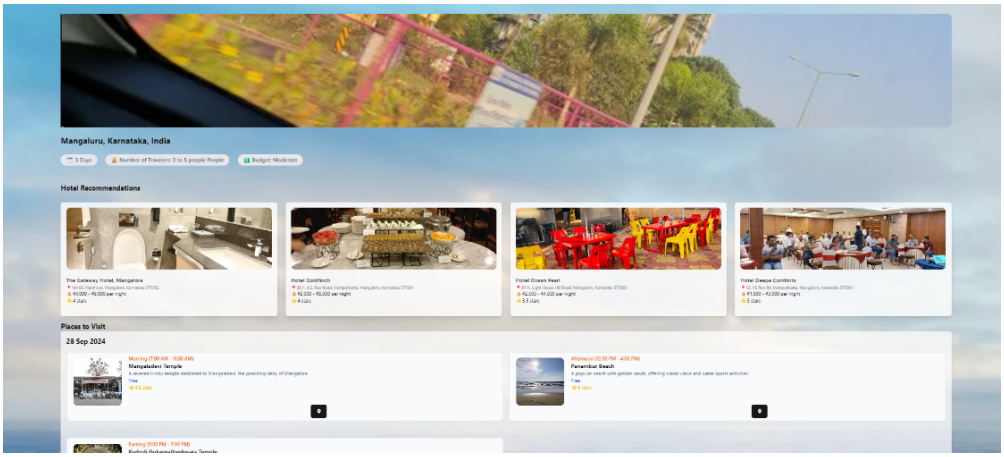


Figure 3.6: View Trip

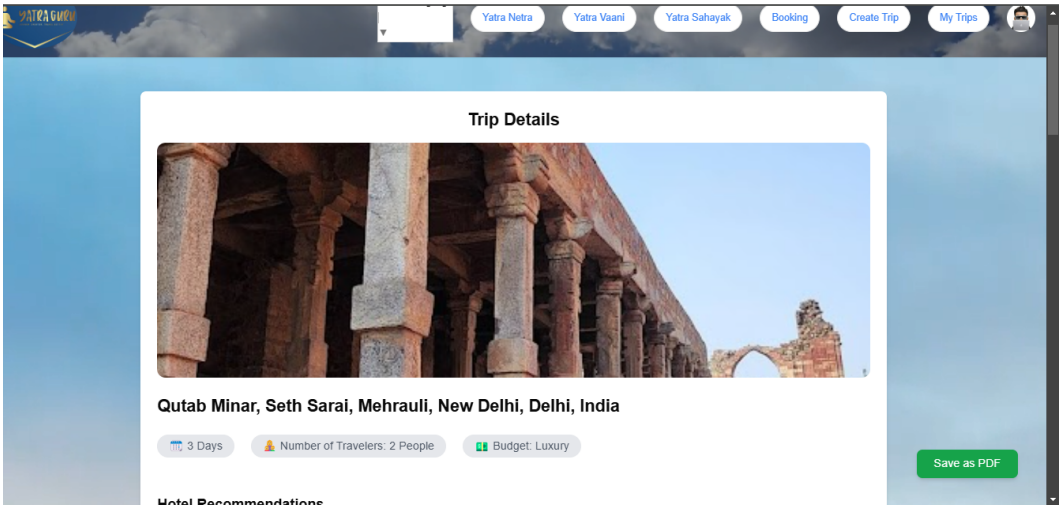


Figure 3.7: View Trip Details

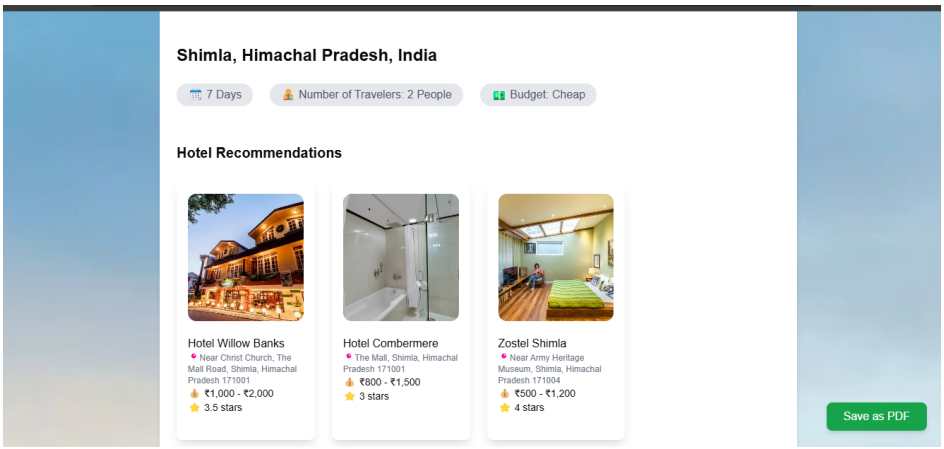


Figure 3.8: PDF

3.5.3 Yatra Vaani

– **Yatra Vaani**: The proposed system is is a speech-to-text translation application developed using React integrating AI for accuracy and efficiency. It uses the Web Speech API for real-time speech recognition and the Google Translate API for automatic translation. AI enhances recognition by adapting to various linguistic inputs and improves translation fluency and contextual accuracy. The system captures spoken language, converts it to text, and translates it into a selected language. Dynamic speech recognition ensures multilingual adaptability. The user interface prioritizes accessibility, featuring language selection and a background video for engagement. Optimized API requests minimize latency for seamless translation.

