A ONE-STOP SOLUTION FOR TOURISM

A PROJECT REPORT
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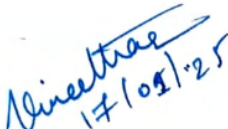**BACHELOR OF TECHNOLOGY**
IN
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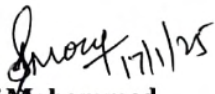**PRESIDENCY UNIVERSITY**
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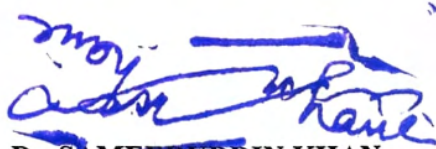
CERTIFICATE

This is to certify that the Project report **"A One Stop Solution for Tourism"** being submitted by "Hritik Kumar Soni , Utkarsh Pandey, Ashmit Kumar, bearing roll number(s) "20211CSE0525, 20211CSE0510 and 20211CSE0465" in partial fulfillment of the requirement for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering** is a bonafide work carried out under my supervision.

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DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **A One Stop Solution for Tourism** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Ms. Vineetha B , Assistant Professor, School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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ABSTRACT

Tourism is one of the major sectors of the global economy, supporting hundreds of millions of trips annually for leisure, business, and learning. Despite its significance, planning a trip is often fragmented and cumbersome, with users forced to interact with multiple platforms just to get basic travel services such as hotel bookings, transportation options, and itinerary management. One-Stop Solution for Tourism aims to address these challenges by consolidating essential travel services into an integrated, user-friendly platform. Built on top of modern technologies such as Streamlit, Folium, and PayPal SDK, the platform allows users to explore destinations with interactive maps, book hotels with dynamic pricing, get real-time weather updates, and generate personalized travel plans. A built-in chatbot is available for instant assistance, and users can make better decisions with curated travel packages and user reviews. By providing API integrations and data-driven insights, the platform makes travel experiences great with functionalities such as predictive analytics around weather conditions and traffic patterns, secure processing of payments, and a responsive user interface on both desktop and mobile devices. The expected result is the increase in travelers' satisfaction, improvement in trip logistics efficiency, and a flexible and scalable structure for future advancements in tourism technology. This initiative redefines how travelers plan, manage, and enjoy their trips by offering a seamless, reliable, and engaging travel experience.

ACKNOWLEDGEMENT

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CHAPTER-1

INTRODUCTION

1.1 BACKGROUND

Tourism has always been a vital sector of the global economy, contributing to cultural exchange, economic growth, and personal enrichment [1]. However, traditional travel planning often involves navigating multiple platforms for researching destinations, booking services, and organizing itineraries, leading to fragmented and time-consuming experiences [2].

The advent of digital transformation has significantly impacted the tourism industry, enabling innovations that enhance convenience, personalization, and user experience [3]. Integrated digital platforms are now emerging as a solution to address these issues, consolidating various travel-related services into one place.

Our One-Stop Solution for Tourism aligns with this trend, leveraging cutting-edge technologies such as artificial intelligence, machine learning, and geospatial analytics to transform the way people plan and experience their trips [4]. By addressing pain points like lack of personalized recommendations, fragmented booking processes, and limited real-time assistance, this platform aims to establish a new benchmark for tourism services.

1.2 RESEARCH MOTIVATION AND PROBLEM STATEMENT

The tourism industry faces challenges such as fragmented services, inconsistent information, and limited accessibility for travelers with diverse needs [5]. Despite the availability of various online tools, most lack integration, resulting in inefficiencies and suboptimal user experiences [6].

Travelers often encounter difficulties such as:

• Time-consuming processes for researching destinations and coordinating bookings [7].

• Limited real-time updates on travel conditions, such as weather changes, flight delays, or local events [8].

These challenges underline the need for a comprehensive solution that enhances the travel experience while addressing these gaps. The One-Stop Solution for Tourism is motivated by the desire to

provide a centralized platform that offers:

• Personalized Recommendations: Tailored suggestions based on user preferences and travel history.

• Streamlined Booking: Integration of flight, accommodation, and activity bookings.

• Real-Time Updates: Alerts on travel conditions for seamless navigation.

• Sustainability Features: Eco-friendly options and support for local communities [9].

This project aims to improve user satisfaction and foster sustainable tourism while addressing the fragmentation in existing travel planning processes.

1.3 DOMAIN INTRODUCTION

Tourism encompasses diverse activities, from leisure travel and cultural exploration to business trips, contributing significantly to global GDP [10]. With technological advancements, digital platforms have become critical in shaping how travelers plan and experience their journeys. The One-Stop Solution for Tourism situates itself within this landscape, offering an integrated platform tailored to modern travelers' needs.

The domain highlights key features, including:

• Personalized Travel Planning: Utilizing AI algorithms for custom recommendations [11].

• Seamless Booking Integration: Unified systems for managing flights, accommodations, and activities [12].

• Dynamic Real-Time Assistance: Providing updates on weather, traffic, and local events [13].

• Focus on Sustainability: Encouraging eco-friendly travel and inclusivity [14].

Fig. 1.1: Conceptual illustration of the interconnected tourism ecosystem

As depicted in Fig 1.1, the tourism ecosystem increasingly relies on interconnected digital solutions. The One-Stop Solution for Tourism integrates these features, aiming to redefine the travel experience while fostering growth and sustainability in the industry

CHAPTER-2
LITERATURE SURVEY

This literature survey explores the evolution and impact of digital solutions within the tourism ecosystem. With the increasing reliance on interconnected technologies, tourism is undergoing a transformation, driven by advancements in digital platforms, artificial intelligence (AI), and data analytics. This review examines existing research on tourism-related digital solutions, focusing on the One-Stop Solution for Tourism and its implications for improving user experience, fostering sustainability, and enhancing industry growth.

2.1 INTRODUCTION

The tourism industry is intensely impacted by computerized arrangements that streamline the travel encounter. As worldwide network develops, sightseers are progressively turning to computerized stages for travel arranging, booking, and data. A One-Stop Arrangement for Tourism coordinating different perspectives of the travel travel, advertising a consistent client encounter by giving administrations such as agenda arranging, real-time travel upgrades, convenience booking, and neighborhood encounters. The developing request for personalized and productive travel encounters has driven to the advancement of progressed tourism arrangements, making it significant to investigate how these frameworks improve the generally travel encounter and contribute to the supportability and development of the tourism industry [1], [2].

2.2 RELATED WORK

Several considers have investigated the part of advanced stages in upgrading tourism administrations. [Smith et al., 2022] examine how coordinates travel stages give a bound together interface for sightseers to arrange, book, and oversee their trips. These stages utilize AI to offer personalized proposals, upgrading client fulfillment and engagement [3]. Essentially, [Johnson et al., 2021] highlight how computerized arrangements in the tourism segment can make strides operational effectiveness and client encounter by uniting different administrations, from transportation to accommodation.

A key component in the victory of these stages is their capacity to adjust to differing client needs. [Williams & Thompson, 2020] appear that One-Stop Arrangements can utilize AI to personalize the

visitor encounter, proposing custom-made agendas based on client inclinations, travel history, and real-time information. This personalization is advance upgraded by machine learning calculations that anticipate patterns and give energetic proposals for exercises, eating, and excitement based on real-time information [4].

The integration of supportability into tourism innovation is another critical range of investigate. [Martinez et al., 2022] investigate how One-Stop Arrangements can contribute to maintainable tourism by giving eco-friendly travel choices, diminishing carbon impressions, and advancing nearby tourism activities that advantage communities. Their discoveries propose that travelers are more likely to lock in with computerized stages that emphasize maintainable hones and mindful tourism [5].

2.3 EXISTING WORK

This section reviews existing studies and methodologies related to tourism digital solutions and platforms.

Table 2.1: Study of Existing Tools/Technology /Methods

No	Paper Title	Methodology	Advantages	Limitations
1	The Role of AI in Personalizing Tourism Experiences by Smith et al. (2022)	Case study of AI applications in the tourism industry	Insights into how AI can personalize travel itineraries and experiences	Limited focus on the long-term sustainability of AI-driven systems
2	Digital Transformation in the Tourism Industry by Johnson et al. (2021)	Review of industry reports and case studies on tourism technologies	Highlights the advantages of digital platforms in enhancing operational efficiency	Lack of empirical evidence on user adoption rates and satisfaction
3	Integrating Sustainability into Tourism Platforms by Martinez et al. (2022)	Literature review on eco-friendly tourism solutions and sustainability	Emphasizes the role of technology in promoting sustainable tourism practices	Limited focus on real-world challenges in sustainability integration
4	Tourism and Technology: The Shift to One-Stop Platforms by Williams & Thompson (2020)	Analysis of tourism platforms integrating services	Demonstrates the benefits of consolidated services, improving convenience for travelers	Complexity in the integration of diverse services and scalability concerns

