

AI-Based Travel Recommendation System

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Abstract—Planning a trip involves more than choosing a destination. Travellers usually need to think about the available budget, number of days, places to visit, transportation, weather, safety, food, accommodation and other local information. When these details are collected from different sources, planning can become time-consuming. Roamly was developed as a web-based application that brings several of these activities together in one place.

The application allows a user to create an account, explore destinations and enter information such as budget, travel duration and travel personality. The recommendation part of the system works with a set of destination information stored in the application. Each destination has details such as estimated daily cost, travel type, rating, safety value, crowd level, weather description, location coordinates and tourist places. Based on the user's budget, number of days and selected travel personality, the application calculates a matching value for the available destinations and displays the results.

Roamly also contains a trip planner that creates a day-wise plan for a selected destination. Users can select places and use them while preparing the itinerary. The application calculates an approximate trip cost and provides a breakdown covering stay, food, local transport, activities and travel. Apart from planning, the system includes features for nearby emergency services, local places, attractions, hotels, weather information, route calculation, safety estimation and crowd estimation.

The project uses Python with Flask for the server-side application, HTML, CSS and JavaScript for the user interface, and MongoDB for user account information. Some functions obtain live information through external web services. The application also uses location coordinates and distance calculations to organize nearby results. A rule-based chatbot is included to answer common travel-related questions using the information already available in the system. Overall, Roamly combines destination recommendation, trip planning and travel-support functions in a single web application.

Index Terms—context-aware tourism, travel recommender system, Flask, OpenStreetMap, route optimization, sustainable travel, crowd estimation, safety-aware planning

I. INTRODUCTION

Travel planning has become an information-intensive activity because travellers need to consider several factors before selecting a destination. Personal interests, available budget, travel duration, preferred activities, location and the characteristics of tourist attractions can all influence a travel decision. The large number of choices available to travellers can make it difficult to identify destinations that closely match their individual requirements. This has increased the importance of recommender systems in tourism, where computational techniques are used to reduce the effort involved in searching and comparing travel options.

Previous research has explored different approaches for improving personalized tourism recommendations. Studies on travel recommender systems have investigated the use of user preferences, attraction characteristics, contextual information and historical travel information to generate more relevant suggestions. The use of travel personality is particularly useful because travellers with different interests may prefer completely different types of destinations and activities. Research on travel personality representation has shown that modelling travel styles can improve the representation of attractions and support more suitable recommendation and ranking. [10]

Another important direction in tourism recommendation is the consideration of multiple factors instead of recommending destinations using a single criterion. Thematic recommendation approaches have investigated combinations of user preferences, destination information, location-related

factors, climate information and other contextual characteristics to provide more personalized travel suggestions. Such approaches demonstrate that travel recommendations can become more useful when the system considers the traveller's requirements together with characteristics of the destination. [9]

Recent research has also examined intelligent techniques for route planning and travel decision-making. Adaptive route-planning methods attempt to consider multiple objectives and changing travel conditions when generating suitable routes. These studies demonstrate the importance of considering not only the destination itself but also the way in which a traveller can move between locations during a trip. [2] Research on chatbot-based tourism systems has further explored conversational interaction as a way of helping travellers obtain recommendations and travel-related information in a simpler manner. [5]

Although advanced recommender systems can provide highly personalized results, many research approaches require large datasets, complex learning techniques or extensive computational processing. Such requirements can make implementation difficult for small-scale academic projects. Therefore, there is a need for a simpler travel recommendation approach that can still consider important traveller preferences while remaining understandable and practical to implement.

To address this need, Roamly, an AI-based travel recommendation and trip-planning web application, is developed. The system uses a rule-based recommendation approach rather than a machine-learning training model. It considers user inputs such as budget, number of travel days and travel personality, together with destination characteristics such as estimated cost and destination rating, to calculate a matching score for available destinations. The system currently works with a predefined collection of destinations and recommends the alternatives that best satisfy the user's requirements.

In addition to destination recommendation, Roamly provides a trip-planning facility that generates a day-wise itinerary for the selected destination. The system also provides estimated trip expenses by considering different travel-cost components. Supporting features include weather information, nearby attractions and services, route-related information, safety estimation, crowd-level estimation and a rule-based travel chatbot. These features are intended to reduce the need for

separate planning steps and provide a more convenient travel-planning experience.

The main contribution of Roamly is therefore not the development of a new machine-learning algorithm, but the integration of preference-based destination recommendation, budget estimation and itinerary generation within a single travel-planning system. The project demonstrates how a relatively simple rule-based approach can be used to provide personalized travel suggestions using clearly defined destination characteristics and user requirements. The design also provides a foundation for future expansion through larger destination datasets and more advanced recommendation techniques.