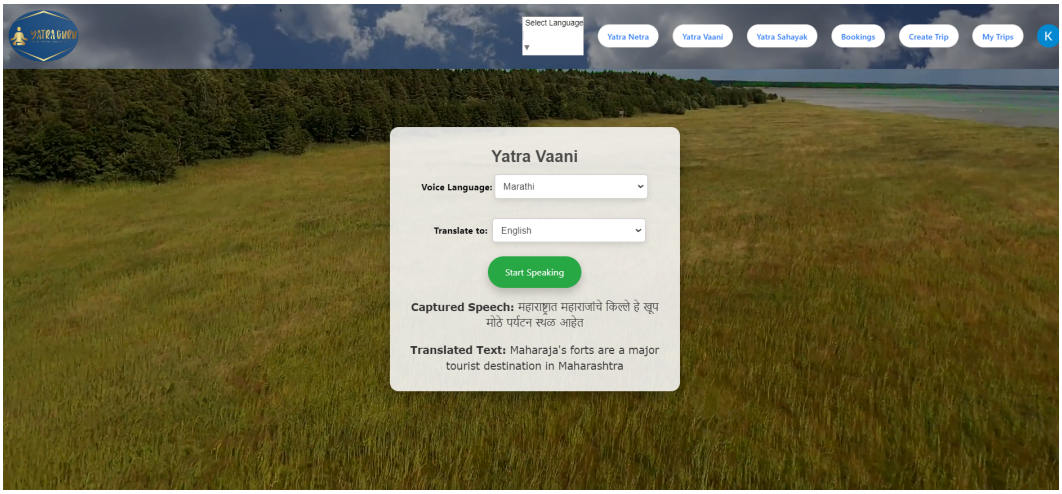


Figure 3.9: Yatra Vaani

3.5.4 Yatra Netra

– **Yatra Netra**: The platform is powered by advanced AI-driven Optical Character Recognition (OCR) and translation technologies, utilizing Google Cloud Vision, Translation, and Text-to-Speech APIs. AI enhances the accuracy and speed of text extraction, language identification, and real-time translation by continuously learning from vast linguistic datasets. The system processes text from a live webcam feed, applies OCR to recognize characters, and intelligently detects the source language before translating it into a user-defined target language.

Additionally, AI-driven speech synthesis via Google Text-to-Speech enables auditory output, making the platform more accessible for visually impaired users. The integration of these AI-powered APIs ensures seamless transitions between text capture, language translation, and speech output, offering an interactive, real-time experience. Designed for efficiency, the solution provides smooth and dynamic camera control, real-time multilingual support, and an intuitive user interface, making it an indispensable tool for travelers, students, and multilingual communication.

Figure 3.10: Yatra Netra

3.5.5 Yatra Sahayak

– **Yatra Sahayak**:

The intelligent travel assistant leverages artificial intelligence (AI) to provide personalized guidance, real-time recommendations, and optimized travel planning. By integrating machine learning algorithms and natural language processing (NLP), the system analyzes travel options and generates customized itineraries. AI-driven speech recognition and synthesis facilitate seamless multilingual voice interactions, enhancing accessibility for diverse user groups.

Additionally, predictive AI models analyze historical data to forecast potential delays and suggest alternative routes. The chatbot interface, powered by LangChain, ensures contextual and interactive conversations by

maintaining memory and dynamically adapting responses based on user input. LangChain's framework enhances the assistant's ability to process, retrieve, and generate relevant travel information efficiently. Furthermore, AI-powered multilingual translation models enable real-time language switching, ensuring smooth cross-linguistic communication. Automated speech recognition (ASR) and deep learning-based speech synthesis improve usability for visually impaired travelers and those requiring hands-free interaction. The system's adaptive recommendation engine refines its accuracy over time, offering increasingly personalized travel suggestions.

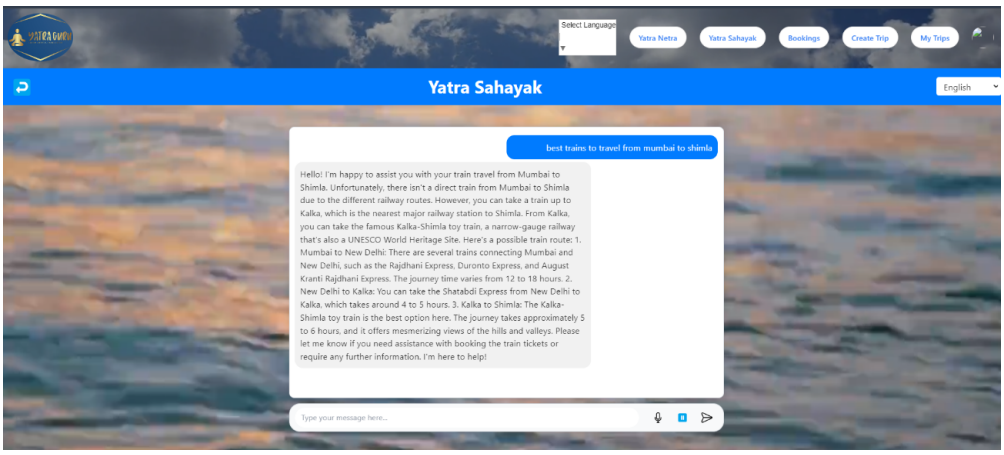


Figure 3.11: Yatra Sahayak

3.5.6 Booking

– **User Reviews and Ratings**: The system incorporates an AI-powered review and rating mechanism to enhance user feedback analysis and hotel evaluation. Natural Language Processing (NLP) techniques analyze user reviews, structuring insights for improved decision-making. A machine learning-based recommendation engine identifies top-rated hotels and assigns a "Recommended" badge, boosting visibility. The rating system employs FontAwesome icons for structured star ratings. API integrations facilitate real-time review retrieval and updates, ensuring data consistency. AI-driven sorting algorithms rank hotels based on popularity, and pricing.