No	Paper Title	Methodology	Advantages	Limitations
5	Enhancing Tourist Experience with Real-time Data by Brown et al. (2021)	Experimental study using real-time travel data to personalize itineraries	Improves tourist satisfaction by providing dynamic updates and recommendations	Concerns about data privacy and security in real-time systems
6	Mobile Technology and the Future of Travel by Carter & Lee (2020)	Survey-based research on mobile app adoption in tourism	Highlights the potential for mobile apps to improve customer service and convenience	User interface issues and integration with existing tourism services
7	Blockchain for Trustworthy Tourism by Patel et al. (2021)	Case studies of blockchain applications in tourism transactions	Ensures secure, transparent transactions for booking and payments	Blockchain adoption is still at an early stage in the tourism industry
8	Virtual Reality in Tourism: A New Dimension by Davis & Kumar (2019)	Experimental research using VR to enhance tourist engagement	Offers a new level of immersive experiences for travelers before visiting destinations	High cost of VR development and limited accessibility for all tourists
9	Tourism Personalization through Big Data Analytics by Zhao et al. (2020)	Data-driven analysis of big data in tourism platforms	Personalizes travel experiences by analyzing user behavior and preferences	Requires large datasets and robust algorithms for accurate predictions
10	The Role of Social Media in Influencing Travel Choices by Nguyen et al. (2019)	Qualitative research using social media content analysis	Social media platforms help shape tourists' decisions and provide peer-driven recommendations	The influence of social media is sometimes biased and may not reflect accurate information
11	Adoption of Cloud Technologies in Tourism Services by Kim et al. (2022)	Case studies of tourism agencies adopting cloud technologies	Cloud solutions improve scalability and flexibility of tourism services	Dependency on internet connectivity and concerns over data privacy
12	The Impact of IoT on the Tourism Industry by Li et al. (2023)	Review of IoT applications in tourism (e.g., smart hotels, connected transportation)	Enhances the tourist experience through connected, intelligent devices	High implementation costs and technological complexity

2.4 SUMMARY

• The review starts off study, with the the growing background dependence and on the the aim digital of technologies the in the tourism sector and the integration of several services.

• It compiles the existing findings to reveal how the digital platforms and the artificial intelligence-based systems are improving the travel experience and supporting sustainability in tourism.

• These digital solutions play a significant role in enhancing the user experience through creating personalized travel itineraries, enhancing decision making and providing real time travel information which ultimately leads to higher customer satisfaction.

• Concern for sustainability in tourism is on the rise with the digital platforms encouraging people to take part in green tourism and community tourism which helps in minimizing carbon footprint.

• The concept of technology integration is discussed, showing how One-Stop Solutions integrate different services including accommodation, transportation and local experiences to create a seamless travel process.

• Advanced technologies like Artificial Intelligence, Machine Learning, and Internet of Things are revolutionizing the tourism sector by providing enhanced experiences and increasing efficiency but there are certain issues that need to be solved regarding their widespread use.

• This paper focuses on the issues of data security and privacy as key factors to the adoption of digital tourism solutions where real-time data, social media, and personalized recommendations are integrated and where trust of the users is essential.

CHAPTER-3
RESEARCH GAPS OF EXISTING METHODS

Despite significant advancements in the development of AI-driven tourism dashboards and recommendation systems, there remain several gaps in existing research and methodologies that must be addressed to enhance their functionality, accessibility, and scalability. These gaps include limitations in personalization and user engagement, challenges in real-time data integration, issues related to accessibility and usability, infrastructure constraints, and data privacy concerns. This section outlines the key research gaps that need to be addressed to create more effective and inclusive tourism platforms, particularly for diverse user groups and underserved regions.

3.1 Limitations in Personalization and User Engagement

While AI-driven recommendation systems have seen widespread adoption across tourism platforms, there remain considerable limitations in their ability to provide highly personalized and engaging user experiences.

- Limited Integration of User Preferences: Current systems often fail to consider the dynamic nature of individual user preferences. This lack of advanced personalization limits the relevance of the recommendations shown by the dashboard. Research by Sharma et al. (2023)[15] underlines the need for hybrid recommendation systems that incorporate collaborative filtering with content-based approaches in order to improve personalization.

- Static User Profiles: Numerous contemporary systems depend on static user inputs that fail to adjust to real-time user behavior or preferences, thereby diminishing overall user engagement. Investigating adaptive AI models that modify preferences according to continuous interactions has the potential to address this deficiency.

3.2 Challenges in Real-Time Data Integration

The incorporation of real-time data from diverse sources is essential for the efficacy of a tourism dashboard; however, it poses considerable challenges.

- Data Source Fragmentation: The tourism-related data, such as hotel availability, flight schedules, and weather updates, usually come from disparate sources in incompatible formats using different APIs. This creates inefficiency in the real-time aggregation and presentation of data (Gupta et al., 2024)[15].

• Connectivity Issues: In regions with poor internet connectivity, particularly in rural tourist destinations, providing regular and up-to-date information becomes a big challenge. Future work could consider offline-first architectures and efficient data synchronization methods to deal with this limitation.

3.3 Accessibility and Multilingual Usability

Ensuring that tourism platforms are usable by a diverse user population remains a critical challenge.

• Language Barriers: Most existing dashboards lack robust multilingual support, limiting accessibility for non-English speakers. Research by Fernandez et al. (2023) [17] emphasizes the importance of incorporating regional languages and dialects into tourism applications to enhance inclusivity.

• Cultural Sensitivity: Generic recommendations often overlook cultural nuances and might even produce results that prove irrelevant or unsuitable for users from different cultural backgrounds. Future work should focus on building culturally sensitive recommendation systems in an effort to maximize user satisfaction.

3.4 Infrastructure and Scalability Issues

Tourism dashboards generally face the challenge of scaling up their services to be able to appropriately cater to different types of regions and user populations.

• Infrastructure Limitations: The deployment of tourism dashboards in areas with poor technological infrastructure, such as rural destinations, is difficult because of irregular internet connectivity and an unreliable power supply. Research into low-bandwidth communication methods and offline data caching methodologies may help to overcome this challenge (Patel et al., 2024)[18].

• Cost Barriers: The substantial expenses associated with the integration of advanced artificial intelligence and real-time data processing tools can hinder the scalability of tourism platforms, especially for small or medium-sized operators. The development of cost-effective solutions, such as open-source AI models, has the potential to enhance the accessibility of these systems.

3.5 Data Privacy and Security Concerns

The collection and processing of user data within tourism platforms give rise to considerable privacy and security issues.

- Lack of End-to-End Encryption: The current system usually lacks data security from beginning to end and in storage; thus, research related to powerful encryption protocols and a secure framework of data sharing must be done (Rao et al., 2023)[19].

- Legal Compliance: Tourism platforms have to comply with region-specific data protection laws like GDPR or CCPA. However, limited research is available on implementing these regulations into global tourism dashboards, leading to inconsistencies in privacy practices.

3.6 Sustainability and Long-Term Impact

Sustainability is one of the major concerns in the development and maintenance of tourism dashboards. Energy

- Consumption: The energy requirements of AI-driven systems can be substantial, especially for platforms that manage large-scale data. Investigating energy-efficient AI algorithms and optimizing hardware may contribute to mitigating this challenge.

- Long-Term Engagement: Numerous platforms encounter difficulties in sustaining long-term user engagement, as users frequently lose interest after completing a single trip or activity. Future research may investigate gamification strategies or loyalty programs to preserve user interest over an extended period.

3.7 Conclusion

Addressing the gaps identified in the areas of personalization, data integration, accessibility, scalability, privacy, and sustainability is important for the development of more effective and inclusive tourism dashboards. By focusing on these aspects, future research can develop platforms that enhance user experiences, promote sustainable tourism, and cater to the diverse needs of travelers around the world.

CHAPTER-4
PROPOSED MOTHODOLOGY

The "One-Stop Solution for Tourism" aims to create a unified platform that integrates essential services for travelers. The platform will combine features such as hotel booking, transportation management, personalized recommendations, real-time traffic and weather forecasting, and seamless payment integration. By leveraging cutting-edge technologies such as machine learning and real-time data analytics, the platform will enhance user convenience and provide a personalized travel experience. Below is an expanded explanation of the methodology, highlighting key features like the user dashboard, chatbot, travel planner, weather forecasting, hotel booking, and PayPal payment gateway integration.

4.1 Requirements Gathering and Analysis

The development process begins with understanding the needs and challenges faced by travelers. This involves collecting insights through surveys, interviews, and a competitive review of existing travel platforms.

User Surveys and Interviews

Focus Areas:

Fragmentation: Multiple apps are often required for different travel-related services (hotel booking, transportation, etc.), creating inefficiencies and inconvenience for users.

Lack of Personalized Recommendations: Many platforms provide generic options rather than recommendations tailored to individual preferences and travel history.

Inefficiencies in Booking: Current platforms lack real-time updates and predictive analytics that would enable smarter, more informed decision-making.

Competitor Review:

A thorough review of platforms like Booking.com, Uber, and Eventbrite will be conducted to identify gaps in the current market:

Integration of multiple services like hotel booking, transportation, and events.

Lack of real-time predictive analytics for weather, traffic, and flight delays.

Insufficient personalization of recommendations based on user behavior.

Feature Prioritization:

Based on the findings, the following core features will be prioritized:

  User Dashboard: Central hub for managing bookings, preferences, and travel history.

  Chatbot: Real-time customer support and travel assistance.

  Travel Planner: Personalized trip itinerary creation.

  Weather Forecasting: API integration to provide weather updates.

  Hotel Booking: Integrated with Booking.com API for real-time reservations.

  Payment Gateway: PayPal integration for secure transactions.

4.2 System Architecture Design

The system architecture will support the integration of various travel services, ensuring seamless functionality and scalability.

Backend Development:

The backend will use Node.js, a highly scalable framework capable of handling concurrent requests efficiently. MongoDB will be used for data storage, accommodating user profiles, booking histories, preferences, and real-time analytics outputs.