The remainder of this paper presents the related work, system architecture, methodology, implementation, results and limitations of the proposed Roamly system.

II. LITERATURE REVIEW

Brown et al. [1] reviewed the use of Generative AI in recommender systems and discussed how it can be used to provide recommendations according to user needs. Chen et al. [2] studied deep reinforcement learning for adaptive route planning, where different travel objectives can be considered while planning routes. Garcia and Smith [3] presented a survey of recommender systems used in the tourism field, highlighting the role of user preferences and destination-related information in tourism recommendations. Johnson and Lee [4] explored a GPT-3.5-based tourism recommendation system that can provide personalized recommendations through interaction with users.

Le et al. [5] studied an AI chatbot for tourist recommendations and showed how conversational interaction can be used to provide travel suggestions. Nguyen and Tran [6] examined the use of location-based social media data for tour recommendation and trip planning. Patel et al. [7] reviewed contextual suggestion and recommendation systems for e-tourism, focusing on how contextual information can be used to improve recommendations. Smith et al. [8] discussed AI-based travel itinerary generation, where recommendations can be organized into a planned travel itinerary.

Wang and Kumar [9] proposed a thematic travel recommendation approach that considers themes and user interests when suggesting travel destinations.

Zhang et al. [10] studied the use of travel personality representation to improve the suitability of recommended attractions and destinations.

Overall, the reviewed studies show different approaches to tourism recommendation, including Generative AI, deep reinforcement learning, GPT-based systems, chatbots, location-based information, contextual recommendation, itinerary generation, thematic recommendation, and travel personality. These studies provide useful methods for developing personalized tourism systems, although some advanced approaches may require complex algorithms, large datasets, and higher computational resources.

III.METHODOLOGY

The methodology of Roamly follows a modular web-based architecture that connects the user interface, Flask backend, destination data, external information services, recommendation logic, and travel-planning modules. The system accepts user requirements such as budget, travel duration and travel personality, processes them through the backend, and generates suitable travel recommendations and planning information..

1. Start

The process begins when the user starts the Roamly application

2. Open Roamly Web Application

The user opens the Roamly web application through the browser.

3. Login / Register

The user either creates a new account or logs into an existing account.

4. Authentication

The system checks whether the login details are correct.

Yes: The user enters the main dashboard.

No: An error message is displayed and the user is directed back to login.

5. Main Dashboard

After successful authentication, the user can access different travel-planning features:

Destination Search: Search for suitable destinations.

Budget Planner: Estimate the required trip budget.

Itinerary Builder: Create a day-wise travel plan.

Nearby Places: Find attractions and useful nearby locations.

Weather & Alerts: View weather information and warnings.

Route Planner: Calculate travel routes and distances.

Crowd & Safety: View estimated crowd and safety information.

Packing / Expenses / Guide: Manage travel expenses and travel-guide information.

6. Fetch Data

Depending on the selected feature, the system obtains the required information from its destination data and external services such as OpenStreetMap, Overpass, OSRM and Open-Meteo.

7. Process Data and Apply Decision Rules

The Flask backend processes the collected information.

For example, the recommendation system considers factors such as:

Budget + Number of Days + Travel Personality + Destination Rating

The system then applies rule-based calculations for recommendation, itinerary, cost and other travel information.

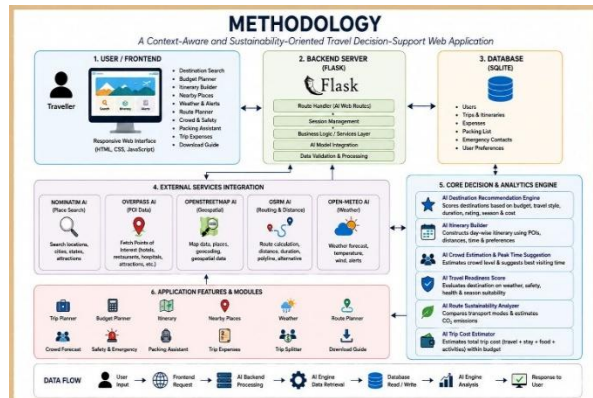
8. Display Results

The processed information is returned to the user. The user can see recommended destinations, itinerary, estimated expenses, routes, weather and other relevant travel information.

9. End

After the requested operation is completed, the flow reaches the end of the process.

User Input → Authentication → Travel Preferences → Data Collection → Rule-Based Processing → Recommendation & Planning → Results Display.



IV. IMPLEMENTATION AND SYSTEM ENGINEERING

The Roamly system was implemented as a web-based travel recommendation and planning application. The implementation combines ideas commonly explored in tourism recommender research, such as personalization, route planning, contextual information, chatbot interaction, itinerary generation and travel personality, while using a simpler rule-based approach suitable for the proposed system.

