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WanderIQ – AI-Driven Travel Recommendation and Itinerary Planning System

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Abstract —*Planning a trip often requires travellers to browse multiple websites, compare prices, check maps and reviews, and arrange schedules manually. This can make the process confusing and time-consuming. WanderIQ is proposed as an AI-driven travel recommendation and itinerary-planning system that brings these activities together in a single web-based platform. The system uses preferences such as budget, interests, travel dates, and trip type to recommend destinations, generate day-wise itineraries, and suggest hotels and flights. Integration with maps and booking APIs is intended to provide route, distance, and travel-option information, while a natural-language chatbot supports travel-related queries. Additional functions include budget planning, expense tracking, nearby restaurant suggestions, and shareable itineraries. The goal is to reduce manual effort and help travellers make more organized decisions. The source paper reports tests across several destinations and describes the itinerary, recommendation, map, and chatbot functions as operating as expected.*

Keywords—*travel planning, AI-based itinerary generation, personalized recommendations, budget optimization, natural language processing, maps integration, smart tourism, real-time travel assistance*

I. INTRODUCTION

Although travel information is widely available, planning a trip can remain difficult because users often switch among map applications, hotel websites, travel blogs, booking platforms, and videos to collect information. This fragmented process can be lengthy and frustrating. WanderIQ proposes a single web-based solution to support trip planning from destination selection through itinerary preparation.

The system is designed to recommend destinations, create day-wise itineraries, identify nearby attractions, suggest hotels and flights, and support budgeting. A chatbot provides an interactive way to ask travel questions. The proposed approach combines machine-learning methods for preference-based recommendations, natural-language processing for conversational interaction, and external APIs for map and travel information.

II. SYSTEM REQUIREMENTS

A. Data Requirements

- *User data:* travel dates, budget limit, destination and hotel preferences, and interests such as adventure, relaxation, family travel, or cultural activities.
- *Destination and point-of-interest (POI) data:* attractions, opening and closing times, entry fees, ratings, and reviews.
- *Travel data:* flight prices, nearby hotel prices and availability, distances between POIs, and estimated travel times.
- *Data formats:* text records stored in MySQL or SQLite, itineraries represented as JSON structures, and images stored in static folders.

B. Software Requirements

- *Frontend:* HTML, CSS, JavaScript, and Bootstrap.
- *Backend:* Python with Flask.
- *Database:* MySQL or SQLite.
- *AI models:* Decision Tree and Naïve Bayes for machine-learning recommendations; spaCy or BERT for natural-language processing.
- *External services:* Google Maps and hotel/flight APIs.

C. Functional Requirements

- *User management:* users can register, log in, and manage a basic profile; authenticated users can create or save trip plans.
- *Trip input:* users provide destination, trip duration, budget, dates, and interests for personalized planning.

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- *Destination and POI recommendation:* the system suggests suitable destinations, attractions, restaurants, and activities based on user preferences.
- *Automatic itinerary generation:* the system prepares a day-wise plan while considering travel time, opening hours, and user interests.
- *Hotel and flight suggestions:* the system displays options and approximate prices using integrated APIs.
- *Maps and route support:* routes, distances, and estimated travel times between attractions are presented using map services.

III. OBJECTIVES

The main objective is to develop a user-friendly and intelligent system that assists travellers in planning trips with minimal manual effort. The specific objectives are:

- Analyse user preferences and recommend suitable destinations.
- Generate day-wise itineraries automatically.
- Provide hotel and flight information through integrated services.
- Estimate trip budgets and help users manage expenses.
- Make travel planning faster, simpler, and more convenient through one integrated platform.

IV. LITERATURE REVIEW

Prior work in travel planning has addressed itinerary optimization, personalization, temporal constraints, route prediction, and conversational recommendation.

A. Itinerary Planning Using Metaheuristics

Tenemaza et al. (2020) presented an itinerary-optimization approach using Genetic Algorithms and k-means clustering. Their approach considers user preferences, attraction opening hours, and travel times, and aims to produce itinerary alternatives that balance feasibility, time, and user value.

B. Personality-Driven Destination Recommendations

Cena et al. (2020) explored the use of personality traits in recommendations for young travellers. Their work suggests that traits such as openness, extraversion, and conscientiousness can contribute to personalized travel choices beyond popularity-based ranking.

C. Temporal Factors in Itinerary Planning

Micheli et al. (2021) emphasized temporal constraints in personalized itinerary generation, including attraction opening hours, expected waiting time, travel duration, and peak periods. These factors are important for producing practical schedules.

