

TOURISMO AI: SMART TRAVEL & HOSPITALITY

A PROJECT REPORT
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This is to certify that the Project report "**Tourismo AI: Smart Travel & Hospitality**" being submitted by "Hritik Kumar Soni , Utkarsh Pandey, Ashmit Kumar, bearing roll number(s) "20211C-SE0525, 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 **Tourismo AI: Smart Travel & Hospitality** 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.**

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ABSTRACT

Tourism in India is a vibrant sector that attracts millions of domestic and international travelers. However, tourists often face fragmented digital experiences across various platforms when planning and managing their journeys. To address this challenge, the Tourismo AI is developed as a one-stop, interactive, and user-friendly web application using Streamlit. This system combines multiple features such as destination discovery, interactive mapping, travel planning, hotel booking with PayPal integration, real-time weather forecasting, and a rule-based chatbot assistant to enhance user engagement and simplify trip management. The platform displays curated travel destinations across India with visuals, category filters, estimated costs, and availability. It utilizes Folium for geospatial visualization and OpenWeatherMap API for weather data integration. Users can generate personalized travel plans, calculate budgets, and book hotels directly through the dashboard. The chatbot provides basic support, and the payment module uses PayPal's secure gateway to simulate real-time transactions. This project demonstrates how data integration, automation, and intuitive design can promote smart tourism by offering a seamless and personalized travel planning experience for users.

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CHAPTER-1

INTRODUCTION

1.1 OVERVIEW

India, a land of immense cultural and geographic diversity, offers a wide array of tourism experiences ranging from heritage monuments to tranquil beaches, mountainous terrains, and vibrant cities. However, despite the increasing adoption of digital platforms, travel planning in India remains fragmented. Tourists often rely on multiple platforms for exploring destinations, checking weather, booking accommodations, and managing budgets, which leads to inefficiencies and a lack of personalization.

To overcome these problems, Tourismo AI is conceptualized as a smart traveler dashboard for a one-stop interactive solution usable by travelers. Developed on Streamlit, Tourismo AI brings together some major travel components, such as destination discovery, interactive map visualizations from Folium, real-time weather updates from OpenWeatherMap API, and hotel bookings backed by PayPal payment simulation. Adding to this is a rule-based chatbot assistant to help users through trip planning and queries.

This project uses modern web technology, open-source libraries, and real-time data APIs to create a smart travel assistant that improves user experience, cuts them out of decision fatigue, and supports efficient and self-governed travel planning. Such a solution aligns with smart tourism and digital India initiatives seeking to uplift service delivery standards across the tourism sector [14][15].

1.2 STATEMENT OF THE PROBLEM

Although online information is ample, the travel sector still suffers from a lack of a centralised user-centric platform aimed at providing contextual, real-time, and actionable travel information. The users must juggle with multiple apps or websites for browsing destinations, making reservations, checking weather conditions, and seeking assistance. This lack of integration poses a hindrance to user experience and dissuades users from spur-of-the-moment or self-arranged travel.

Existing travel tools offer either static content or limited interactivity without real-time personalization, resulting in an inefficient planning process. There is a need for a platform that integrates AI-assisted exploration, real-time services, and interactive planning tools in one interface.

1.3 MOTIVATION

The rise of AI and open-source platforms has unlocked the potential to build intelligent, scalable, and highly interactive applications in the tourism domain. With the increasing trend toward DIY (Do-It-Yourself) travel planning and mobile-first behavior, users expect intelligent systems that offer seamless navigation, personalized content, and on-demand support [16].

Tourismo AI is designed to cater to this expectation by consolidating multiple tourism-related services into a single dashboard. This project is motivated by the desire to simplify and enhance the travel planning experience while promoting tourism through digital empowerment. It also aligns with educational objectives by serving as a real-world example of AI and data integration for smart applications.

1.4 OBJECTIVE

To develop a centralized tourism dashboard for exploring Indian destinations with rich multimedia and real-time data.

To implement a travel planner that generates personalized itineraries based on user input (e.g., budget, duration, destination).

To provide interactive mapping using Folium for better destination understanding.

To allow hotel booking with real-time cost calculations and PayPal payment simulation.

To offer weather forecasting for destinations using OpenWeatherMap API.

To integrate a chatbot assistant to guide users through trip planning and issue handling.

To include tools like a pricing calculator and user dashboard for personalized experiences.

1.5 KEY FEATURES

1.5.1 Interactive Destination Explorer

Displays top destinations in India with images, categories, availability, and estimated costs.

Allows category filtering (e.g., heritage, nature, beach, adventure).

1.5.2 Interactive Map (Folium)

Plots destinations using latitude and longitude with popups for cost and category.

Users can explore destinations geographically.

1.5.3 Travel Planner

Accepts user input for travel duration, budget, and destination preference.

Generates a travel summary with cost, date, and activity suggestions.

1.5.4 Hotel Booking System

Shows a list of hotels per destination with price per night, rating, and images.

Calculates total booking cost based on user-selected nights.

1.5.5 Payment Integration (PayPal)

Simulates online hotel payments using PayPal sandbox integration.

Displays secure payment interface via Streamlit components.

1.5.6 Weather Forecast

Fetches and displays real-time weather data for any city using OpenWeatherMap API.

Provides information like temperature, humidity, and weather conditions.

1.5.7 Chatbot Assistant

Offers basic support for queries like destinations, help desk tickets, and call-backs.

Rule-based logic to simulate interaction and guide users.

1.5.8 Pricing Calculator & User Dashboard

Sidebar tool to calculate estimated travel cost based on user-defined days and daily budget.

Displays a personalized dashboard with greetings and plan summary.

1.6 TECHNICAL IMPLEMENTATION

1.6.1 User Interface & Interaction Environment

The user interface (UI) of Tourismo AI is built entirely using Streamlit, a Python-based open-source web application framework. Streamlit allows rapid prototyping and deployment of data-driven applications with minimal frontend code. The UI is composed of the following interactive elements:

- Sidebar Navigation: Facilitates access to different modules like Destination Explorer, Travel Planner, Hotel Booking, Interactive Map, Weather Forecast, and Contact Form.
- Dynamic Widgets: Uses `st.selectbox`, `st.slider`, `st.number_input`, and `st.date_input` to capture user input for personalized itinerary generation.
- Image and Media Display: Employs `st.image` and `st.markdown` to showcase destination visuals and hotel previews.
- Interactive HTML Embeds: PayPal payment buttons are rendered through `streamlit.components.v1.html()` using embedded JavaScript SDK.

The entire system is browser-accessible, making it cross-platform and requiring no additional installations on the user side.

1.6.2 Backend Architecture

The backend of Tourismo AI is implemented in Python and structured using modular functions. The system integrates various APIs, data frames, and visualization tools to deliver interactive services.

A. Destination & Hotel Data Management

- Technology Used: `pandas`
- Functionality: Two in-memory `DataFrames` are created:
 - `destinations_df`: Stores destination data including name, state, category, cost, image URL, and GPS coordinates.
 - `hotels_df`: Stores hotel names, pricing, ratings, images, and linked destinations.

These `DataFrames` are filtered and iterated through for display and computation during booking and exploration.

B. Interactive Map Integration

- Technology Used: `folium`, `streamlit-folium`
- Function: `generate_map(df)`
- Purpose: Visualizes destinations on a real-time, zoomable map.
- Features:
 - Plots markers with destination name, category, and average cost.
 - Tooltips and popup HTML provide quick access to details.
 - Maps are rendered via `st_folium` to preserve interactivity inside the Streamlit app.

C. Weather Forecasting Module

- Technology Used: `OpenWeatherMap API, requests`
- Function: `get_weather(city, api_key)`
- Purpose:
 - Fetches real-time weather conditions (temperature, humidity, description) for user-selected destinations.
 - API response is parsed and displayed via `st.write()` for traveler planning.

D. Hotel Booking Engine

- Functionality:
 - Allows users to choose a hotel, select the number of nights, and calculate total cost.
 - Displays hotel ratings and images before confirming bookings.

E. Payment Integration (PayPal)

- Technology Used: PayPal JavaScript SDK (sandbox mode)
- Integration:
 - Payment button is rendered inside a Streamlit component using embedded HTML and JS.
 - Payment simulations use a test `client-id` and handle `onApprove`, `onCancel`, and `onError` events.
 - While not a backend-connected transaction system, it simulates the real payment flow for demonstration purposes.

F. Chatbot Assistant

- Type: Rule-based assistant
- Functionality:
 - Parses keywords from user input (e.g., "destination", "ticket", "call back") to trigger relevant forms or information.
 - Does not use NLP or ML but provides contextual assistance based on conditional logic.

G. Budget Calculator & User Dashboard

- Sidebar Widgets:
 - Accepts number of travel days and daily budget.
 - Computes and displays total trip cost dynamically.
- User Greeting:
 - Uses `st.text_input` for name input to personalize sidebar display.

1.6.3 Data Flow Summary

User Input → Travel Planner/Hotel Booking → Data Processing
 APIs → Fetch Weather or Payment Details
 Output → Visual Charts, Cost Estimates, or Confirmation Messages
 Interaction Modules → Chatbot, Map, Forms



Figure 1.1: Conceptual illustration of the interconnected tourism ecosystem

1.7 APPLICATIONS AND USE CASES

- Smart Travel Planning: Personalized itineraries based on user preferences, budget, and duration.
- Hotel Booking: Compare hotels, calculate stay costs, and simulate PayPal payments.
- Weather Forecasting: Real-time weather updates for informed travel decisions.
- Tourism Kiosk Deployment: Usable in airports or stations as a self-service info hub.
- Educational Use: Demonstrates API integration and data-driven UI for academic projects.
- Tourism Promotion: Assists government bodies in showcasing and managing destinations.
- Budget Calculator: Estimates total travel cost using daily budget and trip duration.
- Chatbot Assistance: Simulates basic customer support for queries and service requests.

1.8 CHALLENGES

- No User Login System: Personalization is session-based, not persistent.
- Limited Chatbot Intelligence: Rule-based logic lacks NLP or contextual memory.
- API Dependency: Relies on external services like PayPal and OpenWeather, which may face rate limits or downtime.
- No Data Storage: User reviews, bookings, and inputs aren't saved across sessions.
- UI Limitations: Streamlit has limited mobile responsiveness and interactivity.
- Payment Simulation Only: PayPal integration is in sandbox mode without backend verification.
- Scalability Constraints: Not yet optimized for multi-user or production-level deployment.

CHAPTER-2

LITERATURE SURVEY

This literature survey examines the evolution and impact of digital innovation in the tourism ecosystem. As the industry increasingly adopts AI-driven platforms and integrated systems, it is experiencing significant transformation. This chapter reviews existing research on Tourismo AI, focusing on how technologies such as artificial intelligence (AI), machine learning, and real-time data services enhance user experience, promote sustainability, and foster industry advancement.