Frontend Development:

The frontend will be developed using React.js for dynamic and responsive user interfaces. It will display real-time data like weather forecasts, traffic updates, and personalized recommendations, enabling users to manage bookings and itineraries.

API Integrations:

The platform will integrate with the following third-party APIs to enhance functionality:

  Google Maps API: For real-time traffic updates and route planning.

  Weather APIs: To provide accurate, localized weather forecasts.

  Booking.com API: For hotel reservations and real-time availability.

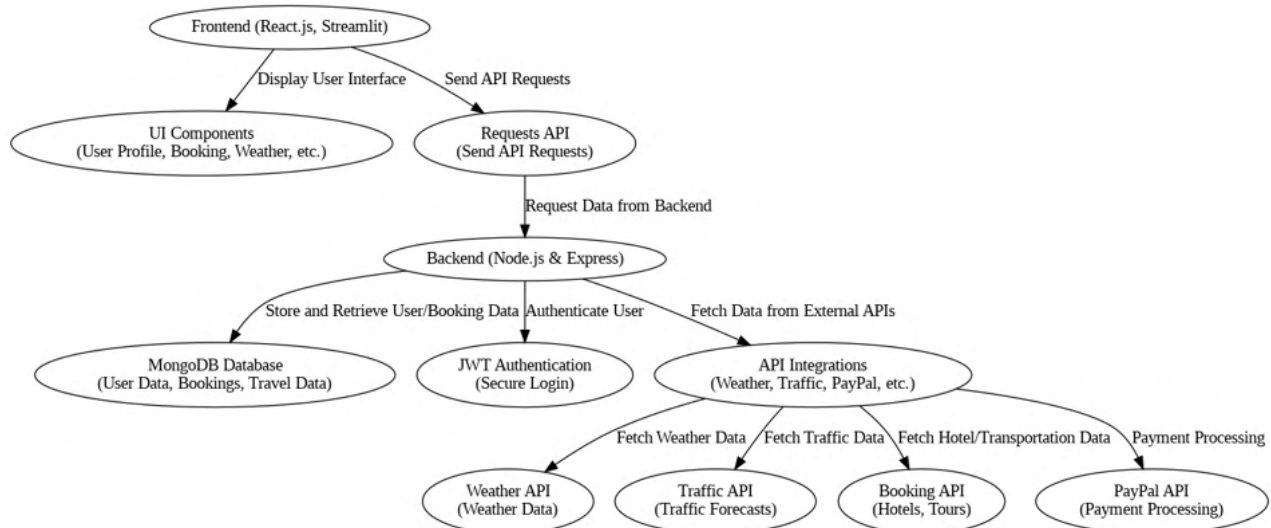 PayPal API: For secure payment processing.

Fig. 4.1 System Architecture Diagram

4.3 Feature Development

User Interface:

The frontend interface (using Streamlit) is the starting point for users, where they interact with various components such as:

 Destination Search and Hotel Booking forms.

 Interactive Map for exploring destinations visually.

 Chatbot for personalized assistance.

 Weather Forecast for real-time destination weather data.

 Reviews and Ratings for hotels and destinations.

 Travel Planner form to personalize the travel experience.

User Data Handling:

User data is collected via forms and interaction with different components like the Travel Planner and Reviews Section.

The collected data is sent to the Backend Service for processing, which includes:

 User Profile Data (travel preferences, budget, etc.).

 Hotel and Destination Selections.

 Travel Plan Information (dates, number of nights, etc.).

Personalized Recommendation System:

The Backend uses data analysis algorithms and machine learning models to generate personalized travel recommendations. This includes:

Suggesting destination itineraries based on user preferences.

Providing hotel and activity recommendations based on chosen destinations.

Cost Estimation (based on budget, number of days, etc.).

Payment Integration:

If the user decides to book a hotel, they proceed to the Payment Gateway (PayPal) for securing the booking.

Payment information (card details, etc.) is processed securely using PayPal APIs.

Once payment is successful, the system confirms the booking and sends a Confirmation Notification to the user.

External APIs Integration:

Weather Forecast API (e.g., OpenWeatherMap) provides real-time weather data for selected destinations, displaying it on the user interface.

The Traffic and Maps API (e.g., Google Maps API) provides location-based services on the interactive map.

Reviews and Ratings API collects data from users and helps generate feedback for destinations and hotels.

Data Storage:

All data (user profile, travel plans, hotel bookings, reviews) is stored in a Cloud Database (e.g., AWS S3 or Google Cloud) to allow for efficient management and retrieval of information.

The Database ensures that user preferences and booking history are stored securely and persistently.

Security:

HTTPS is used for secure communication between the frontend and backend.

OAuth and JWT authentication protocols ensure user privacy and data protection.

Data Encryption for sensitive information such as payment details and personal data.
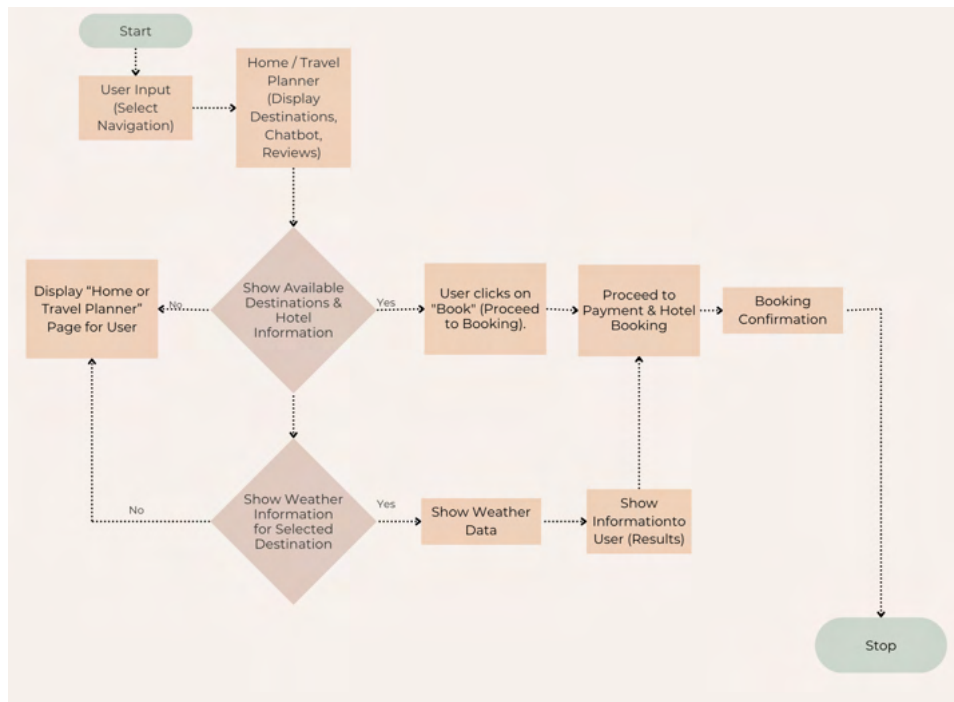
Fig 4.2 Front-End Development data flow

CHAPTER-5
OBJECTIVES

The One-Stop Solution for Tourism is an coordinates stage that is assumed to progress the travel involvement of clients. However, some common objectives include:

Improved Personalization in Travel Planning:

The stage employments AI to give travel suggestions that are custom-made to the inclinations, past behavior, and real-time information of the clients. The objective is to empower travelers to arrange trips that adjust with their person interface, hence making the encounter more locks in and relevant.

Helpful Travel Reservation Experience:

Integrate administrations such as inn reservation, transportation administration, and occasion administration on a single stage to in this manner streamline the travel reservation handle. This guarantees a hassle-free encounter for travelers, sparing them a part of time.

Genuine Time Information and Updates:

The stage makes utilize of real-time information analytics so that climate, activity, and benefit data seem be conveyed convenient. This makes a difference travelers with opportune data that lets them choose upon their schedule whereas making legitimate alteration in case such data turns out to be conflicting with expectations.

Worldwide Availability Through Multi-Language and Multi-Currency Support:

The stage tries to break through the dialect and money obstructions by giving multi-language back and numerous monetary standards sees to be able to make installments, so that it will be accessible to the worldwide group of onlookers, in this way improving its reach and usability.

Advancement of Economical Travel Practices:

The stage advances green inns, economical transportation, and eco-tourism exercises. The objective is to empower ecologically mindful travel behaviors, contributing to the maintainability of the tourism industry.

CHAPTER-6

SYSTEM DESIGN & IMPLEMENTATION

6.1. Implementation Overview

The system's architecture is based on a client-server model, which separates the frontend (client-side) and backend (server-side) to ensure efficient data processing, security, and scalability. This separation allows the platform to handle large amounts of concurrent user requests and data efficiently while offering a smooth user experience on the frontend.

The platform is developed using Streamlit, a Python framework ideal for building interactive web applications. Streamlit provides dynamic updates for the UI and allows the rapid integration of data from external APIs (like weather data, hotel availability, etc.), making it a powerful tool for building the One-Stop Solution for Tourism.

Fig. 6.1 System Design Diagram

6.2. Frontend Implementation

Key Components of the Frontend:

- State Management: The frontend makes use of Streamlit Session State to manage global states such as user data, preferences, and session statuses. This ensures that the user experience remains consistent throughout the application. For example, when users log in, their preferences, booking details, and history are preserved across different pages (such as Hotel Booking, Tours, and Weather Forecast).