D. Deep Learning for Travel Route Planning

Huang et al. (2021) described a multi-task deep-learning framework for travel-route planning that predicts subsequent points of interest using user preferences, POI features, and historical travel patterns. The work illustrates the potential of deep learning for flexible route recommendations.

E. Conversational Recommender Systems

Wang et al. (2022) studied user evaluation of critiquing-based recommendation chatbots. Conversational interaction and feedback techniques can help users explore alternatives and support decision-making. These research directions inform WanderIQ's combination of personalized recommendations, temporal itinerary planning, and chatbot assistance.

V. SYSTEM ARCHITECTURE

A. Data Sources Layer

This layer collects internal and external information needed for trip planning, including destination descriptions, attraction hours and fees, ratings, hotel and flight options, user preferences, and real-time data from maps, weather, restaurant, booking, and currency services.

B. Data Processing and Cleaning

The processing stage extracts useful features such as POI type, user interests, and budget ranges. The proposed recommendation models use Decision Tree or Naïve Bayes methods; clustering groups POIs by similarity, distance, or interest; and the NLP component processes chatbot questions through spaCy or BERT. Data cleaning removes noise, standardizes text, and helps maintain compatibility among API responses.

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C. Application Logic

- *Itinerary generator:* builds day-wise travel plans, accounts for travel time and opening hours, and aims to balance activities with breaks.
- *Budget planner:* estimates trip costs and separates expenses such as accommodation, transport, food, and attraction fees.
- *Recommendation engine:* suggests and ranks destinations and POIs using factors such as popularity, ratings, distance, and the user profile.
- *Chatbot logic:* handles natural-language questions about nearby places, restaurants, suitable visiting times, and activities.

D. Integration and API Layer

The integration layer connects to map services for routes, distances, navigation, and nearby places; hotel and flight APIs for price and availability information; and weather and currency APIs for supporting travel information. API responses are converted into simplified information for presentation.

E. Database Layer

The database stores user accounts and preferences, saved itineraries, search history, destination and POI details, and budget logs.

F. System Flow

The process begins when a user enters trip details such as destination, dates, budget, and preferences. The recommendation engine identifies relevant places and travel options. Information from maps, hotel, and flight APIs is then combined to prepare a day-wise itinerary. The interface presents the plan so that users can view, edit, or save it, while the chatbot supports questions and refinements.

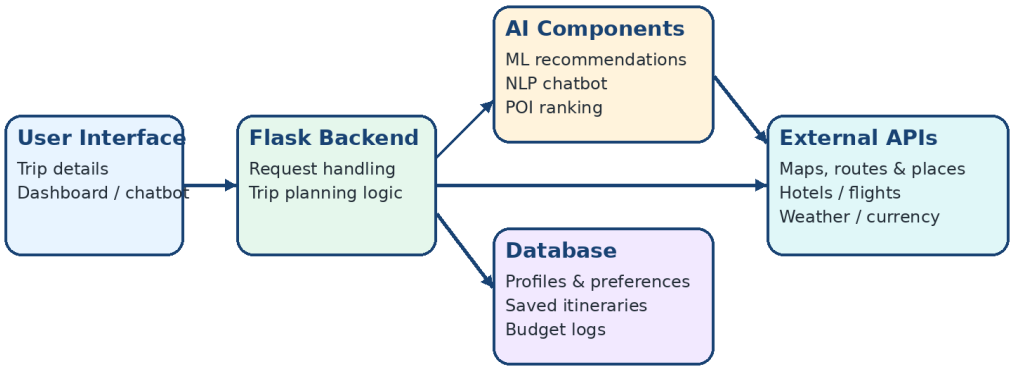


Figure 1. Architecture of the proposed WanderIQ system

VI. USER INTERACTION AND TRIP PLANNING

The proposed workflow is organized as a single pipeline:

- *User sign-up/login:* users register or log in to access the platform.
- *Dashboard access:* users enter trip details and manage itineraries.
- *Preference analysis:* budget, dates, interests, and other inputs are processed.
- *Itinerary generation:* a day-wise plan is created using preferences and travel-time considerations.
- *Real-time suggestions:* hotel, flight, and nearby-attraction options are retrieved through APIs.
- *Storage and access:* generated itineraries can be saved for later use.

This workflow is intended to make trip planning more organized and personalized.