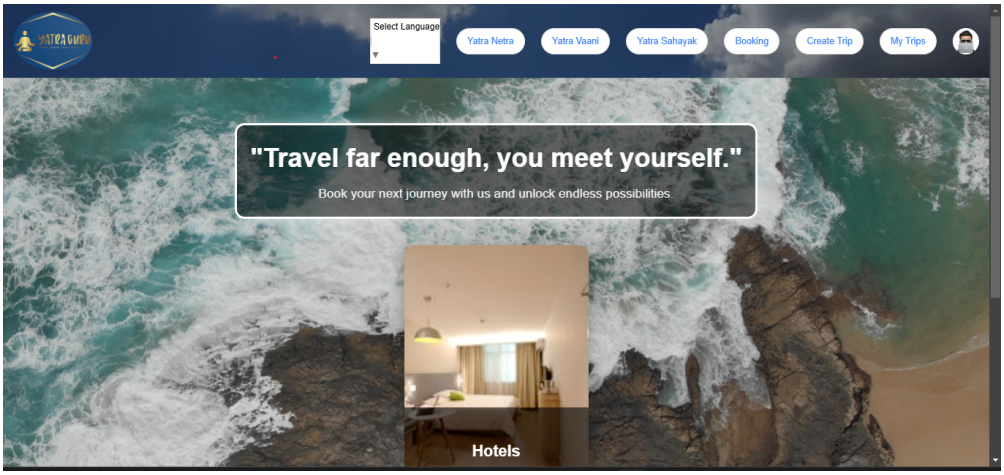


Figure 3.12: Booking

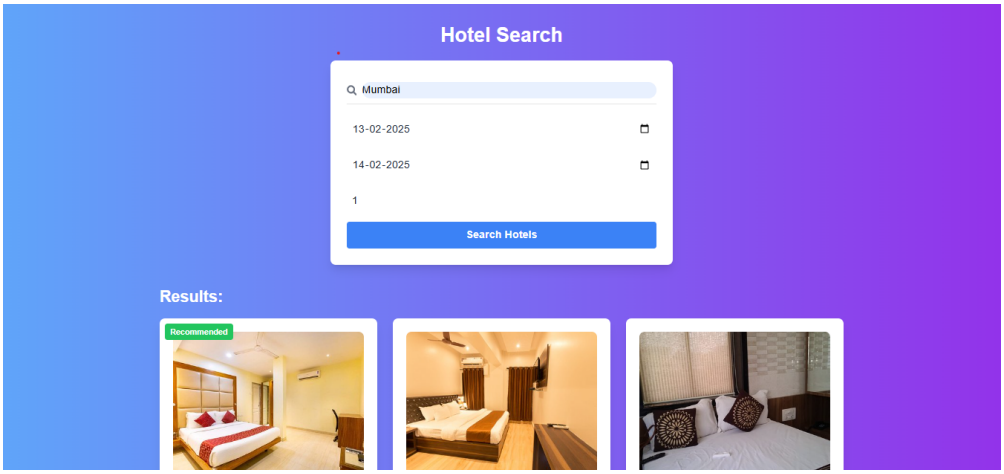


Figure 3.13: Hotel Booking

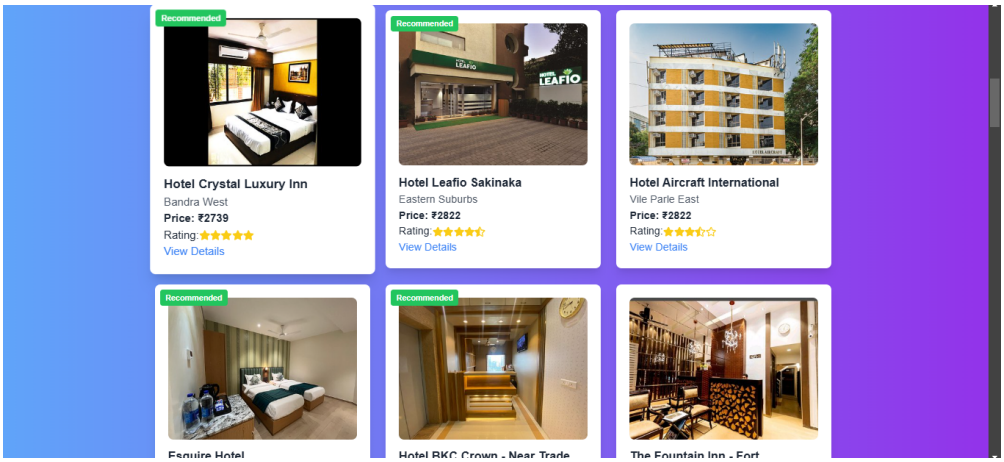


Figure 3.14: Hotel Options

CHAPTER: 4

RESULTS AND DISCUSSION

Chapter 4

Results and Discussion

4.1 Pseudo Code

4.1.1 CreateTrip Component

Algorithm 1 CreateTrip Component

States: `place, formData, startDate, endDate, loading`
Input: Location, Dates, Budget, Traveler
function handleInputChange(name, value)
    Update `formData[name] = value`
end function
On Date Change: calculate `totalDays`
function OnGenerateTrip
    if user not logged in **then**
        Open login dialog
    end if
    if form invalid **then**
        Show error
        return
    end if
    Generate prompt, send to AI
    Save result to Firebase
    Redirect to trip page
end function
function SaveAiTrip(data)
    Save `data` and `formData` to Firestore
end function
function GetUserProfile(token)
    Fetch and store user from token
    Trigger `OnGenerateTrip`
end function
UI: Inputs, Cards, Generate Button, Login Dialog

4.1.2 YatraVaani Component

Algorithm 2 SpeechTranslator Component

Initialize: `capturedText, translatedText, inputLang = "hi", outputLang = "en"`
Create `recognition` with language = `inputLang`
Enable continuous + interim results
On Speech Result:
    Get transcript from `event.results`
    Update `capturedText`
    Call `translateText(transcript, outputLang)`
function STARTRECOGNITION
    Clear texts and start `recognition`
end function
function TRANSLATETEXT(text, targetLang)
    Build request with `text`, source, targetLang
    Send POST to Google Translate API
    Extract and decode response
    Update `translatedText`
end function
function HANDLELANGUAGECHANGE(input/output)
    Update language state
    if input changed **then**
        Update `recognition.lang`
    end if
end function
UI: Video background, dropdowns, start button
Display `capturedText` and `translatedText`