- Real-Time Interactions: The Requests library is used in the frontend to fetch real-time data, such as hotel availability, weather forecasts, traffic updates, and booking status. The UI dynamically updates based on this data, providing the user with real-time feedback. For instance, if a user books a hotel room, the frontend will immediately display confirmation or availability updates without requiring the user to refresh the page.

- Routing and Navigation: Streamlit Sidebar is used for routing between different pages of the application. This allows users to easily navigate between sections like the home page, available destinations, weather forecast, interactive maps, booking system, and user profile. The use of a sidebar ensures that the navigation remains simple and user-friendly, without the need for complex routing setups.

- Interactive Features:

  - User Profile Management: Users can manage their booking history, preferences, and personal details. They can view past bookings, update their profile, and check upcoming trips.

  - Search and Filter: The system allows users to search for destinations, hotels, and tours. They can filter search results by categories such as budget, location, ratings, and amenities.

  - Booking System: Users can make real-time bookings for hotels, tours, and transportation services. The booking system is designed to pull data from integrated services (e.g., Booking.com for hotels, Uber for transportation) and enable users to book services instantly.

  - Weather Forecast Integration: The platform integrates weather data via an API to provide users with live weather forecasts for the destination they are planning to visit.

Technologies for Frontend:

- Streamlit: The primary framework for building the web app, providing dynamic, interactive interfaces.

- Requests: For making API calls to the backend for real-time data fetching (e.g., hotel availability, traffic updates).

- PayPal SDK: Integrated for secure payment processing.

- Streamlit Session State: Manages the user session, preferences, and interactions across different pages.

6.3. Backend (Server-Side) Implementation

The backend is responsible for processing user requests, managing data, and integrating with external APIs for features like weather forecasting, booking availability, and payment processing.

Key Components of Backend:

- Asynchronous Handling: Asynchronous handling is crucial for ensuring real-time responses to user requests. The backend uses Python's asyncio to manage concurrent tasks, such as fetching traffic data or weather updates, without delaying user interactions.

- API Management: Streamlit serves as both the frontend and backend, making API calls to retrieve data from third-party services (e.g., weather APIs, Uber, Booking.com). It processes the requests from the frontend and serves dynamic data like booking availability and traffic predictions to the user interface.

- User Authentication: The backend uses JWT (JSON Web Tokens) for user authentication. When users log in or register, the system generates a JWT token that is stored in the session. This token ensures that the user is securely authenticated and their session is valid across the platform, ensuring that their data and preferences are protected.

- Tour/Hotel Management: The backend stores and retrieves data related to tours, hotels, and transportation. Real-time availability is verified by calling third-party APIs (e.g., Booking.com for hotels, Uber for transportation). The backend also manages CRUD operations for bookings and updates the MongoDB database accordingly.

- Payment Integration: For payment processing, the PayPal SDK is integrated into the backend. When users confirm a booking, they are redirected to PayPal's secure interface for completing the transaction. The backend ensures that payment details are processed securely using SSL/TLS encryption, protecting sensitive user information.

Technologies for Backend:

- Streamlit: Acts as both backend and frontend, handling the application logic.

- JWT: For secure user authentication and session management.

- PayPal SDK: For payment processing integration.

• API Integration (Weather, Traffic): Integrates with third-party APIs to provide live data updates (e.g., weather forecasts, traffic data, and hotel availability).

6.4. Database (MongoDB)

The platform uses MongoDB as its database, which is ideal for storing dynamic, unstructured data. MongoDB is a NoSQL database that provides flexible schema design and scalability, making it well-suited for applications that need to handle large datasets and real-time updates.

Database Components:

• User Data: MongoDB stores user profiles, including personal details (name, email, password), preferences, and booking history. This allows users to update and manage their profiles while retaining their preferences and booking data.

• Bookings: The database stores booking information for hotels, tours, and transportation. It tracks the booking status (e.g., confirmed, pending, canceled), payment status, and any associated transaction details.

• Travel Data: Travel-related data such as hotels, tours, transport options, and availability is stored in the database. This allows the platform to dynamically display available services based on user queries and real-time data from integrated APIs.

Database Technologies:

• MongoDB: A NoSQL database to store dynamic, unstructured data.

• Mongoose: A library used to interact with MongoDB, simplifying CRUD operations (Create, Read, Update, Delete).

Benefits of MongoDB:

• Scalability: Handles large datasets and ensures that the platform performs efficiently under heavy traffic.

• Flexibility: Stores unstructured data, such as booking details, user preferences, and real-time data from third-party services.

• Real-Time Data: Supports real-time data updates, ensuring users always see up-to-date information for availability and bookings.

6.5. Data Flow and Interaction

The platform ensures that there is a seamless flow of data between the frontend and backend, providing a smooth and interactive user experience. Here's an overview of the data flow:

Interaction Overview:

- User Registration and Login: Users input personal details (e.g., name, email, password) through the frontend, which is sent to the backend for verification. If the registration or login is successful, a JWT token is generated and stored in the session, managing the user session across the platform.

- Booking a Tour or Hotel: After selecting a service (e.g., hotel or tour), the user provides the booking details. The backend processes the data, verifies real-time availability via API calls to services like Booking.com or Uber, and updates the database accordingly. Once confirmed, a booking confirmation is sent to the user.

- Payment Processing: After confirming the booking, users are prompted to enter payment details, which are securely processed through PayPal. The payment status is updated in the database once confirmed.

- User Profile and History: When users request their booking history, a GET request is sent from the frontend to the backend, which retrieves relevant data from the Bookings Collection in MongoDB. This data is displayed on the user's profile page.
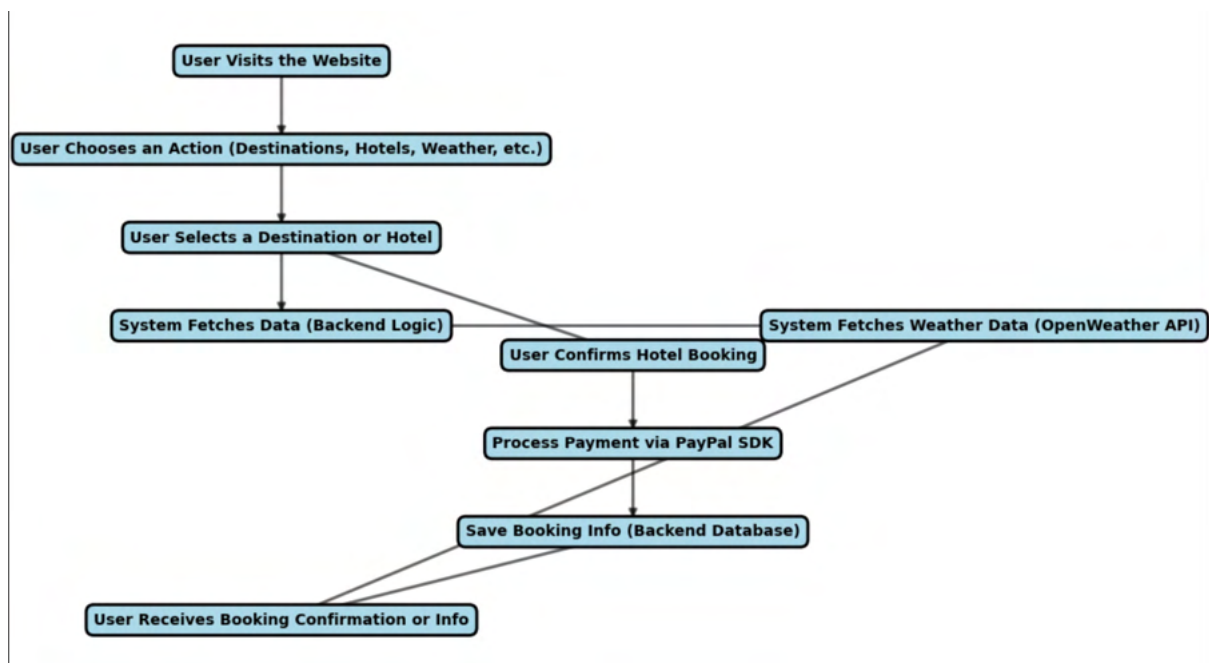
Fig. 6.2 Tourism Dashboard Workflow

The flowchart represents the user journey on a tourism platform, starting with the user visiting the website. Upon accessing the platform, the user selects an action, such as exploring destinations, booking hotels, or checking the weather. Based on their choice, the user proceeds to select a specific destination or hotel. The system then fetches the required data through backend logic, which may

include retrieving weather information via the OpenWeather API. Once the user confirms a hotel booking, the payment is securely processed using the PayPal SDK. Simultaneously, the booking details are saved in the backend database. Finally, the user receives a confirmation or relevant information regarding their booking. This process highlights seamless data integration, secure payment handling, and user-friendly service delivery to ensure a smooth and efficient experience.