VII. RESULTS AND OUTCOME

The source paper describes a demonstration in which a user enters “Goa” as a destination along with trip duration and budget. The system then generates a day-wise itinerary containing popular attractions, estimated travel times, and a suggested visiting order. The paper also describes an interface for viewing recommended hotels, nearby restaurants, route maps, and a saved itinerary associated with a user profile.

According to the reported results, the system was tested with Goa, Jaipur, Pune, and Manali. For these test cases, it generated structured day-wise plans with attractions, travel timings, and suggested breaks. Hotel and flight suggestions were displayed according to budget, map integration presented routes and distances, and the chatbot responded to example queries such as “places near me” and “best time to visit.” The paper interprets these observations

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as indicating that the main planning features functioned as intended. Quantitative performance metrics and a detailed evaluation protocol are not provided in the source paper.

The reported outcome is that an integrated assistant can reduce the manual effort involved in planning by bringing personalized suggestions, schedules, and travel information into one interface. Further evaluation with defined accuracy, latency, user-satisfaction, and API-reliability measures would help quantify the system's performance.

APPLICATION OUTPUT SCREENSHOTS

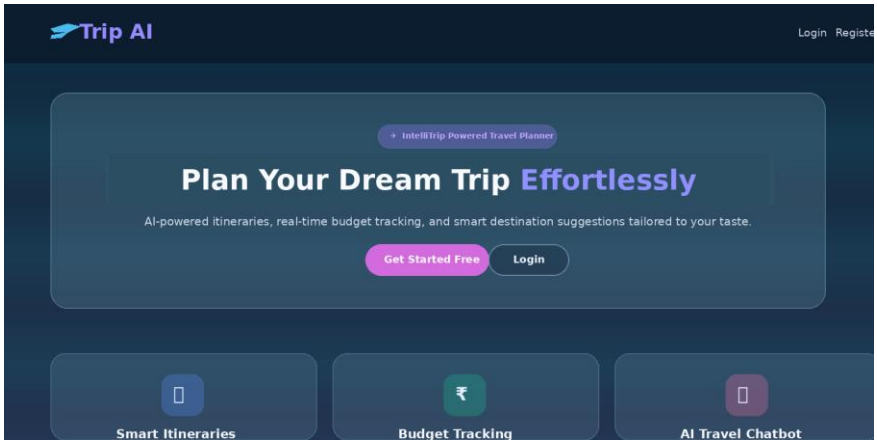


Figure 2. Trip AI home page showing the travel-planning landing interface.

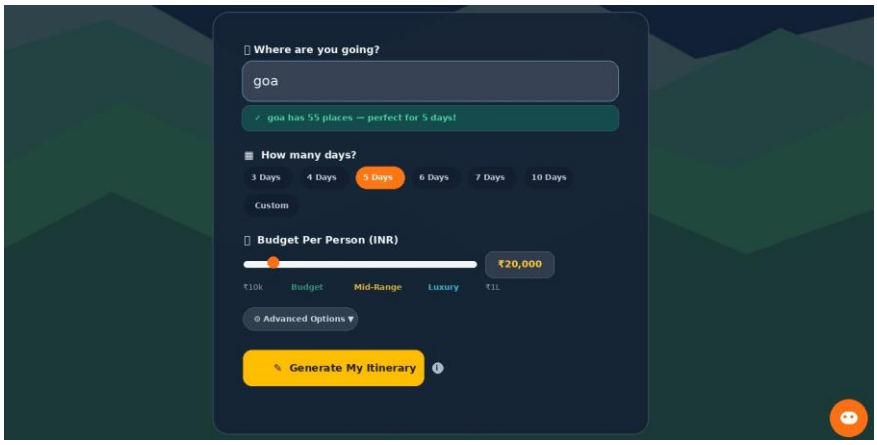


Figure 3. Goa trip input screen showing duration, budget, and itinerary-generation controls.

VIII. CONCLUSION

WanderIQ proposes an AI-driven travel assistant that combines destination recommendation, itinerary generation, budget planning, map support, hotel and flight suggestions, and chatbot interaction. Its architecture brings user preferences, destination information, machine-learning models, NLP, external APIs, and persistent itinerary storage into one workflow. The source paper reports functional demonstrations across multiple destinations and describes the system as useful for producing organized travel plans. Future assessment should include measurable evaluation criteria and systematic user testing to establish recommendation quality, schedule feasibility, and reliability under varied travel conditions.

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