4.1.3 YatraNetra

Algorithm 3 Lens Component

States: `translatedText, cameraActive, targetLanguage`
Refs: `videoRef, canvasRef`
Env: `API_KEY`
function startCamera
    Request camera access and set `videoRef.srcObject`
    `cameraActive` ← `true`
end function
function stopCamera
    Stop all media tracks
    Clear `videoRef.srcObject`
    `cameraActive` ← `false`
end function
function capturePhoto
    Draw video frame to `canvasRef`
    Extract image and call `performOCR(image)`
end function
function performOCR(image)
    Convert to Base64, send to Google Vision API
    if text detected **then**
        Call `detectAndTranslate(text)`
    end if
end function
function detectAndTranslate(text)
    Detect language using Google Translate API
    Translate to `targetLanguage`
    Update `translatedText`, call `textToSpeech()`
end function
function textToSpeech
    Send translated text to Google TTS API
    Play returned MP3 audio
end function
UI: Heading, Video/Canvas, Buttons: Start/Stop/Capture, Language Dropdown, Translated Text Display
Effect: On `cameraActive`, trigger `startCamera`

4.1.4 YatraSahayak

Algorithm 4 ChatComponent

States: `message, response, loading, selectedLanguage, messages`
Refs: `recognitionRef, utteranceRef`
Env: `API_KEY`
function startVoiceInput
    if 'webkitSpeechRecognition' in window **then**
        Initialize `recognitionRef` with selected language
        On `onresult`, set `message` and call `handleSubmit()`
    else
        Alert 'Speech recognition not supported'
    end if
end function
function handleSubmit
    Set `loading` to true, change background color
    Send `message` and `selectedLanguage` to API
    if response is valid **then**
        Update `messages` with `user` and `ai` messages
        Speak `response` using `SpeechSynthesisUtterance()`
    else
        Log error
    end if
    Reset `message`, set `loading` to false
end function
function stopVoiceInput
    Stop `recognitionRef` if active
end function
function stopSpeechSynthesis
    if speech is speaking **then**
        Cancel speech

        function getVoiceForLanguage(lang)
            Find matching voice from `window.speechSynthesis.getVoices()` **return** Voice for language
        end function
        function goBack
            if history exists **then**
                Go back in history
            else
                Redirect to home page

                UI Elements: Video background, Select language dropdown, Chat area, Form with input and buttons for voice input
                Effects: On language change, reinitialize speech recognition settings

4.1.5 HotelBooking Component

Algorithm 5 HotelSearch

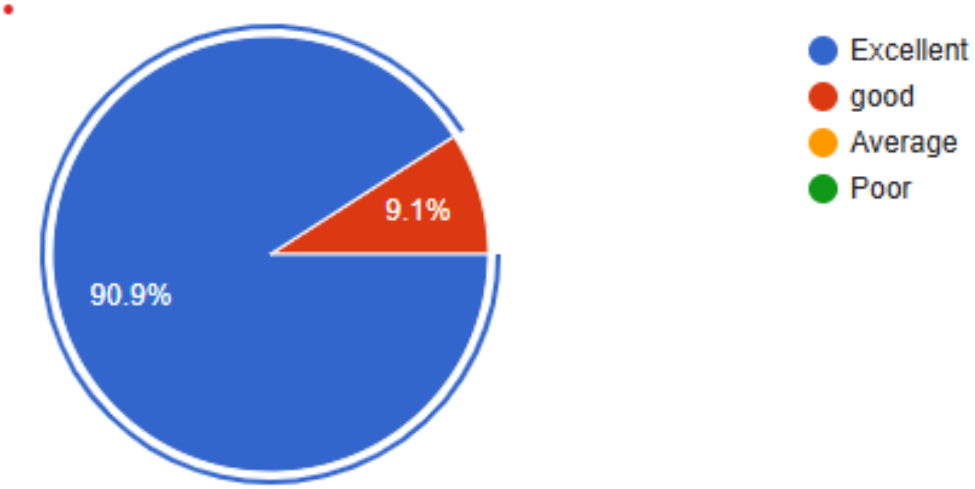
States: `formData, hotels, loading, error`
Env: `API_ENDPOINT`
function HANDLECHANGE
    Update `formData` with user input (location, checkin, checkout, guests)
end function
function HANDLESUBMIT
    Set `loading` to true, clear `error`
    Send `formData` to API via POST request
    if response is valid **then**
        Parse and sort hotel data by price
        Update `hotels` with sorted data
    else
        Set `error` to 'Failed to fetch hotel data'
    end if
    Set `loading` to false
end function
function RENDERSTARS(rating)
    Generate star icons based on hotel rating (FaStar, FaStarHalfAlt, FaRegStar)
return stars
end function
UI Elements: Form inputs (location, checkin, checkout, guests), submit button, hotel cards with details
Effects: Loading state during fetch, error message if fetch fails =0

4.2 Analysis

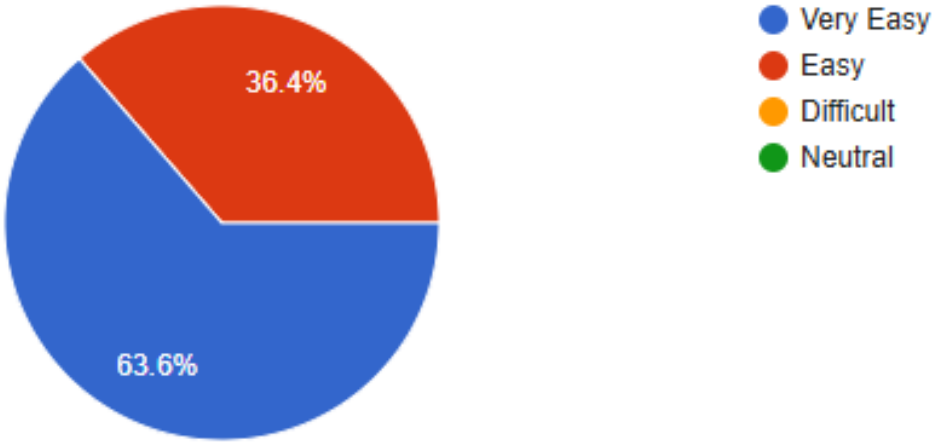
4.2.1 Survey Questions (Google Form)