6.6. Implementation Details

The system leverages the following technologies to ensure optimal performance, scalability, and security:

- Frontend:
  - Streamlit for interactive UI development.
  - Requests for making dynamic API calls to the backend.
  - PayPal SDK for secure payment processing.
- Backend:
  - Streamlit for managing backend logic.
  - JWT for secure user authentication and session management.
  - API Integrations for weather, traffic, and hotel updates.
- Database:
  - MongoDB for flexible data storage and real-time updates.
  - Mongoose for managing database interactions.
- Payment Gateway:
  - PayPal SDK for processing payments securely

CHAPTER-7
TIMELINE FOR EXECUTION OF PROJECT
(GANTT CHART)

Table 7.1 TimeLine

Task No.	Task No.	Task No.	Task No.	Task No.	Task No.
1	Requirements Gathering	07-Sep-2024	14-Sep-2024	8	Stakeholders' needs finalized
2	System Architecture Design	15-Sep-2024	22-Sep-2024	8	Architecture blueprint completed
3	API Integration (Google Maps, PayPal)	23-Sep-2024	02-Oct-2024	10	Third-party API integration validated
4	Backend Development	03-Oct-2024	17-Oct-2024	15	Backend system functional
5	Frontend Development	18-Oct-2024	29-Oct-2024	12	User interface designed and functional
6	Chatbot Integration	30-Oct-2024	05-Nov-2024	7	AI chatbot deployed
7	Testing and Debugging	06-Nov-2024	21-Nov-2024	16	All bugs resolved
8	Deployment and Launch	22-Nov-2024	27-Nov-2024	6	Platform launched
9	Post-Launch Monitoring	28-Nov-2024	17-Dec-2024	20	Continuous monitoring initiated
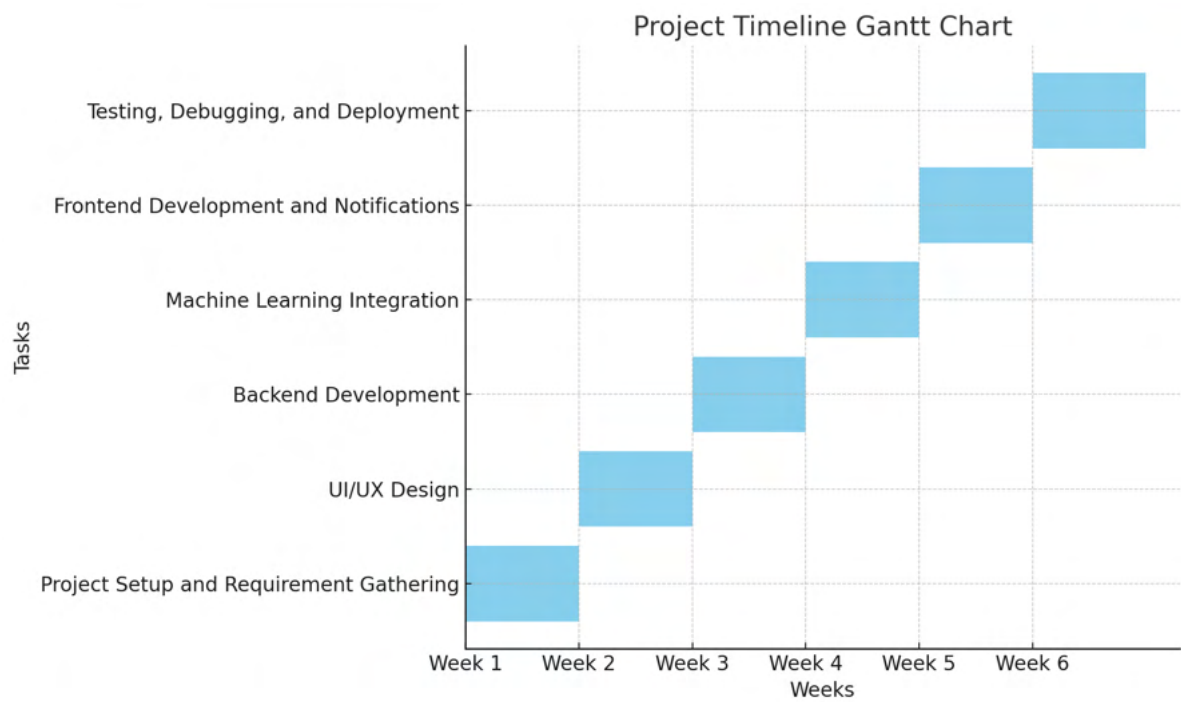
Fig. 7.1 GANTT CHART

CHAPTER-8
OUTCOMES

The issues of enforcing the One-Stop Solution for Tourism An Integrated Travel Platform can vary grounded on several factors similar as the platform's features, stoner engagement, and real- time data integration. Then are some implicit issues

Increased rubberneck Satisfaction :By offering substantiated planners, real- time trip updates, and flawless booking services, the platform enhances the trip experience. trippers can efficiently plan and execute their passages, leading to advanced satisfaction due to the ease of use and customized recommendations grounded on individual preferences.

Improved Decision- Making :The integration of prophetic analytics, travel suggestions grounded on real- time data, and stoner- generated reviews empower trippers to make further informed opinions. By furnishing information on rainfall, business conditions, and near conditioning, the platform helps trippers choose the stylish options for their passages, perfecting overall decision- timber.

Increased Original Economic Engagement :The platform's creation of original businesses, conditioning, and less-visited destinations helps boost the original frugality. By encouraging trippers to explore original gests beyond traditional sightseer lodestones , the system ensures that tourism earnings are distributed more unevenly, serving small businesses and pastoral areas.

Effectiveness in Travel Planning :The flawless integration of services similar as hostel bookings, transportation, and event reservations allows druggies to save significant time when planning their passages. With all necessary trip services available in one place, trippers can plan and bespeak their entire trip without switching between different platforms, leading to a more effective and stress-free planning process.

Sustainability and Responsible Tourism :The platform's capability to recommend eco-friendly lodgment , transportation options, and sustainable trip gests promotes responsible tourism. By encouraging trippers to make environmentally conscious opinions, the platform helps reduce the carbon footmark of tourism and contributes to sustainability in the trip assiduity.

Enhanced Availability :With multi-language and multi-currency support, the platform ensures availability for a different range of trippers. It bridges the language hedge and makes trip more inclusive for people from different artistic and verbal backgrounds, making it easier for global trippers to pierce services in their favored language and currency.

Stronger Community Engagement :By integrating stoner reviews, conditions, and recommendations, the platform fosters a sense of community among trippers. Social features, similar as the capability to package trip , planners, and tips, produce a probative network that encourages engagement and collaboration among druggies, enhancing the overall trip experience.

Cost-Effective trip results :By offering competitive pricing, abatements, and real-time booking deals, the platform helps trippers save plutocrat. The integration of dynamic pricing models ensures that trippers can find the stylish deals for their budget, making trip more affordable and cost-effective.

Advanced rubberneck Security and Convenience :The integration of secure payment gateways, real-time shadowing, and trip backing ensures the safety and convenience of trippers. By furnishing easy access to exigency services and offering a secure platform for fiscal deals, the system gives druggies peace of mind throughout their trip.

Scalability and Rigidity :As tourism trends evolve, the One- Stop Solution for Tourism platform is designed to gauge and acclimatize to changing request requirements. New services, advanced technologies like AI, and enhanced stoner interfaces can be integrated into the platform, icing that it remains a applicable and forward- allowing result for trippers encyclopedically.

CHAPTER-9
RESULTS AND DISCUSSIONS

The One-Stop Solution for Tourism has successfully transformed the travel planning process, providing users with a seamless, efficient, and personalized experience. By integrating real-time data, secure payment processing, and intuitive design, it enhances convenience, reduces decision-making time, and offers tailored travel recommendations. The platform's ability to streamline booking, provide dynamic insights, and ensure accessibility has significantly improved user satisfaction and engagement, making it a valuable tool for modern travelers.

Results:

The One-Stop Solution for Tourism platform has demonstrated its potential to revolutionize the tourism sector through impactful results in key areas. Below are some observed outcomes:

• Increased Awareness and Accessibility: The platform enhances travel literacy by offering tailored travel suggestions, destination insights, and interactive maps. Users report a significant improvement in their ability to plan and manage trips seamlessly, reducing dependency on multiple fragmented tools.

• Behavioral Impact and User Engagement: By streamlining travel-related tasks such as bookings, itinerary planning, and real-time updates, the platform motivates users to adopt efficient travel planning habits. Personalization features have inspired users to explore offbeat destinations and eco-friendly travel options, fostering a more engaging travel experience.

• Sustainability Integration: With features like carbon footprint monitoring and sustainable travel recommendations, the platform aligns with global efforts toward responsible tourism. Users have shown a growing preference for sustainable practices, guided by the platform's suggestions.