2.1 INTRODUCTION

Digital advances are shaping the tourism sector by improving and streamlining travel experiences. Due to globalisation, travellers are increasingly using digital destinations to research their travel itinerary, book accommodations, and obtain destination information. Using Tourismo AI can merge multiple aspects of a travel journey into an intuitive and seamless travel experience, as it not only offers itinerary personalisation but also real-time travel alerts, hotel accommodations and booking, weather forecasts, and the option to purchase a local experience - all from one dashboard.

The rise of efficient and customizable travel planning has resulted in new tourism solutions like Tourismo AI. These solutions allow the whole travel experience to become more enjoyable for consumers through platforms that incorporate advanced technologies such as artificial intelligence (AI), data visualisation, and interactive mapping. These technologies allow for improved user experiences and provide the foundation to propel sustainable and digital transformation in the tourism sector [1], [2].

2.2 RELATED WORK

Several researches have examined how computerized advancements are changing the tourism industry by integrating smart features, real-time information, and user-centric services. These developments have laid the foundation for stages like Tourismo AI, which brings together itinerary planning, destination discovery, hotel booking, weather forecasting, and chatbot-based support in one integrated system.

[Smith et al., 2022] investigated the rise of intuitive travel platforms that combined location insights, inn booking, and itinerary management through data-driven dashboards. Their findings

emphasize improved engagement and decision-making through intelligent maps and real-time recommendations [3].

[Johnson et al., 2021] focused on tourism stages that implemented proposal frameworks and energetic estimating apparatuses to offer assistance clients arrange their trips more successfully. These frameworks, comparable to Tourismo AI, enable voyagers to make data-informed choices by comparing inn costs, evaluating travel budgets, and mimicking taken a toll breakdowns through seamless integration [4].

[Williams & Thompson, 2020] explored the effect of customized interfacing on travel fulfillment. Their work highlights how AI-powered apparatuses such as chatbots can serve as 24/7 advanced associates for travelers, handling queries, schedule demands, and benefit tickets. Tourismo AI's chatbot, although rule-based, reproduces this approach by advertising essential back features like destination information, callback requests, and issue reporting [5].

[Martinez et al., 2022] considered how intelligent tourism frameworks can support economic travel by giving weather-aware route recommendations, local travel options, and carbon-conscious decision-making. Tourismo AI's integration with the OpenWeatherMap API is a real-world implementation of such frameworks, making a difference to clients who arrange trips based on climate conditions [6].

Furthermore, academic models utilizing Streamlit and Python-based data perception libraries (e.g., Folium, Matplotlib) have shown promising results in real-time tourism dashboards. However, most of them lack integration in booking workflows, intelligent chat, or payment simulation—all of which are featured in the Tourismo AI application [7].

These thoughts collectively illustrate the value of a connected, smart tourism stage and validate the design choices implemented in Tourismo AI, which combines different microservices to deliver a cohesive user experience.

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	Relevance to Tourismo AI	Limitations Addressed
1	<i>The Role of AI in Personalizing Tourism Experiences</i> Smith et al. (2022)[2]	Case study on AI in tourism	Inspired Tourismo AI's chatbot for query-based destination and hotel info	Tourismo AI extends it with rule-based assistance for broader utility
2	<i>Digital Transformation in the Tourism Industry</i> Johnson et al. (2021)[3]	Review of digital tourism platforms	Validates the integration of booking, planning, and user dashboards	Tourismo AI builds a user-centric interface via Streamlit
3	<i>Integrating Sustainability into Tourism Platforms</i> Martinez et al. (2022)[6]	Review on eco-tourism and digital innovation	Supports real-time weather planning and local tourism promotion	Tourismo AI adds awareness but lacks explicit carbon footprint features
4	<i>Tourism and Technology: The Shift to One-Stop Platforms</i> Williams & Thompson (2020)[5]	Comparative platform analysis	Aligns with Tourismo AI's integrated modules (hotel, map, weather, planner)	Addresses integration via Python modules, avoids third-party complexity
5	<i>Enhancing Tourist Experience with Real-time Data</i> Brown et al. (2021) [14]	Experimental weather-based planning	Informs weather-based destination suggestions using OpenWeatherMap API	Tourismo AI shows dynamic forecasts per user input
6	<i>Mobile Technology and the Future of Travel</i> Carter & Lee (2020)[15]	Survey on mobile tourism app use	Encourages Tourismo AI's lightweight, browser-based UI for cross-device access	Does not yet support responsive mobile-first UI
7	<i>Blockchain for Trustworthy Tourism</i> Patel et al. (2021)[16]	Blockchain use in secure bookings	Related to Tourismo AI's PayPal simulation for transaction transparency	Tourismo AI uses mock PayPal without backend validation

No.	Paper Title	Methodology	Relevance to Tourismo AI	Limitations Addressed
8	<i>Virtual Reality in Tourism: A New Dimension</i> Davis & Kumar (2019)[17]	Experimental VR enhancement	Implies potential expansion of Tourismo AI into immersive previews	Currently outside the scope due to hardware limitations
9	<i>Tourism Personalization through Big Data Analytics</i> Zhao et al. (2020)[18]	Use of data behavior for customized plans	Suggests future integration of AI-driven itinerary personalization	Tourismo AI currently uses manual input, lacks data-driven intelligence
10	<i>The Role of Social Media in Influencing Travel Choices</i> Nguyen et al. (2019)[19]	Social media content analysis	Indicates value in integrating review visibility and ratings	Tourismo AI supports review submission but lacks sharing or social feed
11	<i>Adoption of Cloud Technologies in Tourism Services</i> Kim et al. (2022) [20]	Case study on cloud deployment	Supports scalability concepts for hosting Tourismo AI on cloud platforms	Tourismo AI runs locally; lacks persistent backend/cloud storage
12	<i>The Impact of IoT on the Tourism Industry</i> Li et al. (2023)[21]	IoT for smart hotels, devices, and connected travel	Suggests future potential for smart kiosk or travel sensors	Tourismo AI currently operates as a desktop/web dashboard

2.4 SUMMARY

- The paper starts with the observation of the increase in usage of digital technology in the tourism industry and the demand for integrative services. It presents some of the main findings of recent studies illustrating how digital platforms and AI systems are enriching the travel experience while enhancing sustainability in tourism.
- These technologies are critical to enhancing customer experience through offering customized travel agendas, facilitating informed decision-making, and delivering real-time travel information, all of which drive enhanced customer satisfaction.
- There is increasing interest in sustainable tourism, and online platforms are reacting by fostering environmentally friendly activities and community-based tourism, thus lowering the entire carbon footprint. The bundling of services like accommodation, transportation, and local experiences into

one platform, such as Tourismo AI, serves to prove the real-world utility of One-Stop Tourism Solutions.

- Emerging technologies such as Artificial Intelligence, Machine Learning, and the Internet of Things are transforming the way tourism services are provided through enhanced automation, customization, and operational effectiveness. Yet, extensive use of these technologies is coupled with challenges in domains like data privacy, trust among users, and secure integration of systems.
- This review highlights that although sites such as Tourismo AI provide holistic and smart tourism solutions, security, transparency, and ethical usage of user data are still essential to attain long-term adoption and effects in digital tourism.

CHAPTER-3

RESEARCH GAPS OF EXISTING METHODS

Despite notable advancements made toward generating AI-enabled tourism dashboards and recommendation systems, there are still important research gaps that limit their effectiveness, accessibility, and scalability. If we address key challenges, including limited personalisation, lack of practical real-time spatial data integration, ease-of-use challenges, issues related to infrastructure, and data privacy issues, we can enable the development of more intelligent, inclusive, and sustainable tourism applications.

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 rely on fixed filtering mechanisms and do not adapt well to the evolving nature of user preferences, leading to generic and less relevant suggestions. Hybrid recommendation models that combine collaborative filtering with content-based approaches have shown promise in enhancing recommendation quality [15].
- Static User Profiles: Many existing dashboards rely on static data that does not reflect users' real-time behavior or changing context. This results in decreased user engagement over time. Adaptive learning models capable of dynamically updating user profiles are needed to maintain relevance and personalization [15].

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: Tourism data such as hotel availability, transportation schedules, and weather updates are obtained from multiple APIs with inconsistent formats. This fragmentation leads to inefficient data aggregation and inconsistent user experience [16].
- Connectivity Issues: Real-time services often require stable internet connections, which may not be available in remote or rural destinations. The use of offline-first design paradigms and synchronized data caching is under explored in current implementations [16].

3.3 Accessibility and Multilingual Usability

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

- **Language Barriers:** Most tourism platforms are English-centric and do not support regional or native languages. This restricts access for non-English-speaking users, especially in multilingual countries like India. Incorporating multilingual capabilities enhances inclusivity and accessibility [17].
- **Cultural Sensitivity:** Generic recommendations often overlook local customs, values, or regional preferences. Culturally aware algorithms are needed to offer personalized, contextually appropriate suggestions that resonate with diverse user backgrounds [17].

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:** Many regions with tourism potential face challenges such as low internet bandwidth and power instability. Designing lightweight, offline-compatible architectures is crucial for scalability in such areas [18].
- **Cost Barriers:** Advanced AI and real-time data integration require substantial computational resources, which can be cost-prohibitive for smaller tourism operators. Leveraging open-source tools and low-cost frameworks can democratize access to intelligent tourism dashboards [18].

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:** Many existing systems do not incorporate end-to-end encryption protocols, making user data vulnerable during transmission and storage. Research is needed to develop encryption standards tailored for tourism applications [19].
- **Legal Compliance:** Tourism platforms often operate globally and must comply with data protection regulations like GDPR (Europe) and CCPA (USA). Existing systems lack built-in mechanisms to ensure jurisdiction-specific compliance, necessitating adaptable privacy management frameworks [19].

3.6 Sustainability and Long-Term Impact

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

- Energy Consumption: AI-driven systems are resource-intensive, especially those using real-time analytics and large-scale models. Optimizing energy consumption through efficient algorithms is critical to ensuring the platform's environmental sustainability [19].
- User Retention: Tourism dashboards often fail to maintain user engagement beyond an initial travel cycle. Integrating gamification, loyalty programs, or social interaction features could enhance long-term user retention and platform relevance [15].

3.7 Conclusion

For tourism platforms to provide deep learning, personalization, inclusion and accessibility, providing real-time data integration, addressing scale, protecting travelers' privacy, and creating a sustainable model, future research needs to develop frameworks that focus on these important issues and create a better and more inclusive intelligent user-centered system like Tourismo AI. It is so important that a truly intelligent system includes considerations for the travel experience, education and learning in tourism, and ultimately sustainable tourism for the diversified travel consumer.