The following questions were included in the survey conducted via Google Forms to understand user preferences, challenges, and expectations related to our project:

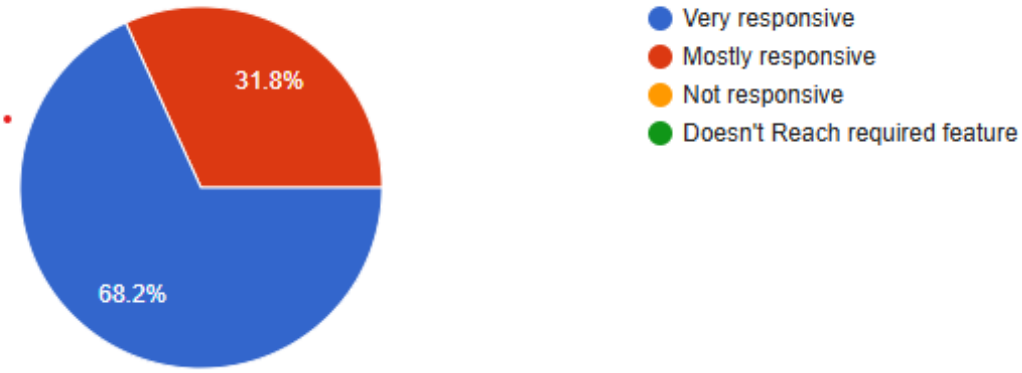
1. How would you rate your overall experience with Yatra Guru?



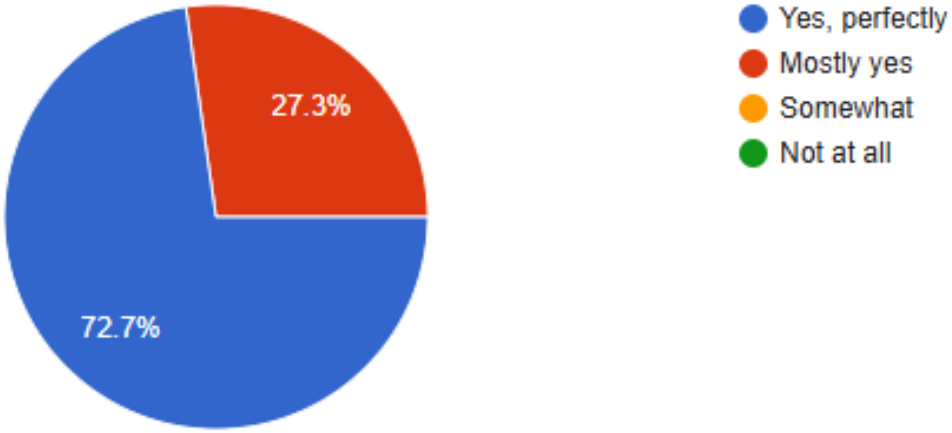
2. How easy was the platform to navigate?



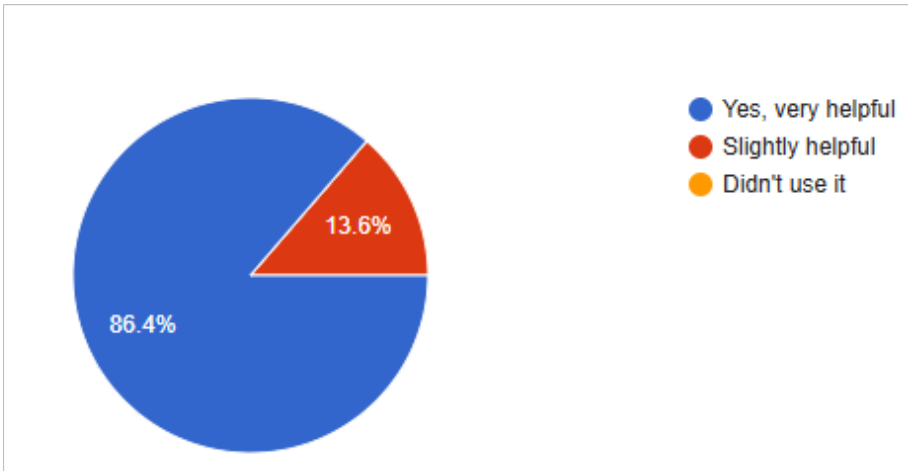
3. How was the responsiveness of the website across every feature?



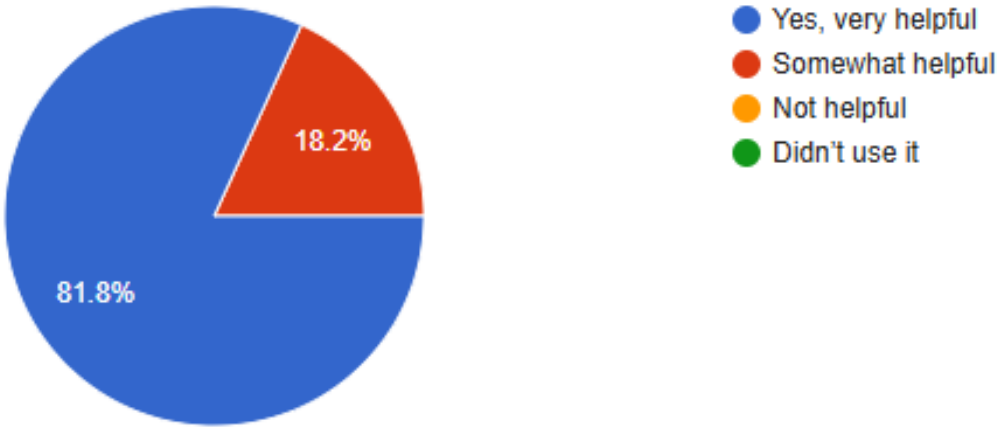
4. Did the itinerary match your preferred travel style (e.g., adventurous, relaxing, budget)?