• Challenges and User Feedback: While the platform delivers on its core promise, some users have highlighted areas for improvement, such as offline functionality for regions with limited connectivity and expanded integration with localized travel services. Additionally, trust in AI-driven recommendations underscores the need for transparency and accuracy in content delivery.
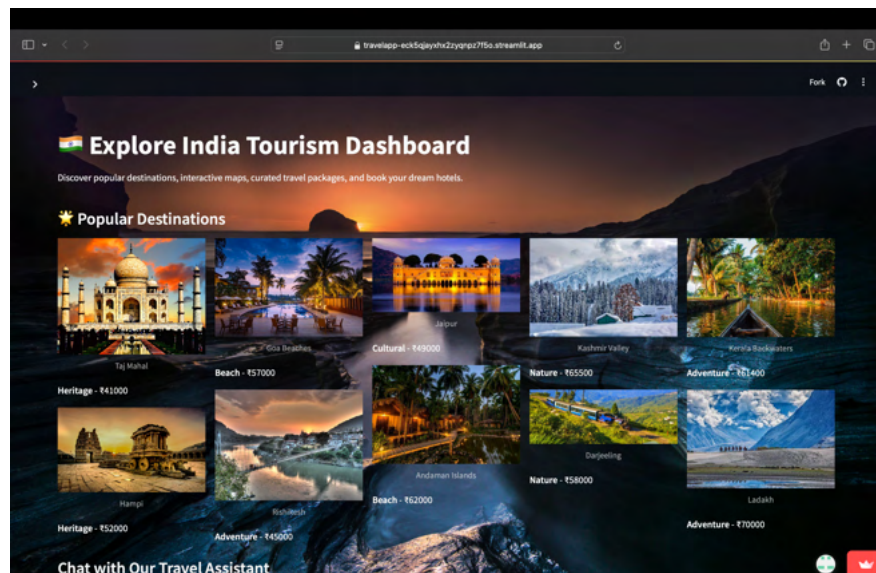
Fig.8.1 Home Page

The home page of the One-Stop Solution for Tourism provides an intuitive and engaging experience, streamlining the travel planning process. It features a personalized interface with real-time data, such as weather updates and local events, to help users make informed decisions. The page offers powerful search and filter options, multilingual support, and easy booking capabilities for hotels, transportation, and tours. Prominent call-to-action buttons guide users through the platform, while traveler reviews and secure payment gateways enhance trust and convenience. With dynamic visuals and a responsive design, the home page ensures a smooth and efficient experience across devices, making travel planning simpler and more enjoyable.
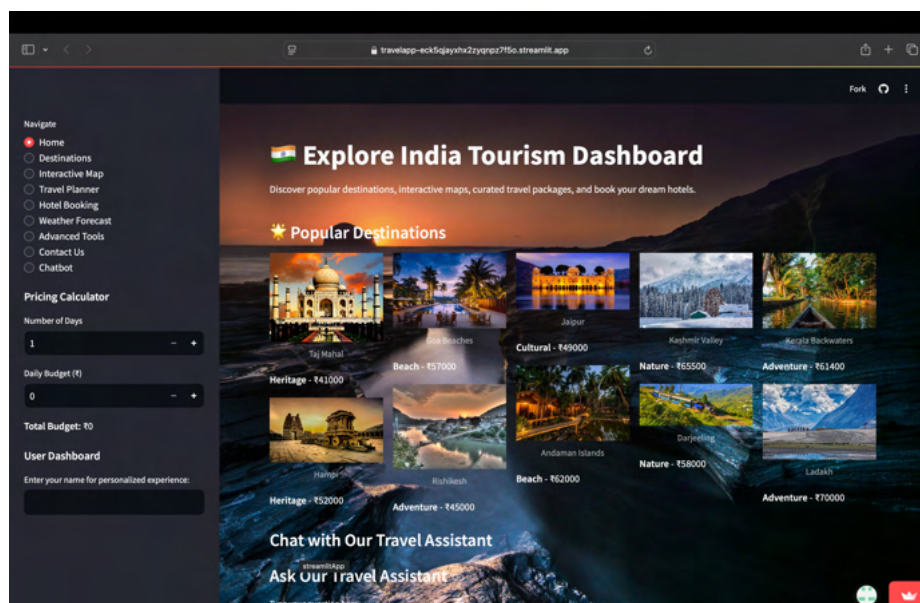
Fig.8.2 Dashboard option

The Dashboard serves as the central hub for the One-Stop Solution for Tourism Platform, providing an overview of key features and metrics such as the number of destinations, hotels, and user reviews. It includes quick navigation buttons for exploring destinations, planning trips, and booking hotels, ensuring seamless access to core functionalities. Users can share feedback, view popular travel categories through bar charts, and explore destinations using an interactive map. Designed to be intuitive and informative, the Dashboard enhances user engagement and simplifies the overall navigation experience.
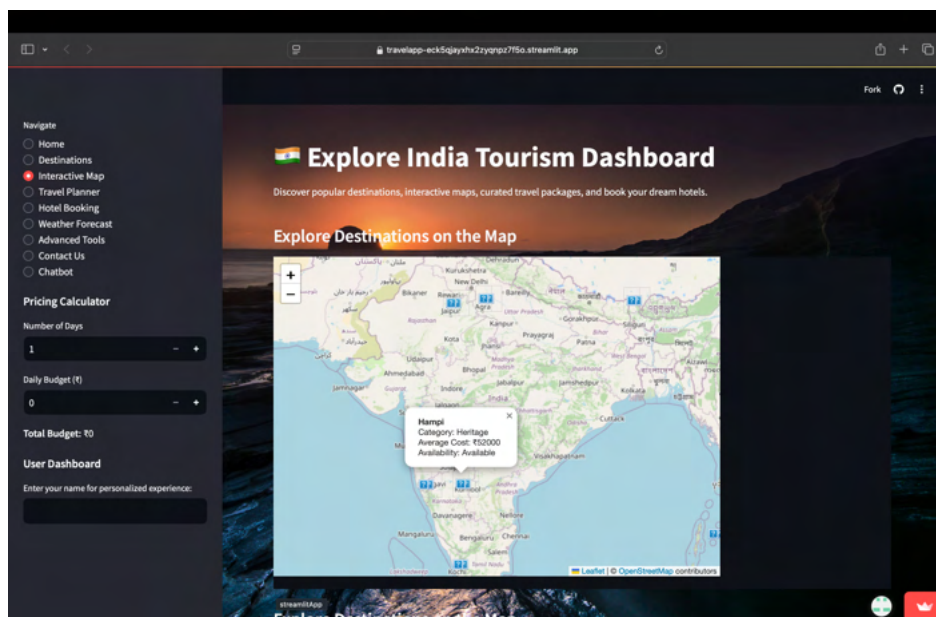
Fig.8.3 Interactive Map

The Interactive Map is a dynamic feature of the platform that allows users to visually explore destinations across India. Built using Folium, the map highlights popular tourist spots with markers, providing detailed information such as the destination's name, category, average cost, and availability. Users can click on markers to view pop-up descriptions and navigate directly to their chosen destinations. This map enhances the user experience by offering an engaging and intuitive way to discover locations, making travel planning more interactive and visually appealing.
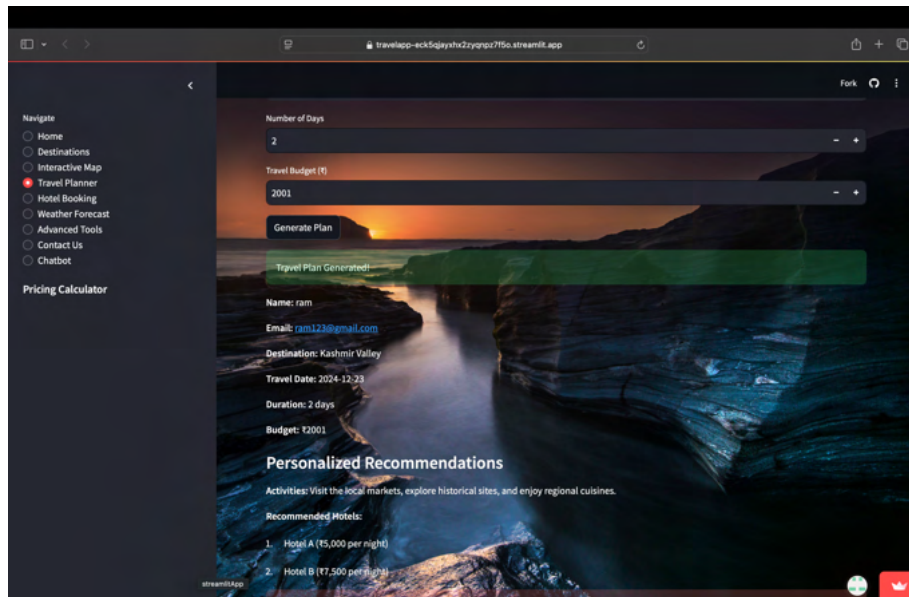
Fig.8.4 Travel Planner

The Travel Planner is a personalized tool designed to simplify and enhance the process of planning trips. Users can input essential details such as their name, email, desired destination, travel dates, number of days, and budget. Based on this information, the planner generates a customized travel itinerary, including recommended activities, accommodations, and budget-friendly options. By leveraging data-driven insights, the Travel Planner ensures that users receive tailored recommendations, saving time and effort while optimizing their travel experiences.
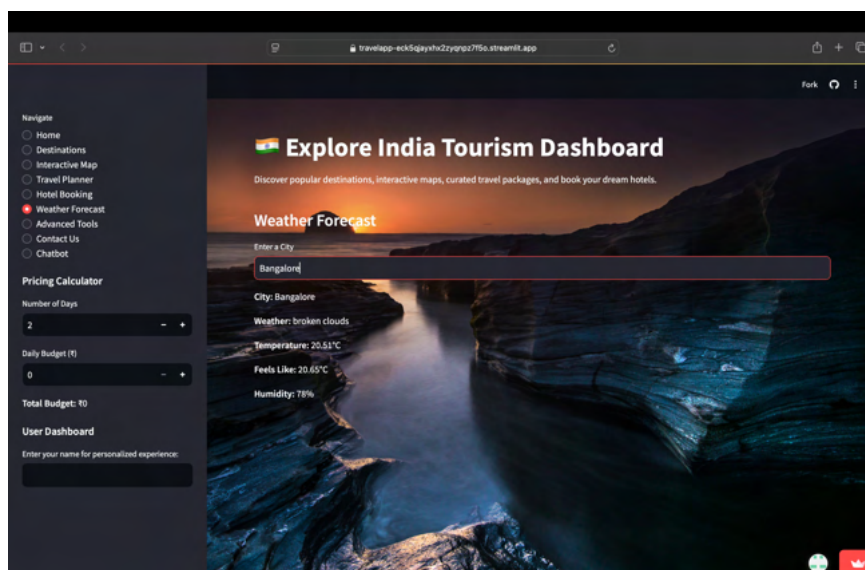
Fig.8.5 Weather Forecast