CHAPTER-4

PROPOSED MOTHODOLOGY

Tourismo AI is dedicated to building an all-in-one, AI-powered platform to support travellers by integrating a range of services into one unified solution. Services offered through the platform include personalised hotel booking, intelligent transport management, live weather forecasts, traffic updates, and a live trip planner. By using a host of machine learning algorithms based on available data across many proprietary databases, Tourismo AI will synthesise the travel needs and deliver personalised recommendations for suitable travel services that factor in user preferences in terms of comfort, quickness, and cost-efficiency to enhance contextually convenient customer satisfaction. The platform will consist of a user dashboard to capture all travel details in one handy location, an AI-powered chatbot to provide direction or guidance in seconds, a travel planner to help organise travel logistics, real-time weather forecasting, and a PayPal external payment gateway to secure bookings and payments for services. By integrating everything in amazing detail, Tourismo AI will be the premier solution for all travelling needs.

4.1 Requirements Gathering and Analysis

The Tourismo AI foundation starts with requirements gathering and analysis. This element of the process focuses on understanding user needs, their pain points, and problems with existing solutions. Overall, the goal is to ensure that the platform is created around user-based features which would lead to a seamless and tailored travel experience.

User Surveys and Interviews

Focus Areas:

Fragmentation of Offerings: Travellers today can install several apps that offer distinct services (hotel booking, transport, activities, etc.), which can often create frustration and unnecessary tasks. The survey will identify fragmentation pain points.

Generalise Recommendations: At travel platforms today, these recommendations are generic and often make no consideration of users' preferred features, preferences, or past actions. However, if we are able to ask users about ideal travel recommendations as well as the characteristics they would and would not value, this will enable recommendations to be fit to users' expectations. e.g. would users want deals on suggested hotels as similar to their past trips, or custom itineraries?

Inefficiencies in Booking: Travellers face many problems when using travel platforms, for example, real-time updates, price fluctuations, and inventory on a booking site. Tourismo AI will have to address these issues by providing predictive analytics for many forms, including weather, traffic, flight delays, etc.

Competitor Review:

A thorough review of platforms like Booking.com, Uber, and Eventbrite will be conducted to

Recognize Existing Gaps: Evaluate the levels of integration of numerous services, including access to accommodation, transport, and events, and notice what features lack predictive analytics, real-time data processing, or personalization.

Service Integration: How do competitors combine multiple services, and what technology do competitors utilize to give users an integrated experience?

Personalization: What level of personalization is offered? This could include how competitors recommend recommendations based on travel preferences or travel behaviours.

Limitations in Real-Time Services: Evaluate how competitors utilize real-time data with respect to the weather forecast, traffic data, and availability.

Feature Prioritization:

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

User Dashboard: A personalized dashboard where users can view all their bookings, travel preferences, and history. It will serve as the central hub for managing their travel experience.

Chatbot Integration: A 24/7 AI-powered chatbot will provide real-time customer support and assist with travel planning. It will offer answers to queries, help with bookings, and provide recommendations based on user preferences.

Travel Planner: A tool that will allow users to create custom itineraries. The planner will be based on preferences such as travel dates, budget, interests (e.g., adventure, relaxation), and previous travels.

Weather Forecasting Integration: This feature will allow users to view real-time, location-specific weather updates to help them plan their travel and activities.

Hotel Booking Integration: Integration with the Booking.com API will allow users to search for hotels, view real-time availability, and book accommodations seamlessly.

Payment Gateway (PayPal Integration): Secure and easy payments for booking services. PayPal will allow users to make transactions without entering payment details on multiple sites, ensuring a smooth, secure transaction experience.

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 be built using Node.js, a JavaScript runtime that's perfect for handling multiple, concurrent requests efficiently. Node.js is known for its scalability, which is crucial for applications expecting high traffic.

Database: MongoDB

MongoDB will be used as the database to store user data (profile, preferences, travel history), booking information, and real-time analytics data.

MongoDB's flexibility will allow it to handle unstructured data from multiple sources, such as user behavior, third-party APIs, and sensor data for real-time services.

API Management:

The backend will act as a middle layer, managing interactions between the frontend and third-party services (such as weather, maps, hotel bookings, and payments). APIs will be designed to handle data exchange efficiently.

Frontend Development:

The user interface will be designed using the Streamlit framework because it allows for fast development of interactive and dynamic web applications which are user friendly. The application will have a modular layout consisting of sidebars and sections for hotel booking, trip planning, weather conditions, and maps. The users will also be able to enjoy visualizations as the application will assimilate interactive destination maps and real-time weather updates.

API Integrations:

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

Table 4.1: Integrated APIs and Their Functions

API	Function
OpenWeatherMap API	Fetches 5-day weather forecasts for any location.
PayPal API	Processes secure online payments for bookings.
Google Maps API / Folium	Displays travel routes and destination maps.
Chatbot API (Optional)	GPT-3.5 Turbo or rule-based assistant for planning guidance.

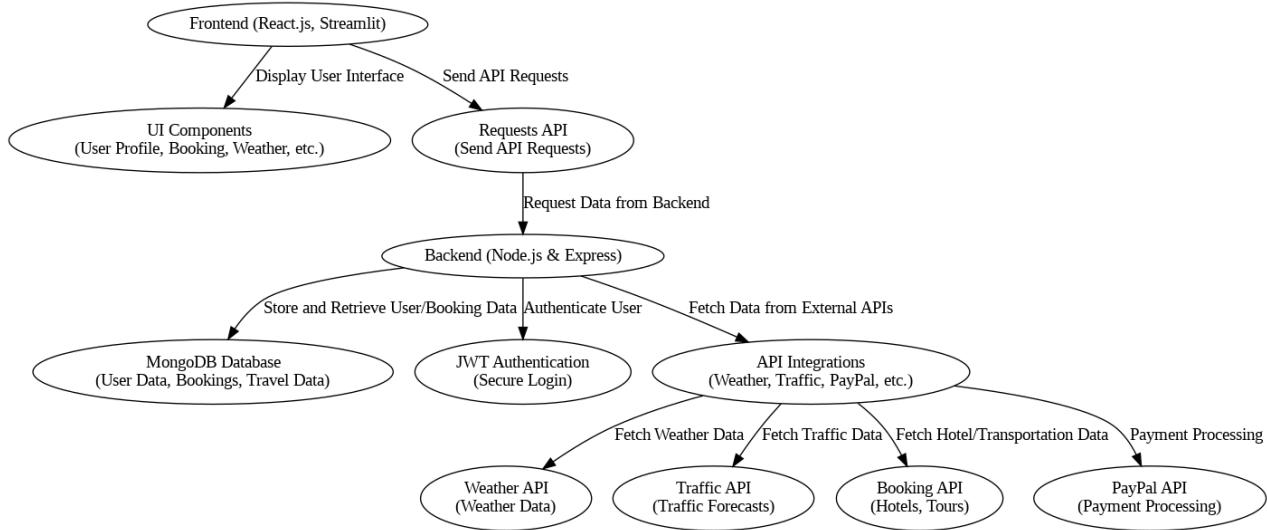


Figure. 4.1: System Architecture Diagram

4.3 Feature Development

User Interface

The frontend interface is created with Streamlit, offering a simple and dynamic experience. The major features of the user interface are:

Destination Search and Hotel Booking Forms:

Functionality: Users can input their travel information like destination, travel dates, and number of guests. This data is utilized to filter out available hotels and activities that suit their needs.

Flow: After the user submits the search, the system processes the input and retrieves corresponding results and displays them in a structured and easy-to-browse format.

Interactive Map:

Integration: Utilizing Google Maps API and Folium, the map enables users to see visually their destination and its surrounding areas.

Functionality: Users can zoom in and out, interact with points of interest (POIs), and see travel routes to nearby places or attractions.

Chatbot for Personalized Assistance:

Technology: The platform hosts a GPT-3.5 or custom rule-based engine-powered chatbot that acts as a virtual assistant.

Purpose: The chatbot may respond to queries related to traveling, aid in creating an itinerary, offer tips for travel, and walk the user through the booking process conversationally.

Weather Forecast for Real-Time Data:

Integration: With the OpenWeatherMap API, the platform retrieves weather forecasts for the chosen destinations.

Display: Current weather conditions, such as temperature, rainfall, and wind speed, are shown for the user's chosen travel dates, which assist in improved travel planning.

Reviews and Ratings for Destinations and Hotels:

Functionality: Users are able to read reviews, see ratings from other travelers, and provide their own comments.

Integration: This information assists in developing a dynamic recommendation system whereby the system identifies top-rated destinations and accommodations based on past guest experience.

Travel Planner Form:

Personalization: A separate section where users submit information like favorite activities (e.g., nature, adventure, sightseeing), preferred type of hotels, and budget for the trip.

Outcome: Depending on this information, the system will provide customized itineraries, travel packages, and respective recommendations.

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:

OpenWeatherMap API:

Purpose: Provides up-to-date weather data (temperature, precipitation, etc.) for the user's selected destination, helping them plan their trip accordingly.

Integration: Weather information is displayed on the destination's page and directly impacts travel recommendations (e.g., suggesting indoor activities if it's expected to rain).

Google Maps API / Folium:

Purpose: Displays interactive maps showing user-selected destinations, nearby hotels, and activity locations. It also provides real-time route planning, directions, and estimated travel times.

Features: Users can click on the map to explore nearby attractions, restaurants, and other points of interest. Routes between multiple locations can also be planned and displayed on the map.

Chatbot API:

Technology: The chatbot uses GPT-3.5 or a custom rule-based system to respond to user inquiries and assist with trip planning.

Functionality: Provides instant travel advice, clarifies user questions, and helps users finalize their booking choices.

Ratings and Reviews API:

Purpose: Aggregates and displays user-generated ratings and reviews for hotels, destinations, and activities, helping future users make informed decisions.

Integration: Provides users with insights from previous travelers, adding authenticity and reliability to the suggestions provided by the platform.

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:

The platform uses SSL/TLS encryption to secure all data exchanges between the frontend (user interface) and backend (server), protecting sensitive information such as login credentials and payment details.

OAuth & JWT:

The platform uses OAuth for secure user authentication, and JWT (JSON Web Tokens) for maintaining secure user sessions across the platform.

Functionality: Users are securely logged in, and sensitive actions (such as payment or viewing personal data) are restricted to authenticated sessions.

Data Encryption:

All sensitive data, including payment details and personal user information, is encrypted using advanced algorithms before being stored in the database, ensuring privacy and regulatory compliance.