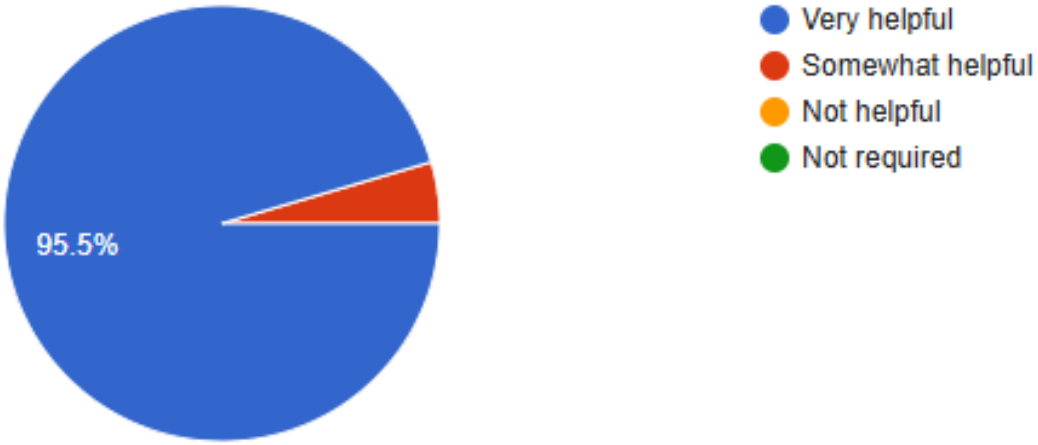
5. Did the sentiment analysis help you choose better options (hotels, attractions)?



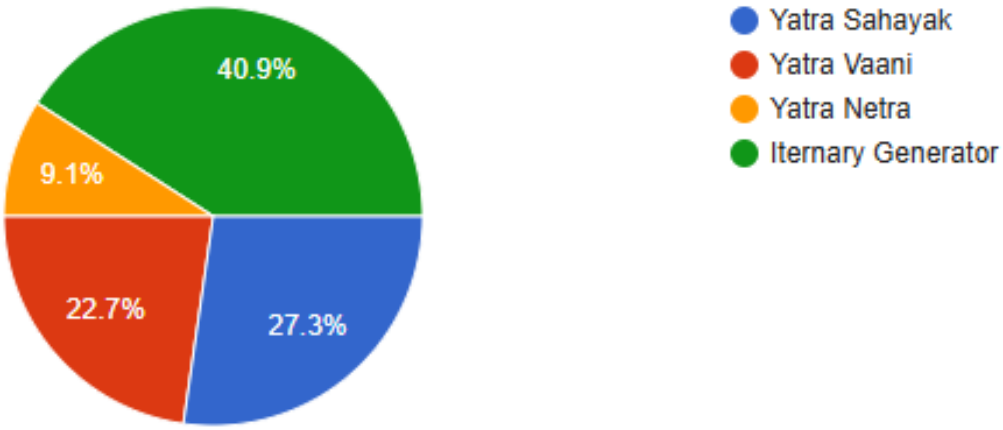
6. Was the dynamic pricing insight feature helpful for trip planning?



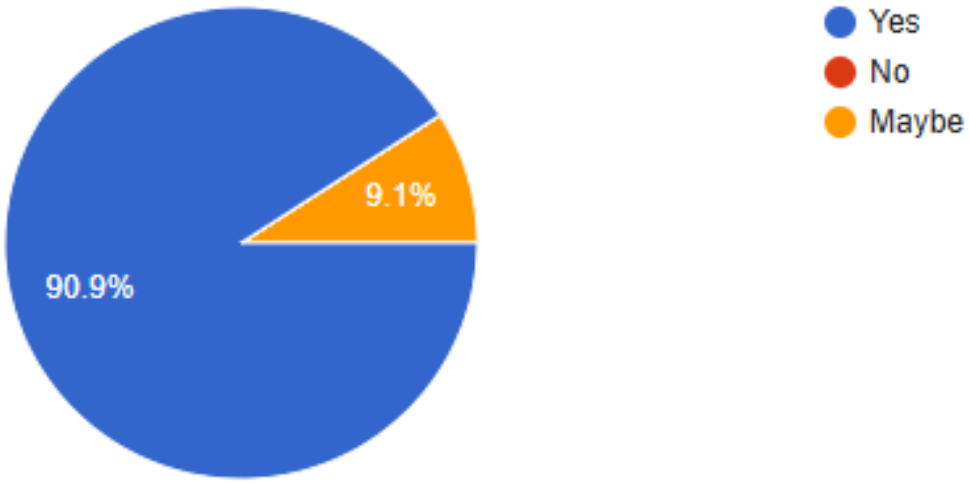
7. How helpful was the language translation feature?



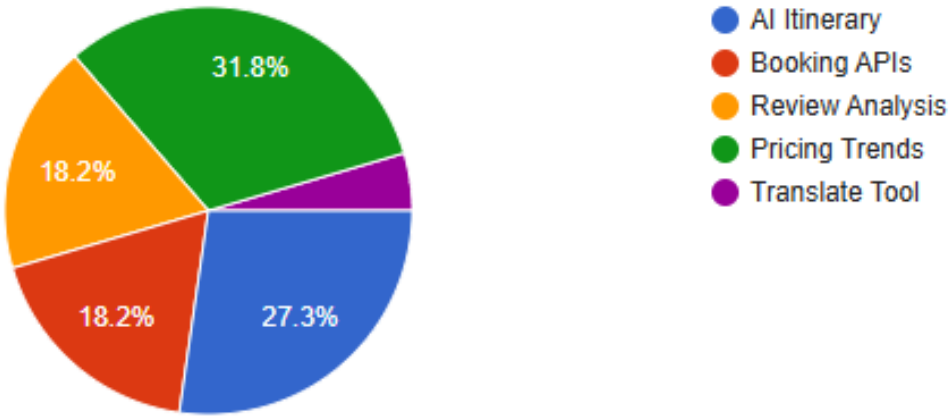
8. Which feature did you find most impressive?