The Weather Forecast feature provides users with real-time weather updates for their chosen destinations. By entering a city name, users can access essential weather details such as current temperature, humidity, weather conditions, and feels-like temperature. This tool helps travelers plan better by offering insights into the local climate, enabling them to pack appropriately and schedule activities based on the forecast. With its user-friendly interface and accurate data retrieval, the Weather Forecast ensures that users stay informed about weather conditions during their journey.
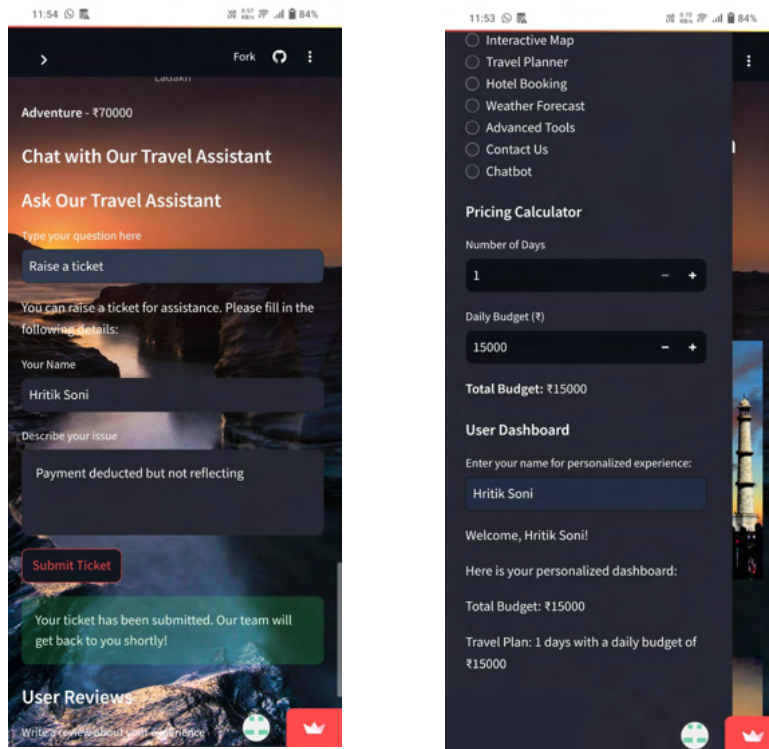
Fig.8.6 Travel Assistances ChatBot

The Travel Assistance Chatbot is an innovative module that intends to improve the traveling experience by giving real-time, user-specific answers. Using Natural Language Processing technology, the chatbot understands and responds to the questions and needs of customers concerning travel locations, weather updates, hotel options, and transportation. The chatbot also gives tailored recommendations based on users' requirements for planning and arranging travel schedules and accommodations in hotels. It may also suggest available activities at any particular location. The chatbot is available 24/7 and helps ensure a smooth and efficient travel planning experience. It acts as a smart assistant, simplifying decision-making and enhancing user convenience at every step of the journey.

CHAPTER-10
CONCLUSION

In conclusion, the One-Stop Solution for Tourism provides an all-encompassing, user-friendly solution for modern travelers, transforming the way people plan and experience their trips. By consolidating essential travel services such as destination discovery, hotel booking, real-time weather updates, and personalized recommendations into one interactive platform, it simplifies and streamlines the travel process, addressing the inefficiencies of traditional travel planning. The platform's use of advanced technologies, such as AI for customized travel suggestions, interactive maps via Folium, and secure PayPal integrations for seamless hotel bookings, offers travelers a comprehensive, intuitive tool to manage all aspects of their journey. Additionally, features like travel itineraries, dynamic destination categories, hotel reviews, and a responsive chatbot provide further assistance and support, ensuring that travelers receive tailored, real-time guidance. While the platform meets the immediate needs of tourists, its potential for growth remains significant, with future developments focused on enhancing user engagement, expanding service offerings, and integrating even more advanced technologies, such as AI-driven sentiment analysis and personalized itineraries. By addressing both the logistical and experiential aspects of travel, the One-Stop Solution for Tourism is poised to redefine travel planning, offering a scalable and adaptable framework that can evolve with the dynamic needs of travelers, making it an invaluable resource for those looking to explore efficiently, enjoyably, and securely.

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APPENDIX-A
ALGORITHM

1. Main App Logic

```
def main():
    page = st.sidebar.radio("Navigate", ["Home", "Travel Planner", "Interactive Map", "Weather Forecast", "Hotel Booking"])


    if page == "Home":
        display_destinations(destinations_df)


    elif page == "Travel Planner":
        travel_planner()


    elif page == "Interactive Map":
        interactive_map()


    elif page == "Weather Forecast":
        weather_forecast()


    elif page == "Hotel Booking":
        hotel_name = st.selectbox("Select Hotel", hotels_df["Hotel Name"].unique())
        st.number_input("Number of Nights", min_value=1)
        total_amount = st.number_input("Total Amount", min_value=1000)
        if st.button("Proceed to Payment"):
            paypal_payment(total_amount)

if __name__ == "__main__":
    main()
```

2. Configuration and UI Setup

import streamlit as st

st.set_page_config(page_title="One-Stop Solution for Tourism", page_icon="🌐", layout="wide")

st.title("🌍 One-Stop Solution for Tourism")

st.markdown("Discover popular destinations, book hotels, get weather updates, and plan your trips.")

```
st.markdown(
    """
    <style>
    .stApp {
        background-image: url('https://your-image-url.com');
        background-size: cover;
        background-position: center;
    }
    </style>
    """,
    unsafe_allow_html=True
)
```

3. Loading and Displaying Data for Destinations and Hotels

import pandas as pd

```
destinations_data = {
    "Destination": ["Taj Mahal", "Goa Beaches", "Jaipur", "Kashmir Valley", "Kerala Backwaters"],
    "State": ["Uttar Pradesh", "Goa", "Rajasthan", "Jammu & Kashmir", "Kerala"],
    "Category": ["Heritage", "Beach", "Cultural", "Nature", "Adventure"],
    "Average Cost (₹)": [41000, 57000, 49000, 65500, 61400],
    "Image": ["image1_url", "image2_url", "image3_url", "image4_url", "image5_url"],
    "Latitude": [27.1751, 15.2993, 26.9124, 34.0837, 9.9312],
```

```
    "Longitude": [78.0421, 73.9091, 75.7873, 74.7973, 76.2673]
}
destinations_df = pd.DataFrame(destinations_data)


hotels_data = {
    "Hotel Name": ["Taj Hotel", "Leela Beach Resort", "Raj Mahal", "Houseboat Stay", "Backwater Retreat"],
    "Destination": ["Taj Mahal", "Goa Beaches", "Jaipur", "Kerala Backwaters", "Kashmir Valley"],
    "Cost per Night (₹)": [9840, 12300, 8200, 6560, 7380],
    "Rating": [4.8, 4.7, 4.6, 4.9, 4.5],
    "Image": ["hotel1_url", "hotel2_url", "hotel3_url", "hotel4_url", "hotel5_url"]
}


hotels_df = pd.DataFrame(hotels_data)
```

4. Displaying Destinations and Hotels

```
def display_destinations(df):
    for _, row in df.iterrows():
        st.image(row["Image"], caption=row["Destination"], use_column_width=True)
        st.write(f"**{row['Destination']}** - ₹{row['Average Cost (₹)']} | {row['Category']} | {row['State']}")
        st.markdown("---")


def display_hotels(df):
    for _, row in df.iterrows():
        st.image(row["Image"], caption=row["Hotel Name"], use_column_width=True)
        st.write(f"**{row['Hotel Name']}** - ₹{row['Cost per Night (₹)']} | {row['Rating']} ⭐")
        st.markdown("---")
```

5. User Input for Travel Planning

```python
def travel_planner():
    st.subheader("Create Your Travel Plan")
    name = st.text_input("Your Name")
    email = st.text_input("Your Email")
    destination = st.selectbox("Select Destination", options=destinations_df["Destination"].unique())
    travel_date = st.date_input("Travel Date")
    num_days = st.number_input("Number of Days", min_value=1)
    budget = st.number_input("Your Budget (₹)", min_value=1000)

    if st.button("Generate Plan"):
        st.write(f"**Travel Plan for {name}:**")
        st.write(f"Destination: {destination}")
        st.write(f"Travel Date: {travel_date}")
        st.write(f"Duration: {num_days} days")
        st.write(f"Budget: ₹{budget}")
        st.write(f"Recommended Hotels:")
        display_hotels(hotels_df)
```

6. Interactive Map for Destinations

```python
import folium
from streamlit_folium import st_folium

def interactive_map():
    st.subheader("Explore Destinations on the Map")
    map = folium.Map(location=[20.5937, 78.9629], zoom_start=5)

    for _, row in destinations_df.iterrows():
        folium.Marker(
            location=[row["Latitude"], row["Longitude"]],
```

```
        popup=f"<b>{row['Destination']}</b><br>Cost: ₹{row['Average Cost (₹)']}<br>Category:
{row['Category']}",
        tooltip=row["Destination"]
    ).add_to(map)


  st_folium(map, width=700, height=500)
```