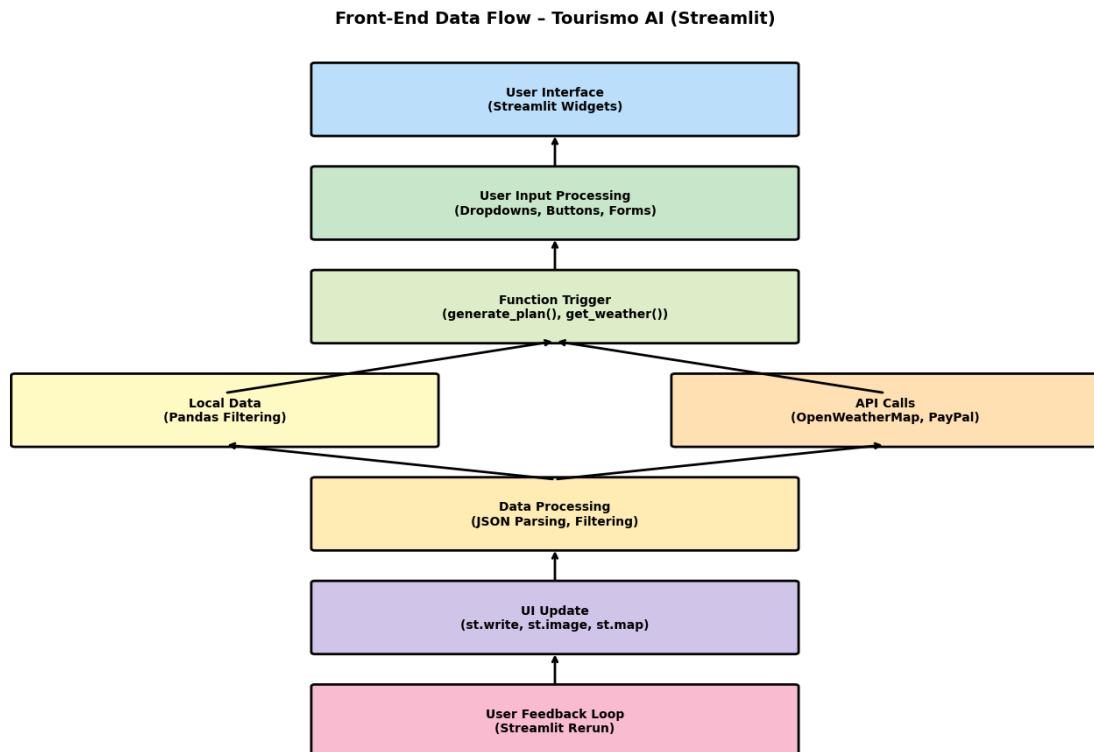


Figure 4.2: Front-End Development data flow

CHAPTER-5

OBJECTIVES

Tourismo AI is an coordinates stage that is assumed to progress the travel involvement of clients. However, some common objectives include:

AI-Driven Travel Experience Personalization:

Customized travel recommendations according to user interests, past behavior, and artificial intelligence insights are one of the primary aims of Tourismo AI. Every journey is differentiated and aligned to the interests of the user due to the platform's capacity to suggest personalized itineraries, activities, accommodations, and even local experiences depending on individual user analysis.

A Helpful Travel Reservation Experience

Tourismo AI seeks to improve the travel reservation process by unifying the hotel reservation process, transportation, event planning all in a single platform. This unifies the entire travel booking and reservation process, giving travelers an experience not only without hassle but be developed so they can save considerable time by booking everything, through a single platform.

Real-Time Information and Updates

The platform is designed to provide real-time data analytics of current conditions for travelers with regard to weather, activities and services. As travelers are able to identify the current and up-to-the-moment scenarios they planned their trips around, they can make more informed decisions about their trip. Travelers can also revise their schedule if circumstances change or don't match their pretrip expectations, but the real-time information helps ensure they can stay on track with their travel plans.

Global Reach via Multi-Language and Multi-Currency Options

In an effort to promote access to Tourismo AI at a global level, the platform includes multi-language capabilities and the ability to transact in multiple currencies. In doing this, the platform will further increase usability and accessibility in order to enable travelers looking for new experiences to access and navigate the platform in their preferred language and process transactions in the currency of their choice.

CHAPTER-6

SYSTEM DESIGN & IMPLEMENTATION

6.1. Implementation Overview

The Tourismo AI system is built using a client-server architecture which separates the frontend and backend functionalities to produce better performance, scalability, and security. The frontend of the Tourismo AI system is built with Streamlit, this allows us to create an interactive user interface that integrates several APIs: including OpenWeather, hotel booking platforms, PayPal for payments, and Folium for the maps. The backend of the Tourismo display handles the data processing and live updates that allow users to plan personal travel itineraries, book hotel accommodations, and view forecasts at the same time. The modular systems give us more flexibility and ease to integrate future technologies such as augmented reality (AR), or accommodate many different languages, and incorporate artificial-intelligence generated all together within this system.

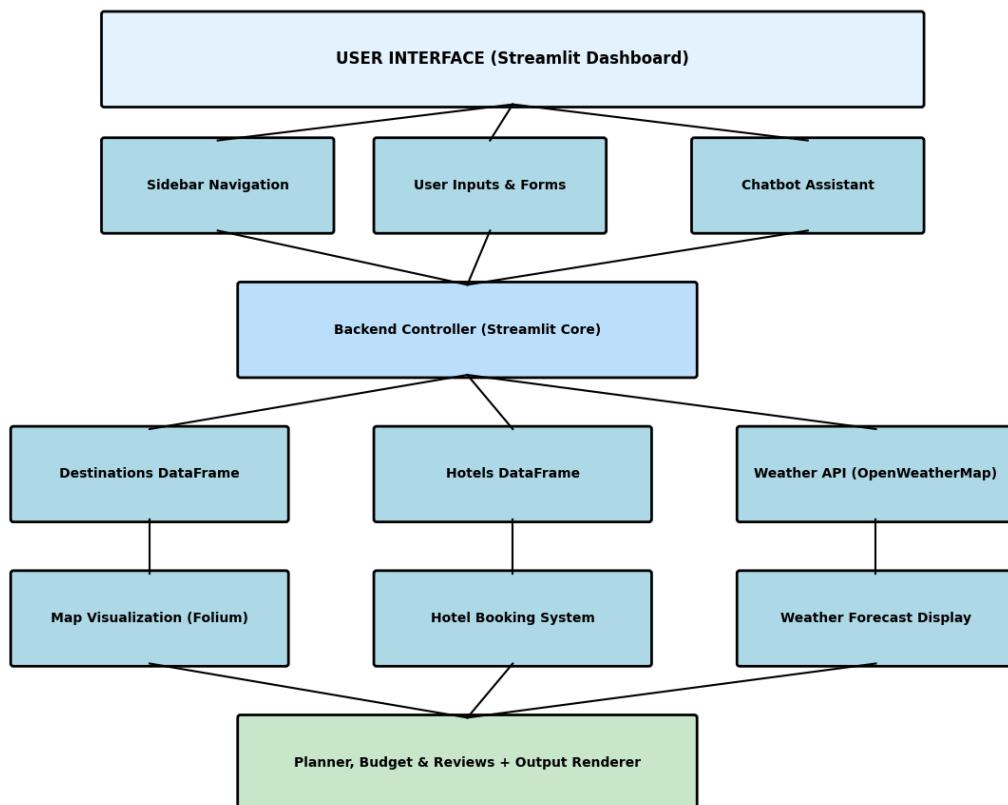


Figure 6.1: System Design Diagram

6.2. Frontend Implementation

Key Components of the Frontend:

- State Management: The frontend operation utilizes Streamlit Session State to retain global countries involving user authentication, preferences, and session information. This allows when a user logs in they are able to conserve their details when reserving (e.g., user Profile, history) across different fronts of the operation. As a session-based country operation will allow the user to switch seamlessly between the hostel booking, diary, and rainfall functionalities without having to input their details every time, or navigating from the previous booking position.
- Real-Time interactions: In order to provide users with dynamic and responsive gestures, the frontend relies heavily on the queries archive to relay information between the frontend and foreign or backend APIs in real-time. Consequently, when a user is searching if a hostel is available, or entering a business update, or completing a booking, the frontend will inform the user in real-time without requiring them to refresh the page. For example, once a hostel space is reserved, the frontend will also receive an update from the backend on the status of their reservation and display it in the interface. This added responsiveness to the operation improves the overall reliability of the operation.
- Routing and Navigation: Navigation between different pages and functionalities will occur through the Streamlit Sidebar, which is the primary method of routing users around the application. The Streamlit Sidebar will allow users to access important areas of the application such as the home page, the destinations available, the weather forecast, the interactive map, the Google Public API booking system and the user profile. This way, we are able to compartmentalise navigation to avoid any complicated routing logic while retaining a neat appearance using the Sidebar that allows the user to seamlessly move between the application's features.
- User Profile Management: The complete suite of User Profile Management features occurs on the platform. In order to easily link and access the user's profile details, preferences, booking history and upcoming travel plans, users will need to sign in to their profile and this will link to their personal dashboard. In the profile section of a user's profile, they can update personal information, access their booking history, and see travel suggestions unique to their trip history, in line with continuing to improve the user experience.

- Interactive Features:
 - Search and Filter Options: The Search and Filter system is one of the key aspects of the Frontend. It allows users to find their destinations, hotels, and tours quickly. Compatible filters include budget limits, geographic locations, hotel ratings, and amenities. It increases the speed of the decision-making process as users can cut through various offerings to quickly find travel and accommodation services that satisfy their criteria.
 - Real-Time Booking System: The application provides a built-in Booking System through an integrated Console, allowing users to book the hotels, tours, and transport services in real-time. The Booking System connects to external systems through platforms such as Booking.com and Uber APIs respectively using, real-time booking confirmations and availability data. When users decide to book a service, the booking information is sent back to the Frontend through an API request. As soon as the system receives the response, it is reflected in the Frontend interface.
 - Weather Forecast Integration: The platform's frontend has a Weather Forecast component that delivers current weather data from a third-party weather API. It enables the user to view the current weather, and any 7-day forecast for the destination travelled. The integration delivers value to the platform since it assists the traveller in making the right choices regarding when to travel to their destination, and what preparations to undertake based on the current weather conditions.

Technologies for Frontend:

The front-end is built mostly on Streamlit because it has made UI development easy and quick, and, with the Requests library, PayPal SDK, and Streamlit Session State, it provides for enhanced utility.

- Streamlit: The framework used to build the UI.
- Requests: Used for API calls for data when fetching data.
- PayPal SDK: Used to take payments securely and seamlessly.
- Streamlit Session State: Used for the global user session.