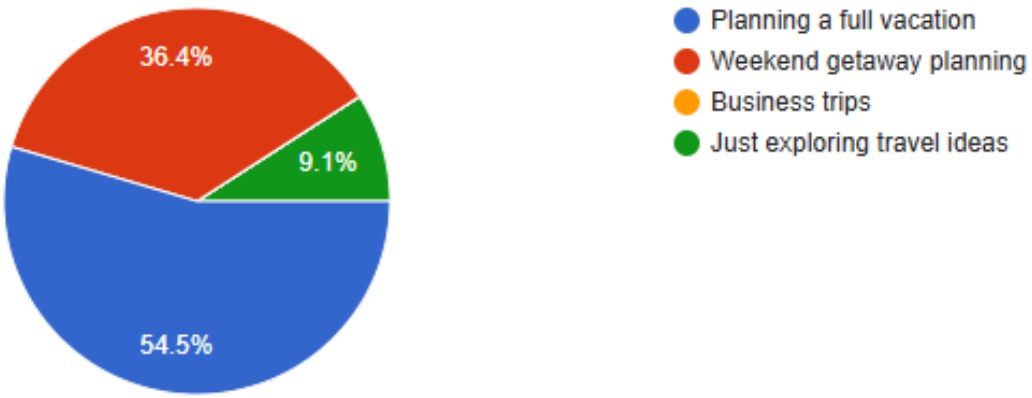
9. Would you consider using Yatra Guru for future travel planning?



10. What feature should be made more prominent on the homepage?



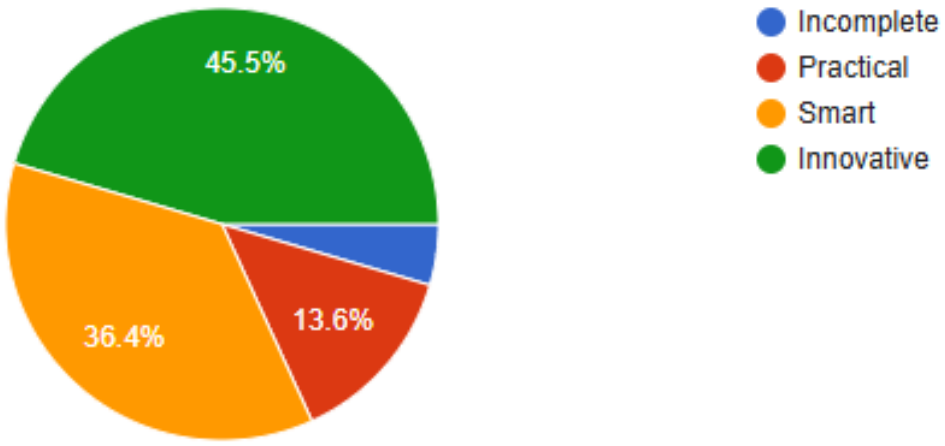
11. Where would you personally use this tool the most?



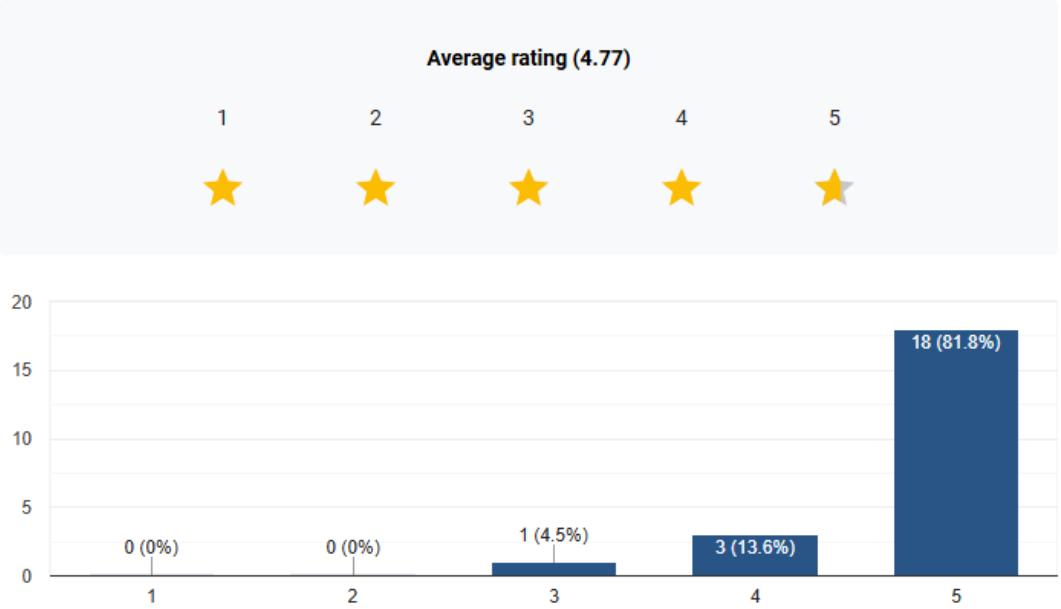
12. What Features should be added in future to this project?