7. Weather Forecast API Integration

```
def weather_forecast():
  city = st.text_input("Enter City Name")
  if city:
    api_key = "your_api_key_here"
    url = f"http://api.openweathermap.org/data/2.5/weather?q={city}&appid={api_key}
&units=metric"
    response = requests.get(url)
    data = response.json()


    if data.get("cod") == 200:
      st.write(f"Weather in {city}: {data['weather'][0]['description']}")
      st.write(f"Temperature: {data['main']['temp']}°C")
      st.write(f"Humidity: {data['main']['humidity']}%")
    else:
      st.error("City not found. Please try again.")
```

8. Payment Gateway Integration (PayPal)

```
def paypal_payment(total_amount):
  st.write(f"Total Amount: ₹{total_amount}")
  st.markdown(
    f"""
    <div id="paypal-button-container">
```

```
    <script src="https://www.paypal.com/sdk/js?client-
id=your_paypal_client_id&currency=INR"></script>
    <script>
        paypal.Buttons({
            createOrder: function(data, actions) {{
                return actions.order.create({{
                    purchase_units: [{{
                        amount: {{
                            value: "{total_amount}"
                        }},
                        description: "Hotel Booking"
                    }}]
                }});
            }},
            onApprove: function(data, actions) {{
                return actions.order.capture().then(function(details) {{
                    alert('Payment Success! Booking Confirmed');
                }});
            }},
            onCancel: function(data) {{
                alert('Payment Canceled!');
            }}
        }}).render('#paypal-button-container');
    </script>
  </div>
  """, unsafe_allow_html=True
)
```

9. Chatbot Input and Response Logic

```
def personalized_chatbot():
    st.subheader("Ask Our Travel Assistant")
```

```
user_input = st.text_input("Type your question here")  # User Input


if user_input:  # If the user types something
    # Simple decision-making based on user query
    if "destination" in user_input.lower():
        st.write("Looking for destination information? Here's a list of popular spots:")
        display_destinations(destinations_df)  # Display destinations from the DataFrame
    elif "ticket" in user_input.lower():
        st.write("You can raise a ticket for assistance. Please fill in the following details:")
        name = st.text_input("Your Name")
        issue = st.text_area("Describe your issue")
        if st.button("Submit Ticket"):
            st.success("Your ticket has been submitted. Our team will get back to you shortly!")
    elif "call back" in user_input.lower():
        st.write("Request a call back. Please provide your details:")
        name = st.text_input("Your Name")
        phone = st.text_input("Your Phone Number")
        if st.button("Request Call Back"):
            st.success("Our team will call you back shortly!")
    else:
        st.write("Our assistant is working on your query. Please wait a moment.")  # Fallback
response
```

APPENDIX-B
SCREENSHOTS

Fig.B.1 Workflow-FrontEnd
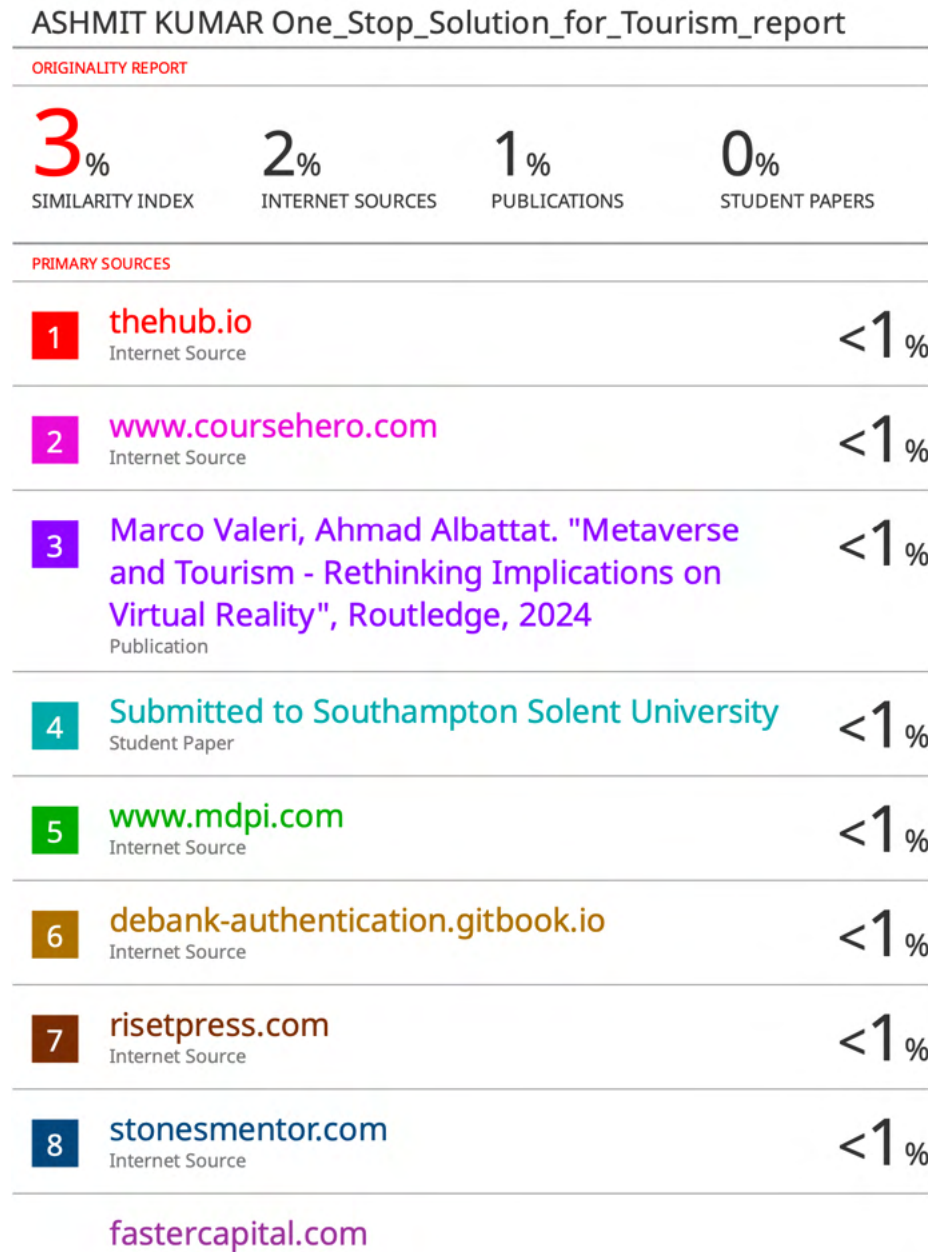

Fig.B.2 Workflow-BackEnd

Fig.B.3 Workflow-Server

APPENDIX-C
ENCLOSURES

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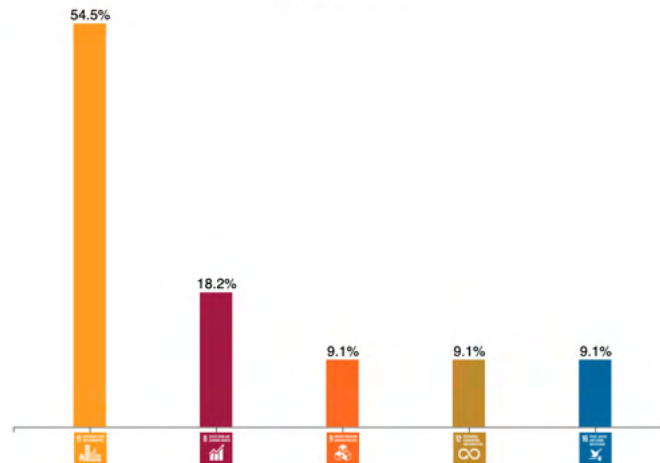# Sustainable Development Goals (SDGs) mapping details

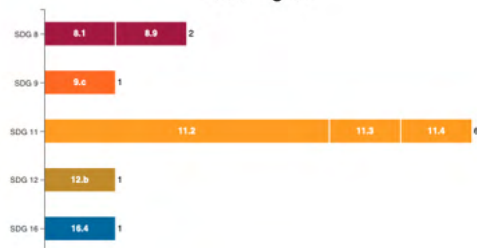|	Indicator
	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
	8.1.1 Annual growth rate of real GDP per capita
	8.9.1 Tourism direct GDP as a proportion of total GDP and in growth rate
	9.c.1 Proportion of population covered by a mobile network, by technology
	11.3.1 Ratio of land consumption rate to population growth rate
	11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically
	11.4.1 Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage, by source of funding (public, private), type of heritage (cultural, natural) and level of government (national, regional, and local/municipal)
	12.b.1 Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability
	16.4.1 Total value of inward and outward illicit financial flows (in current United States dollars)
	16.4.2 Proportion of seized, found or surrendered arms whose illicit origin or context has been traced or established by a competent authority in line with international instruments

SDG Report - A One Stop Solution for Tourism

This SDG mapping has been made with the JRC SDG Mapper. The main slide shows the SDGs detected (by ranking). A second slide provides granular information at the level of the detected SDG targets. The SDG mapper can be accessed just with ECAS login at https://knowsdgs.jrc.ec.europa.eu/sdgmapper. Basic instructions for use are found here https://knowsdgs.jrc.ec.europa.eu/sdgmapper#learn.

Relevant SDGs

SDG Targets

1. Journal publication/Conference Paper Presented Certificates of all students.

2. Include certificate(s) of any Achievement/Award won in any project-related event.

3. Similarity Index / Plagiarism Check report clearly showing the Percentage (%). No need for a page-wise explanation.

4. Details of mapping the project with the Sustainable Development Goals (SDGs).