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: In order to offer a real-time, interactive end user experience, the back-end relies on asynchronous programming patterns with asyncio and aiohttp libraries. This enables the application to execute multiple operations at once while not blocking other code execution. For example, if a user wants information about a destination, the application can simultaneously request the current weather, hotel availability, and traffic conditions. This back-end system design mitigates any lag in the user experience, reduces load times, and supports a fluid experience.
- API Management: Streamlit, acting as both the front-end and back-end, plays a major role in handling user data and connecting to third-party services. For example, the backend was created so that it can easily talk to various external APIs such as OpenWeatherMap to capture weather forecasts, Booking.com or Amadeus APIs to validate hotel availability, and transportation services like Uber to predict transport times. In practice, users would perform actions like searching for hotels. The backend would create an API request, submit it to the appropriate service, and pass the data in a compliant format for display. Streamlit provides important API management that ensures the information provided to the user is accurate, timely, and displayed in an engaging way through Streamlit's interactive functionality.
- 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 and Hotel Management: The backend facilitates a robust structure for managing tours, hotels and transportation. Static information, such as package tours and destination information, is stored in the MongoDB database while transient information, such as hotel availability and transportation schedules, are made using real-time API calls to services like Booking.com and Uber. When a user searches for available hotel accommodations or travel options, the backend retrieves the data, processes it, and displays only relevant up-to-date results. CRUD (Create, Read, Update and Delete) operations of user bookings and preferences have been handled through the backend which ensures users have a seamless time managing their travel plans. The structured and consistent travel data is accurate and lends well for user choice and personalization.
- Payment Integration: The backend calculates the financial aspects through the PayPal SDK. Once the user accepts the booking, they are redirected to PayPal's payment application to complete their purchase. Once the payment is processed, PayPal responds with a confirmation response to

the backend. The backend ensures through secure token validation that the transaction is legitimate. Once validated, the backend updates the booking in the MongoDB database and indicates to the user of the success of the payment process. All payment transactions are encrypted using SSL/TLS to ensure that financial exchanges are protected with respect to sensitive data. Since PayPal is an established and accepted platform and used by many users all over the world, this provides for user trust and justification for meeting financial digital security.

Technologies for Backend:

Table 6.1: Backend Technology Stack with Functional Roles

Component	Technology / Tool	Purpose
Core Framework	Streamlit	Manages both frontend and backend interactions
Database	MongoDB	Stores user data, bookings, hotel listings, and tour packages
Authentication	JWT (PyJWT library)	Secure user login/session without storing state on server
Async Support	Python asyncio, aiohttp	Enables non-blocking API calls for real-time updates
Payment Gateway	PayPal SDK	Secure and trusted platform for handling user payments
Weather API	OpenWeatherMap	Real-time weather forecasts per selected destination
Hotel Booking API	Booking.com / Amadeus / RapidAPI	Fetches hotel availability, pricing, and ratings
Transport API	Uber API or similar	Fetches ride availability and fare estimates
Encryption	SSL/TLS	Ensures secure transmission of sensitive data during login and payments

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: When users first access Tourismo AI, they need to either sign up to get an account created, or login. The process is initiated on the frontend, where the user enters in their information, such as name, email, and password. The data is then sent to the backend securely, to authenticate the account credentials when logging in. If the credentials are correct, the backend will create a JWT (JSON Web Token), which will then be sent back to the frontend. The JWT token will remain in the session of the user and used for that session so that the user can

have secure access while on Tourismo AI. In the case, where there is an error, or incorrect credentials, the user will see a message in which to retry again.

- Selecting a Destination and Booking a Service: Once logged in, users can explore various travel-related services, such as hotel bookings, transportation, and events. After selecting a service, the user provides additional details (e.g., destination, dates, number of people). This information is sent from the frontend to the backend, which processes the request by checking real-time availability. For hotel bookings, the backend interfaces with external APIs (such as Booking.com or Airbnb) to retrieve the availability and rates of hotels in the chosen location. For transport services, real-time availability is checked through APIs like Uber or local transport services. Once the service is confirmed, the booking details are stored in the database, and a booking confirmation is sent to the user through the frontend.
- AI-Based Personalization and Recommendations: The "Tourismo" AI platform has been designed to incorporate an AI based engine to provide personalized recommendations based upon a user's previously shown interactions, preferences, and behavioral patterns. Once a user logs on, the platform will utilize AI algorithms to retrieve, analyze similar data of past user preferences (i.e. favorite destinations, activities, previous services booked) data and make recommendations about travel destinations, hotels, or events in the future. The data flow will ensure that the consumer is receiving an individualized, personalized experience to enhance user engagement.
- 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 Management: The user profile serves as the central hub for managing bookings and personal preferences. When users navigate to their profile section, they can view their past bookings, payment history, and personal preferences. A GET request is sent from the frontend to the backend, which retrieves relevant data from the Bookings Collection in the MongoDB database. This data includes details like booking dates, services used, destinations, and payment statuses. The retrieved data is then displayed on the user's profile page, allowing them to track their travel history, manage future bookings, and update their preferences.
- Event and Activity Management: For users who want to explore local events or activities during their travel, the platform provides event and activity recommendations powered by AI. The frontend collects the user's destination and travel dates, sending this data to the backend. The backend communicates with external event management APIs (such as Eventbrite or local event

APIs) to fetch available events and activities during the user's travel dates. The platform then displays personalized event recommendations based on the user's preferences and interests.

- Notifications and Real-Time Updates: Throughout the user journey, **Tourismo AI** ensures that users stay informed. Whether it's booking confirmations, payment receipts, or personalized travel recommendations, the platform uses push notifications or email services to notify the user of important updates. These notifications are sent from the backend, triggered by specific actions (such as a successful booking, payment confirmation, or an upcoming trip reminder).

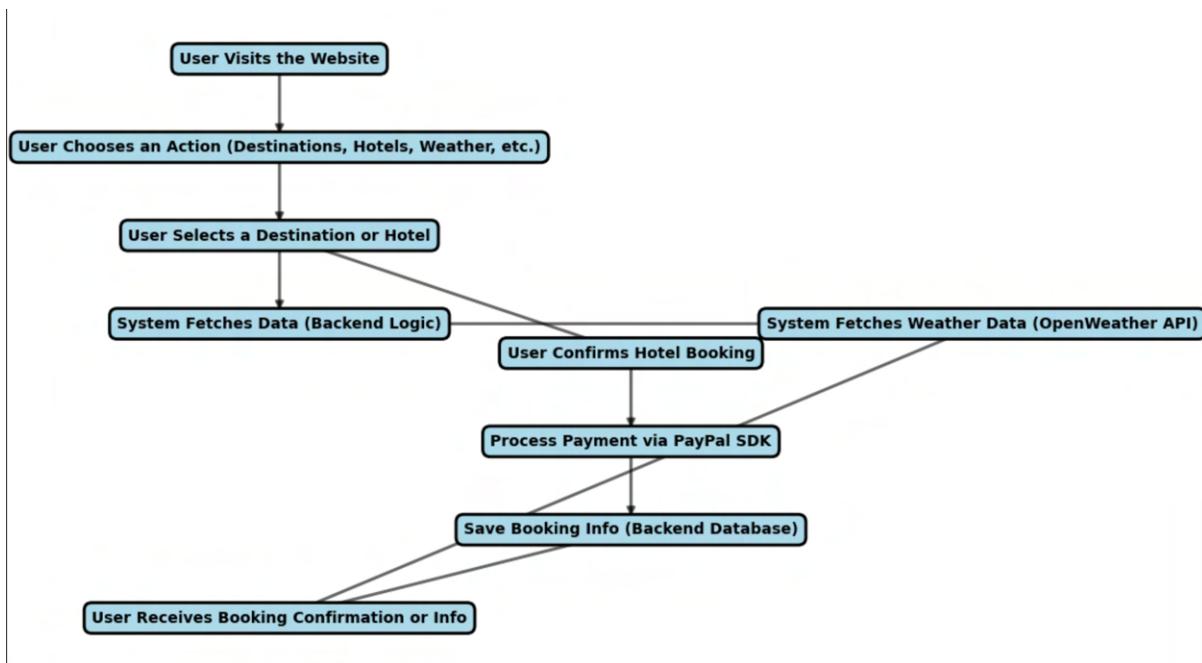


Figure 6.2: Tourism Dashboard Workflow

The data flow interaction in Tourismo AI ensures a seamless user experience by efficiently handling processes like user registration, service booking, payment processing, and personalized recommendations. Users register and log in securely, after which they can explore and book services like hotels, transport, and events. The platform uses AI to offer tailored suggestions based on user preferences. Payment details are processed securely through external gateways like PayPal, and booking history is stored and accessible via the user profile. Real-time notifications keep users informed throughout their journey, ensuring a smooth and personalized travel experience.

6.6. Implementation Details

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

- Frontend:

The frontend of the application is developed using Streamlit, a Python-based framework known for its ease of use and rapid development capabilities. Streamlit enables the creation of responsive and interactive user interfaces without the need for traditional HTML/CSS or JavaScript coding. Through Streamlit, users can interact with different components such as travel destination selectors, date inputs, chatbot windows, and map visualizations.

- The requests library is used extensively on the frontend to handle asynchronous HTTP calls to external APIs. This includes calls to weather services, hotel booking APIs, and location-based data endpoints.
- For payment processing, the PayPal SDK is planned for integration to facilitate secure and seamless transaction handling. This would allow users to book hotels or pay for travel packages directly through the dashboard, enhancing the user experience.

- Backend:

Although Streamlit serves as both the frontend and backend in this implementation due to its ease-of-use, there is core backend logic for form submissions, embedding chatbots, API interactions, and data processing.

- Backends are planned to eventually support JWT (JSON Web Token) based authentication to manage logging in, sessions and eventually, roles. This will be a required layer of activity as the platform grows permits user accounts and customizations.
- The application interacts with several different APIs:
- OpenWeatherMap API: This API provides the user with current weather information for their selected destination. This addition to trip planning will provide temperature, wind and precipitation forecasts.
- Traffic and Hotel APIs (to be implemented): These APIs will be included in future versions to provide live traffic updates and real hotel availability in real time, and make the travel planning experience more fluid and biological.

- Database:

For managing persistent data such as user profiles, travel history, hotel information, and personalized recommendations, the system is designed to use MongoDB, a flexible NoSQL database.

- MongoDB provides schema-less data storage, making it suitable for storing varied travel-related data like weather logs, user inputs, hotel metadata, and payment history.

- Mongoose, an Object Data Modeling (ODM) library for MongoDB and Node.js, will be integrated to enforce schema structures and validation rules when interacting with MongoDB. Although not implemented in the current version, it is included in the future roadmap for database management.

- Payment Gateway:

The payment feature is a core part of the proposed platform and is facilitated through the PayPal SDK. PayPal's SDK provides:

- End-to-end encrypted transaction flow.
- PCI-compliant security standards.
- Support for various payment methods including cards and digital wallets.

This ensures a trustworthy platform where users can confidently book travel packages, hotel stays, or tourist activities.

- Other Tools and Libraries

Several Python-based tools and libraries are used throughout the application:

- Folium: This library is used for rendering interactive maps with tourist destinations marked dynamically. It integrates with geolocation APIs and enhances the visual planning experience for users.
- Pandas: Utilized for handling structured data such as city details, hotel listings, weather data, and user-generated input. It ensures efficient data manipulation and transformation.