Its good according to me
the feedback in contact us.
A few ui changes will be suffice
3rd trip globe 🌎
More booking options such as for flights, cab, trains
Clear map pdfs
Flight and Railway Booking
NA
I guess its perfect as it is now
Flight and Railway Bookings
amazing
Perfect
Superb

13. What's the one word that best describes your impression of Yatra Guru?



14. How would you rate the visual design of the platform?



4.2.2 Survey Response Analysis

- **Positive Overall Feedback:** The majority of users expressed high satisfaction with their experience using Yatra Guru, indicating that the platform is effectively meeting their expectations.
- **Ease of Use:** The platform was described as **easy to navigate**, showcasing an intuitive and user-friendly interface that allows for smooth user interaction.
- **Website Responsiveness:** Users found the platform to be **technically reliable and responsive** across different features, contributing to a seamless experience.
- **Itinerary Relevance:** The generated itineraries were seen as **well-aligned with users' travel preferences**, including adventurous, relaxing, and budget-conscious styles.
- **Sentiment Analysis Feature:** This feature was widely considered **helpful in decision-making**, particularly when choosing hotels and attractions.
- **Dynamic Pricing Insight:** Users appreciated this tool for its **support in planning and budgeting**, enhancing the overall trip planning process.
- **Language Translation:** The translation tool was one of the most valued features, providing a **smoother experience for multilingual users**.
- **Most Impressive Features:** Users most often highlighted the **Itinerary Generator**, as well as tools like **Yatra Vaani**, **Yatra Sahayak**, and **Yatra Netra**.

- **Repeat Usage Intent:** Most respondents indicated a **willingness to use the platform again** for future travel planning.
- **Homepage Feature Suggestions:** Key features suggested for greater prominence include **AI-generated itineraries**, **pricing trends**, **review analysis**, and **booking integrations**.
- **Use Case Variety:** Respondents planned to use Yatra Guru for **full vacations, weekend getaways**, and even **casual travel idea exploration**, demonstrating the platform's versatility.
- **Feature Requests:** Suggested enhancements included **flight, train, and cab bookings**, **user reviews**, **AI restaurant suggestions**, **voice navigation**, and **improved maps and UI**.
- **Impression Keywords:** Users described Yatra Guru as **Innovative**, **Smart**, and **Practical**, reflecting a strong, modern impression of the platform.
- **Visual Design Praise:** The platform's **visual aesthetics were highly rated**, further reinforcing the positive user experience.

CHAPTER: 5

CONCLUSION

Chapter 5

Conclusion

5.1 Conclusion

Yatra Guru simplifies planning a trip using AI-powered itinerary building, live price tracking, and multilingual support within a single simple interface. Using machine learning and forecasting algorithms, it provides customers travel recommendations based on their requirements, enabling them to optimize their expenses better and make more informed decisions.

Unlike other travel portals, Yatra Guru is never callous to customers' needs, fluctuating prices, and changing traveling conditions, and offers a superior, more streamlined planning process. Its wise thinking has brought about greater efficiency, efficient cost management, and improved customer satisfaction, and is now an essential tool for travelers today.The forthcoming enhancements will feature smart price alerts, APIs for bookings, and more towards heightened user engagement, adding to its functionality to excel at providing a wiser, hassle-free, and frictionless booking experience in travel. Auto Quest is a step towards digital travel recommendation innovation, making the trip as frictionless as the planning.

5.2 Future Scope

- **Booking Page**: This page will help users to book the flight, cab, hotel rooms as per their convenience. After implementing this, users can accommodate the best as per their requirements and budget.
- **Comparison Page**: This page will help users compare prices of hotels so they can select the best fit and most budget-friendly option.
- **Filter by Amenities**: Allow users to filter hotels, flights, or cabs based on specific amenities like free Wi-Fi, pool, breakfast included, business class, or additional services like free airport transfer.
- **Price Alerts**: Let users set price alerts so they get notified when the price of a flight, hotel, or cab drops to their desired range.

- **Best Time to Book**: Show users insights or recommendations about the best time to book based on historical data or trends to help them secure the best prices.

5.3 Conference Link

https://ieee-conecct.org/

References

[1] Sai Mohith S , Dr. HemaMalini B H , Karthik K , Nithin Reddy P N§Sanath R. (January 2025) A Review Paper On AI-Driven Travel Planning

[2] Ankita Mudhale, Madhuri Shirmale, VedantKudalkar, Rishikesh Motiray, Sharique Ahmad (April 2024) Travel Itinerary Planner Using AI

[3] Komal Londhe , Nikita Dharmadhikari , Parth Zaveri , Unal Sakoglu (May 2024) Enhanced Travel Experience using Artificial Intelligence: A Data-driven Approach

[4] Reenu Joseph (June 2024) Trip Planner and Recommender with GenAI

[5] Prachiti Bapat; Ruchir Jadhav; Vedant Mishra; Aarti Sahitya(Feb 2023) An Approach Travel Recommendation System and Route Optimizer using AI

[6] Chandra Sekhar Veluru (October 2023)Transforming Travel Planning: The Impact of Generative AI on Itinerary Optimization, Cost Efficiency and User Experience

[7] Shrivastav, S., Patel, S. (2023, November). Trip Advisor: A User-Centric Travel Planning Application. Journal of Tourism Technology.

[8] Zaid Makwani, Umar Momin, Ayush Dubey (May 2022)Travel Booking App

[9] Deepanjal Shrestha, Tan Wenan, Neesha Rajkarnikar, Deepmala Shrestha and Seung Ryul Jeong (2021 Aug) Study and Evaluation of Tourism Websites based on User Perspective

[10] Almeida, P. F., Mendes, A. C. (2021, October). Highlights how Neural Machine Translation (NMT) has surpassed Statistical Machine Translation (SMT) as the primary method due to its end-to-end learning approach.

[11] M. Arora, N. Chaudhary, M. Bhandwal, T. Baig and P. Patil, (November 2023) "AI-Driven Personalized Travel Planning: Enhancing Tourist Experiences in Uzbekistan,"

[12] Jacques Bulchand-Gidumal (August 2020) Impact of Artificial Intelligence in Travel, Tourism, and Hospitality

[13] Faiza Renaldi, Hary Suryanto, Agya Java Maulidin, Irma Santikarama Integrating Travel Booking Management System Using Rest-API(November 2020)