CHAPTER-7

TIMELINE FOR EXECUTION OF PROJECT (GANTT CHART)

Table 7.1 Table of content for Gantt Chart

Task No.	Task Name	Start Date	End Date	Duration (Days)	Milestone / Deliverable
1	Requirements Gathering	25-Jan-2025	31-Jan-2025	7	Stakeholders' needs finalized
2	System Architecture Design	01-Feb-2025	06-Feb-2025	6	Architecture blueprint completed
3	API Integration (Google Maps, PayPal)	07-Feb-2025	14-Feb-2025	8	Third-party API integration validated
4	Backend Development	15-Feb-2025	28-Feb-2025	14	Backend system functional
5	Frontend Development	01-Mar-2025	10-Mar-2025	10	User interface designed and functional
6	Chatbot Integration	11-Mar-2025	17-Mar-2025	7	AI chatbot deployed
7	Testing and Debugging	18-Mar-2025	27-Mar-2025	10	All bugs resolved
8	Deployment and Launch	28-Mar-2025	01-Apr-2025	5	Platform launched
9	Post-Launch Monitoring	02-Apr-2025	20-Apr-2025	19	Continuous monitoring initiated

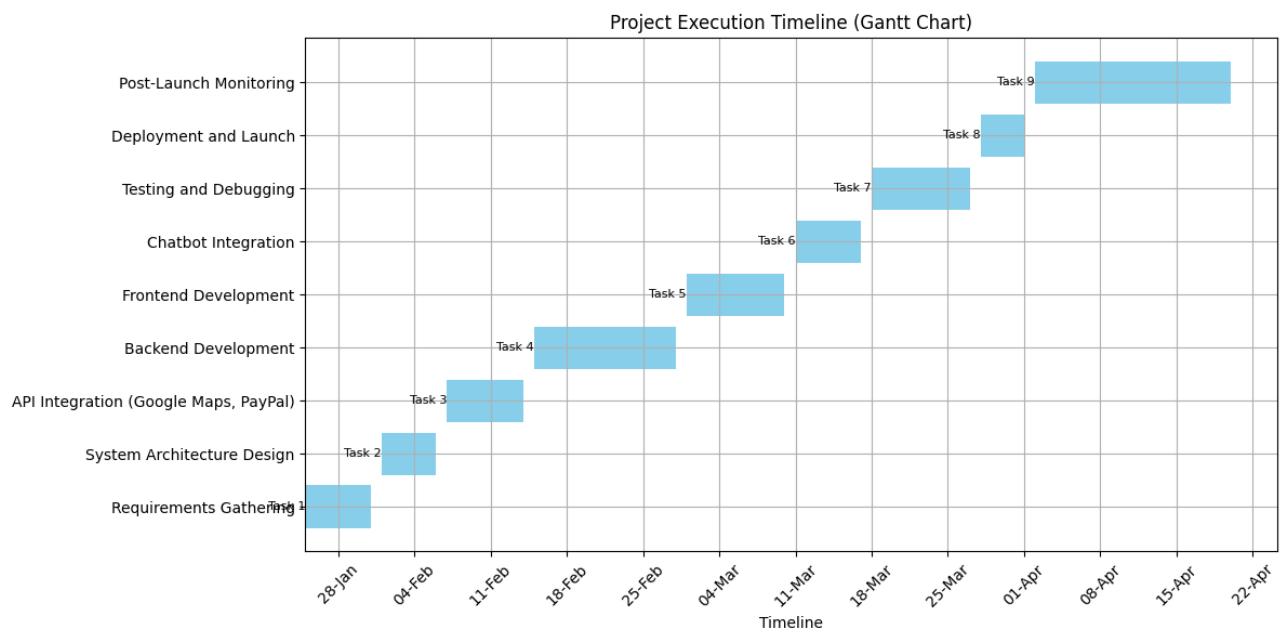


Figure 7.1: Gantt Chart

CHAPTER-8

OUTCOMES

The implementation of Tourismo AI, an AI-driven and integrated travel platform has implications and provides possibilities that will have great effects and challenges to overcome in the tourism and hospitality ecosystem. The effects are realized across user experience, economic impacts, environmental sustainability, and global inclusivity.

Increased Traveler Satisfaction: Tourismo AI makes the travel experience less stressful as it enhances traveler satisfaction through AI-personalized recommendations, real-time trip updates, multilingual chatbot engagement, and a seamless service. Tourismo AI does all the heavy-lifting when it comes to what a trip will look like for users, from discovering the destination they want to explore to booking the hotel they want to stay at. The end result is travelers that will walk away from the trip experience happier and more satisfied, leading to an overall more engaged user. .

Intelligent Decision-Making: The platform collects and utilizes the predictive analytics data, user behavior record, weather forecast, and crowd analytics to suggest travel plans that best suit their needs. These intelligent insights identify variables of potential travel decisions, facilitate rational assessments of travel time for travel to events, routes, lodging, and activities. AI-driven suggestions reduce guesswork in planning travel and improve the outcome of the quality or relevance of travel choices.

Enhancing Local Economies: Tourismo AI's emphasis on off-the-beaten-path and lesser known destinations allows visibility for local businesses and artisans. With the addition of local events, small hotel chains, and rural experiences, Tourismo AI decentralizes the flow of tourism revenue and stimulates equitable local economic development with more equitable opportunities for smaller areas.

Streamlined and Coordinated Travel Planning: With a centralized point of access for hotel bookings, flight/train schedules, tourist attractions and events, ground transportation, users can plan their entire trip in one space. Its convenience to have these travel and leisure activities allow these

services to inter-operate, saving time, effort and overall hassle on the planning process and outcome. Overall experience while planning is improved.

Integration of Eco-Tourism & Sustainability: Tourismo AI promotes responsible tourism by suggesting environmentally friendly lodging, sustainable travel (such as electric cars), and low-impact travel itineraries. Tourismo AI educates individuals about their ecological footprint and incentivizes users to choose greener options - eventually reducing the carbon footprint of tourism and promoting conservation-oriented behaviors.

Greater Accessibility & Inclusivity: Tourismo AI supports multilingual interfaces, voice input for all products (hence, they will be designed for voice recognition as the primary input) and will provide Indian Sign Language (ISL) support - with plans for additional implementation in the future. Users can access the application in multiple currencies which increases access for those with disabilities as well as for users with different language and socio-economic backgrounds - thus supporting a global and inclusive user base.

Greater Community & Social Engagement: Attributes such as user-generated material, travel feedback, shared plans, and recommendations in-app create a community driven experience. Users can engage with each other based on similar interests and work together to build a social element into travel planning to facilitate the surface of co-creation, trust, and engagement.

Affordable travel options: Tourismo AI's combination of real-time price comparison and dynamic updates, AI-based budget travel ideas, and inconsistent discounts help users in connecting with the best travel deals. With custom alerts and smart filters, travelers can plan within their budget and have options with Tourismo AI as an affordable option for quality travel.

Traveler Safety and Support: Tourismo AI offers a state of security for transactions and emergencies through reliable payment access, trip tracking, and immediate access to support through a chatbot. The ability to access an emergency helpline, receive real-time alerts, and locate travel bookings with identity protection is an important factor that allows users heightened safety as they embark on their journey.

Scalability and Future Adaptability: Tourismo AI is built using a modular and scalable architecture, enabling it to evolve with technological advancements. Features like augmented reality for virtual tours, blockchain for secure identities, and wearable integration can be seamlessly incorporated, ensuring that the platform remains innovative and future-ready.

CHAPTER-9

RESULTS AND DISCUSSIONS

Tourismo AI has already streamlined the travel planning process, providing users with a quick, easy and user-friendly experience, and ensuring personalized and unique travel itineraries. By infusing curated AI recommendations, real-time itinerary data, and adding secure booking to the experience, the platform efficiently enhances ease of use, saves users time while planning and enhances their travel planning experience. With their fresh and rookie UI/UX design, instantly generated itineraries, real-time weather conditions, interactive maps, and easy-to-use functionality the platform is equipped to ensure the necessary tools to plan the perfect trip. Providing real-time data insights, tailored recommendations, and improved booking processes has significantly improved user engagement - making Tourismo an essential new assistant for modern travelers looking to plan travel in a more clever, and efficient way.

Results:

Tourismo AI 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.

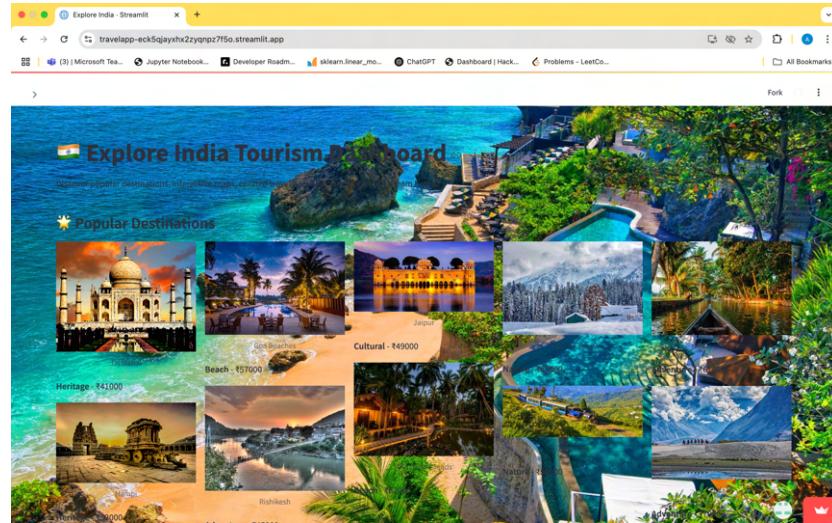


Figure 8.1: Home Page

The home page of the Tourismo AI 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.

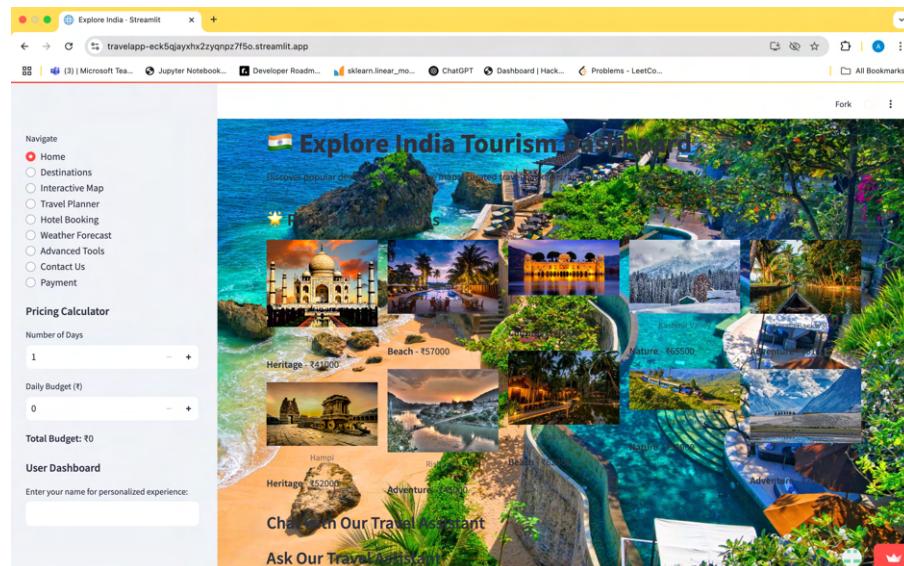


Figure 8.2: Dashboard option

The Dashboard serves as the central hub for the Tourismo AI 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.

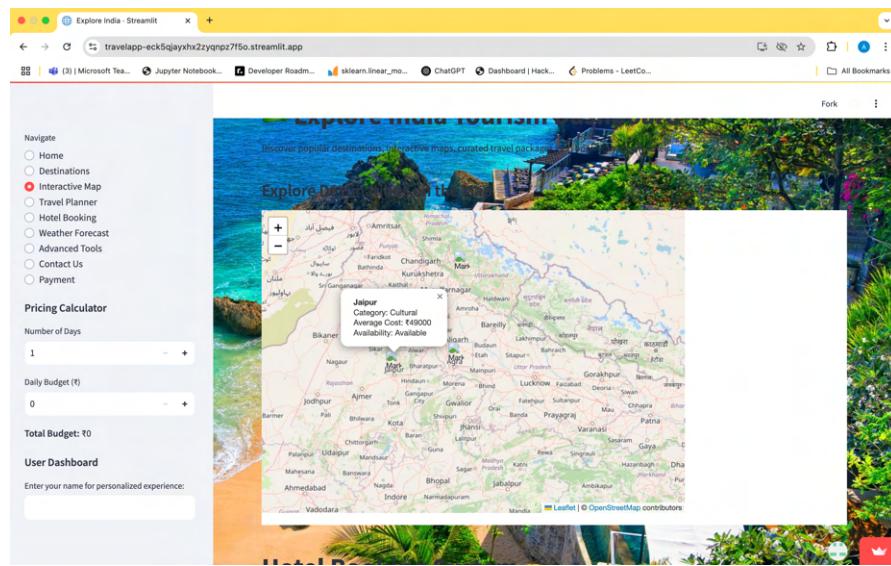


Figure 8.3: Interactive Map

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.

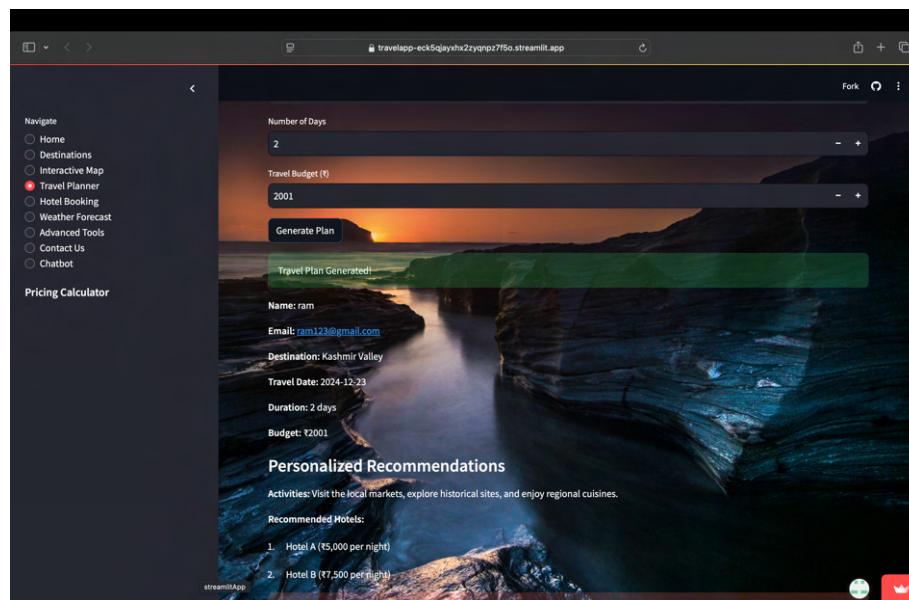


Fig.8.4: Travel Planner

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.

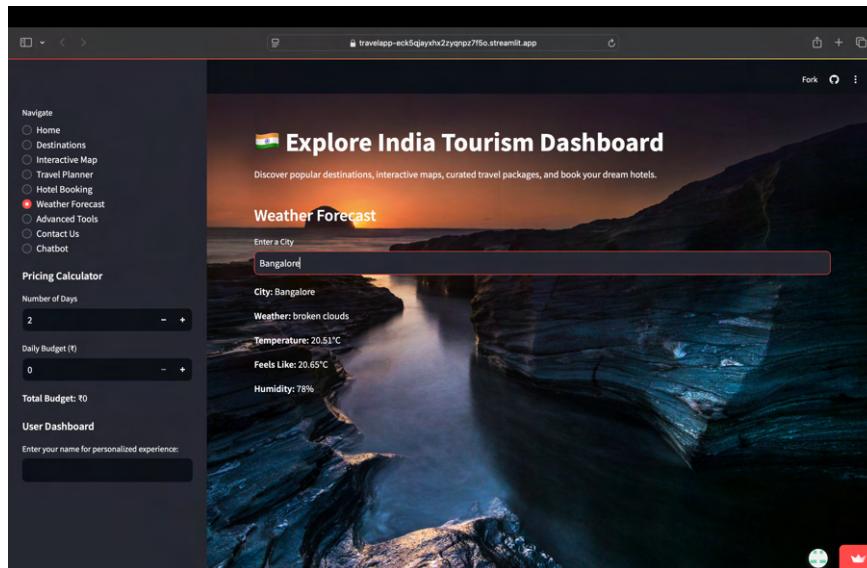


Fig.8.5: Weather Forecast

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.

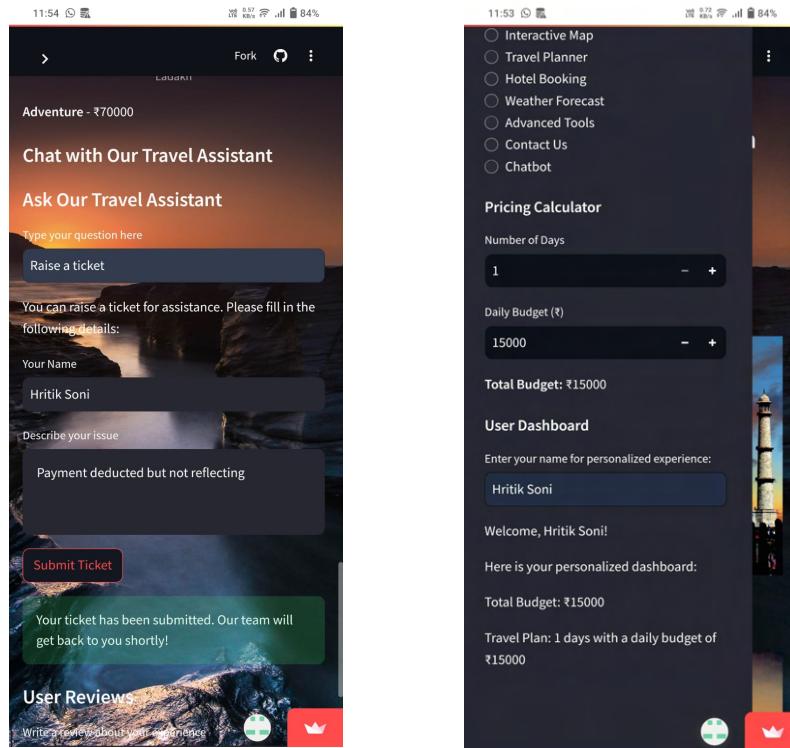


Fig.8.6: Travel Assurances ChatBot

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 Tourismo AI 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 Tourismo AI 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

PSEUDOCODE

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="Tourismo AI", page_icon="🌐", layout="wide")
st.title("🌐 Tourismo AI")
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

```
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

```
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

```

1 import streamlit as st
2 import folium
3 from streamlit_folium import st_folium
4
5 # Configuration of the Streamlit App
6 st.set_page_config(page_title="Explore India", page_icon="●", layout="wide")
7 st.title("Explore India Tourism Dashboard")
8 st.markdown("Discover popular destinations, interactive maps, curated travel packages, and more!")
9
10 # Background CSS for the App
11 st.markdown(
12     """
13     <style>
14     .stApp {
15         background-image: url('https://wallpapercrafter.com/desktop/38784-Trebarwith-Straight-Path-to-the-Sea')
16         background-size: cover;
17         background-position: center;
18     }
19     </style>
20     """
21 )
22 unsafe_allow_html=True
23
24 # Display the popular destinations
25 def display_destinations(df, category="All"):
26     filtered_df = df if category == "All" else df[df["Category"] == category]
27     for _, row in filtered_df.iterrows():
28         st.image(row['Image'], use_column_width=True)
29         st.write(f"**{row['Destination']}** ({row['Category']}) - {row['State']}")
30         st.write(f"Cost: ₹{row['Average Cost (₹)']} | Availability: {row['Availability']}")
31         st.markdown("—")
32
33 # Chatbot UI for interacting with the Travel Assistant
34 def personalized_chatbot():
35     st.subheader("Ask Our Travel Assistant")
36     user_input = st.text_input("Type your question here")
37
38     if user_input:
39         if "destination" in user_input.lower():
40             st.write("Looking for destination information? Here's a list of popular spots")
41             display_destinations(destinations_df) # Display destinations
42         elif "ticket" in user_input.lower():
43             st.write("You can raise a ticket for assistance. Please fill in the following")
44             name = st.text_input("Your Name")
45             issue = st.text_area("Describe your issue")
46
47 # Navigation
48 page = st.sidebar.radio("Navigate", ["Home", "Destinations", "Interactive Map", "Travel P"])
49
50 # Displaying the corresponding page content based on user selection
51 if page == "Home":
52     st.subheader("Popular Destinations")
53     cols = st.columns(5)
54     for i, row in destinations_df.iterrows():
55         with cols[i % 5]:
56             st.image(row['Image'], caption=row["Destination"], use_column_width=True)
57             st.write(f"**{row['Category']}**") # Average Cost (₹)
58             st.write(f"Cost: ₹{row['Average Cost (₹)']} | Availability: {row['Availability']}")
59
60     st.subheader("Chat with Our Travel Assistant")
61
62 elif page == "Destinations":
63     st.subheader("Find Your Destination")
64     category = st.selectbox("Choose a Category", ["All"] + list(destinations_df["Category"]))
65     display_destinations(destinations_df, category)
66
67 elif page == "Interactive Map":
68     st.subheader("Explore Destinations on the Map")
69     map = folium.Map(location=[20.5937, 78.9629], zoom_start=5)
70     for _, row in destinations_df.iterrows():
71         folium.Marker(
72             location=[row["Latitude"], row["Longitude"]],
73             popup=f"<b>{row['Destination']}

```

Figure B.1: Workflow-FrontEnd

```

1 import pandas as pd
2 import requests
3
4 destinations_data = {
5     "Destination": ["Taj Mahal", "Goa Beaches", "Jaipur", "Kashmir Valley", "Kerala Backwaters",
6                     "Hampi", "Rishikesh", "Andaman Islands", "Darjeeling", "Ladakh"],
7     "State": ["Uttar Pradesh", "Goa", "Rajasthan", "Jammu & Kashmir", "Kerala",
8               "Karnataka", "Uttarakhand", "Andaman & Nicobar", "West Bengal", "Ladakh"],
9     "Category": ["Heritage", "Beach", "Cultural", "Nature", "Adventure",
10                  "Heritage", "Adventure", "Beach", "Nature", "Adventure"],
11     "Average Cost (₹)": [14000, 57000, 49000, 65000, 61000, 52000, 45000, 62000, 58000, 70000],
12     "Image": [
13         "https://44.208.blogspot.com/-TrWt03zcaY/Wq0ZzgDGJI/AAAAAAAAMy/0BwAVhuFJM-K9D7MDZ43BFDRdZdu8gCEwYBhgL/s1600/taj-mahal-1400824_1920.jpg",
14         "https://0-xx.bstatic.com/xdata/images/hotel/max1200/207321005.jpg?k=1edb37487105b7db2e86e1c3c978982b80d3a523a5eace91e62f3f2c32ae4696o",
15         "https://th.bing.com/th/id/OIP.os9y4SJTnANZPMX16cQhDt7rs=s&pid=ImgDetMain",
16         "https://th.bing.com/th/id/OIP.fffB1WjBPvORP5tksoAHeE77rs=s&pid=ImgDetMain",
17         "https://th.bing.com/th/id/OIP.HyU2ttxGqeulpiw0gQhE87rs=s&pid=ImgDetMain",
18         "https://karnatakaturism.org/wp-content/uploads/2020/05/Hampi.jpg",
19         "https://www.holidify.com/images/bgImages/RISHIKESH.jpg",
20         "https://th.bing.com/th/id/OIP.g271q_vAEwXsGvauf0hE87rs=s&pid=ImgDetMain",
21         "https://sikkimtourism.org/wp-content/uploads/2022/06/Arheling-To-Train..jpg",
22         "https://th.bing.com/th/id/OIP.cU66TTKwrf-kmNo_LY7ghE87rs=s&pid=ImgDetMain",
23     ],
24     "Latitude": [27.1751, 15.2993, 26.9124, 34.0837, 9.9312, 15.3550, 30.0869, 12.0016, 27.0410, 34.1526],
25     "Longitude": [78.0421, 73.9891, 75.7873, 74.7973, 76.2673, 76.4600, 78.2678, 93.8552, 88.2627, 77.5772],
26     "Availability": ["Available", "Few Slots", "Available", "Sold Out", "Few Slots", "Available", "Available", "Sold Out", "Few Slots", "Available"]
27 }
28
29 destinations_df = pd.DataFrame(destinations_data)
30
31 def get_weather(city, api_key):
32     url = f"http://api.openweathermap.org/data/2.5/weather?q={city}&appid={api_key}&units=metric"
33     response = requests.get(url)
34     return response.json()
35
36 def get_destinations():
37     return destinations_df
38
39 def save_user_review(review, rating, hotel):
40     pass
41

```

Figure B.2: Workflow-BackEnd

```

boom.py 6  () db.json 8  Backend.py 2  () UI.py 8  Search - db.json on
Users > ashmitkumar > Documents > res > () db.json > ...
1  {
2    "destinations": [
3      {
4        "id": 1,
5        "destination": "Taj Mahal",
6        "state": "Uttar Pradesh",
7        "category": "Heritage",
8        "average_cost": 41000,
9        "image": "https://a.bp.blogspot.com/-TrWytD3zcaY/Wq0ZjzgDGJt/AAAAAAAAMy/OBwAVhu7FJ",
10       "latitude": 27.1751,
11       "longitude": 78.0421,
12       "availability": "Available"
13     },
14     {
15       "id": 2,
16       "destination": "Goa Beaches",
17       "state": "Goa",
18       "category": "Beach",
19       "average_cost": 57000,
20       "image": "https://q-xx.bstatic.com/xdata/images/hotel/max1200/207321005.jpg?k=1ed03",
21       "latitude": 15.2993,
22       "longitude": 73.9091,
23       "availability": "Few Slots"
24     },
25     {
26       "id": 3,
27       "destination": "Jaipur",
28       "state": "Rajasthan",
29       "category": "Cultural",
30       "average_cost": 49000,
31       "image": "https://th.bing.com/th/id/OIP.osd9uY4SJIRuNZPtMX16cQHaDt?rs=1&p=ImgDetM",
32       "latitude": 26.9124,
33       "longitude": 75.7873,
34       "availability": "Available"
35     },
36     {
37       "id": 4,
38       "destination": "Kashmir Valley",
39       "state": "Jammu & Kashmir",
40       "category": "Nature",
41       "average_cost": 65500,
42       "image": "https://th.bing.com/th/id/OIP.fffBB1VWj8PyORP5tksoEAHsE7?rs=1&p=ImgDetM",
43       "latitude": 34.0837,
44       "longitude": 74.7973,
45       "availability": "Sold Out"
46   }
47 }

db.json 114  () db.json > ...
115   "hotels": [
116     {
117       "id": 1,
118       "hotel_name": "Taj Hotel",
119       "destination": "Taj Mahal",
120       "cost_per_night": 9840,
121       "rating": 4.8,
122       "image": "https://imgcld.yatra.com/ytmages/image/upload/t_hotel_yatra_details_desk",
123     },
124     {
125       "id": 2,
126       "hotel_name": "Leela Beach Resort",
127       "destination": "Goa Beaches",
128       "cost_per_night": 12300,
129       "rating": 4.7,
130       "image": "https://dynamic-media-cdn.tripadvisor.com/media/photo-o/28/64/f2/b3/sibay",
131     },
132     {
133       "id": 3,
134       "hotel_name": "Raj Mahal",
135       "destination": "Jaipur",
136       "cost_per_night": 8200,
137       "rating": 4.6,
138       "image": "https://i.pinimg.com/originals/f4/02/da/f402da68c36ad9634d9bc2ef741c0843",
139     },
140     {
141       "id": 4,
142       "hotel_name": "Houseboat Stay",
143       "destination": "Kerala Backwaters",
144       "cost_per_night": 6560,
145       "rating": 4.9,
146       "image": "https://s4.scoopwhoop.com/anj/houseboat/731473165.jpg",
147     },
148     {
149       "id": 5,
150       "hotel_name": "Backwater Retreat",
151       "destination": "Kashmir Valley",
152       "cost_per_night": 7300,
153       "rating": 4.5,
154       "image": "https://th.bing.com/th/id/R.e448f6d151211f96baa5a66bd2845a4b?rik=RBXZvx8Y",
155     },
156     {
157       "id": 6,
158       "hotel_name": "Hampi Palace",
159   }
160

```

The screenshot shows a code editor with two tabs open: 'boom.py' and 'db.json'. The 'db.json' tab is active and displays a JSON object containing arrays for 'destinations' and 'hotels'. The 'destinations' array lists five locations with their IDs, names, states, categories, average costs, and availability status. The 'hotels' array lists six hotels with their IDs, names, destination names, costs per night, ratings, and images. The code editor interface includes a search bar, file navigation, and various toolbars.

Figure B.3: Workflow-Server

APPENDIX-C ENCLOSURES

Journal Publication Certificates

Title: **Tourismo AI: Smart Travel & Hospitality Hub**

Authors: ¹Ashmit Kumar, ²Hritik Kumar Soni, ³Utkarsh Pandey.

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Sustainable Development Goals (SDGs) mapping details

SUSTAINABLE DEVELOPMENT GOALS



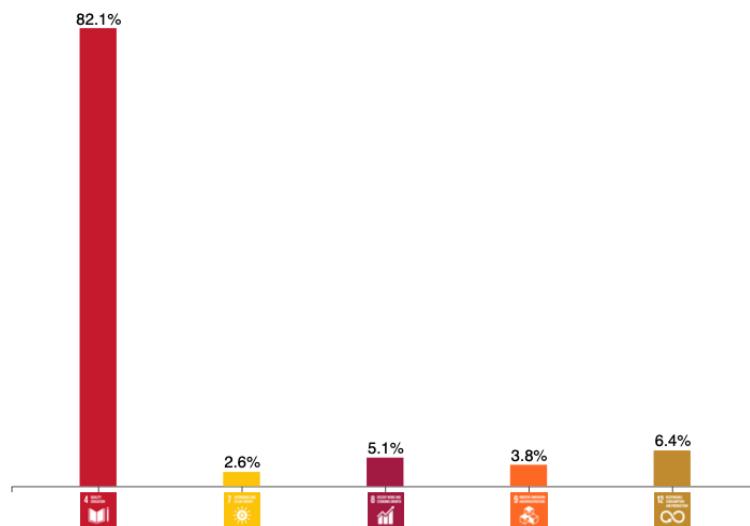


SUSTAINABLE DEVELOPMENT GOALS

SDG Report - Tourismo AI: Smart Travel & Hospitality

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



Target	Description	GERF 2 Indicators	GERF 1 Indicators	UN SDG Indicators
TARGET 4·A  BUILD AND UPGRADE INCLUSIVE AND SAFE SCHOOLS				Main indicators 4.a.1 Proportion of schools offering basic services, by type of service
TARGET 12·B  DEVELOP AND IMPLEMENT TOOLS TO MONITOR SUSTAINABLE TOURISM				Main indicators 12.b.1 Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability
TARGET 8·9  PROMOTE BENEFICIAL AND SUSTAINABLE TOURISM				Main indicators 8.9.1 Tourism direct GDP as a proportion of total GDP and in growth rate
TARGET 7·3  DOUBLE THE IMPROVEMENT IN ENERGY EFFICIENCY	Associated indicators 2.7_a Greenhouse Gas (GHG) emissions avoided (tonnes CO2eq) with EU support	Associated indicators 1.6_a Domestic material consumption per capita		Main indicators 7.3.1 Energy intensity measured in terms of primary energy and GDP
TARGET 8·1  SUSTAINABLE ECONOMIC GROWTH	Associated indicators 2.15_a Number of processes related to partner country practices on trade, investment and business, or promoting the external dimension of EU internal policies or EU interest, which have been influenced 2.16_a Number of countries supported by the EU to strengthen investment climate 2.19_a Number of countries supported by the EU to strengthen revenue mobilisation, public financial management and/or budget transparency	Associated indicators 1.13_a World Bank Doing Business distance to the frontier score 1.16_a Proportion of domestic budget funded by domestic taxes		Main indicators 8.1.1 Annual growth rate of real GDP per capita
TARGET 9·C  UNIVERSAL ACCESS TO INFORMATION AND COMMUNICATIONS TECHNOLOGY	Main indicators 2.11 Number of people with access to internet with EU support Associated indicators 2.12_a Number of (a) countries supported by the EU to enhance..., (b) people supported by the EU with enhanced... access to digital government services	Main indicators 1.9 ITU Individuals using the internet Associated indicators 1.10_a ITU ICT Development Index		Main indicators 9.c.1 Proportion of population covered by a mobile network, by technology