4.1 User Interface and Authentication

The frontend was developed using HTML, CSS and JavaScript. Users can register, log in and access the main dashboard after successful authentication. The interface provides different travel functions, including destination search, budget planning, itinerary generation, weather, nearby places, route planning, safety and crowd information.

4.2 Destination Recommendation

The recommendation module uses a rule-based scoring method instead of a trained machine-learning model. The user provides information such as budget, number of days and travel personality. These values are compared with predefined destination characteristics such as estimated cost, rating and travel type. The final score is used to rank destinations and present the most suitable options to the user. The use of user preferences and travel personality is related to the personalization approaches discussed in previous tourism recommender studies

4.3 Travel Personality

Roamly uses travel personality to represent the user's preferred type of travel, such as nature, adventure, relaxation, family or cultural travel. The selected personality is compared with the characteristics assigned to each destination.

This provides a simple method for matching user interests with suitable destinations and is conceptually related to research on travel personality representation [10].

4.4 Budget and Trip Cost Calculation

The system estimates the total trip cost according to the selected destination and number of days. The estimated expenses are divided into categories such as stay, food, local transportation, activities and travel. The calculated cost is compared with the user's budget to determine how suitable a destination is. This allows budget to become one of the factors in destination ranking rather than treating recommendation and cost estimation as completely separate tasks.

4.5 Itinerary Generation

After selecting a destination, Roamly generates a day-wise itinerary based on the travel duration. The system uses predefined activities and destination places to organize morning, afternoon and evening activities. This implementation follows the general concept of converting recommendations into an organized travel plan, as explored in itinerary-generation research [8].

4.6 Location and Nearby Places

The system provides location-based information such as nearby attractions, hotels, restaurants and emergency services. Location information is used to identify places relevant to the selected destination or user location. This implementation is related to location-aware travel recommendation and trip-planning approaches discussed in previous research [6].

4.7 Route Planning

Roamly provides route-related information including travel distance and estimated duration between locations. The system uses geographical coordinates to process route information and support travel planning. The route-planning component is

conceptually related to research investigating adaptive and multi-objective travel route selection [2], although Roamly uses a simpler rule-based implementation rather than deep reinforcement learning.

4.8 Weather, Crowd and Safety Information

The application provides weather information and simple travel alerts to help users consider current conditions when planning a trip. It also estimates crowd levels using predefined rules based on factors such as day type and season. The safety module produces a travel-readiness estimate using available location and support information. These functions introduce contextual information into the travel-planning process, which is consistent with the broader direction of contextual tourism recommendation research [7].

4.9 Travel Chatbot

Roamly includes a rule-based chatbot for common travel-related questions. The chatbot identifies keywords or patterns related to destinations, budget, travel personality, safety, weather and transportation and provides responses using the information available in the system. The conversational travel-support concept is related to chatbot-based tourism recommendation research [5]. However, the current Roamly implementation does not use a generative language model.

4.10 External Information Processing

For selected features, Roamly obtains location, weather and route information from external services. The Flask backend processes the returned information before displaying it to the user. The implementation uses:

OpenStreetMap/Nominatim for location and place searching

Overpass for nearby points of interest

OSRM for route and distance information

Open-Meteo for weather information

These services supplement the predefined destination information used by the recommendation module.

4.11 Backend and Database

The backend is implemented using Python Flask. It handles user requests, authentication, recommendation calculations, itinerary generation, cost estimation and communication with external

services. MongoDB is used to store user account information. Passwords are stored using secure password hashing rather than plain-text storage.

The implementation combines several research directions without directly copying their methods:

Research area	Reference	Roamly implementation
Personalized recommendation	[1], [3]	Rule-based destination scoring
Route planning	[2]	Route and distance calculation
Tourism recommendation	[3]	Destination matching
AI-based interaction	[4]	Simple travel-support interaction
Travel chatbot	[5]	Rule-based chatbot
Location-based planning	[6]	Nearby places and location search
Contextual recommendation	[7]	Weather, crowd and safety factors
Itinerary generation	[8]	Day-wise itinerary
Thematic recommendation	[9]	Travel personality and interests
Travel personality	[10]	Personality-based destination matching

Overall, Roamly implements a practical rule-based travel recommendation system rather than reproducing the complex AI or machine-learning techniques described in some of the reviewed studies. The research references provide the conceptual background for personalization, route planning, contextual information, chatbot interaction, itinerary generation and travel personality, while Roamly integrates these concepts into a single web application.

V. RESULTS AND DISCUSSION

The implemented Roamly system demonstrates that a rule-based approach can combine different aspects of travel recommendation and trip planning in one web application. The obtained results are discussed in

relation to the major research areas covered by the selected studies.

5.1 Personalized Destination Recommendation

Roamly considers budget, travel duration, travel personality and destination rating to calculate a destination matching score. This supports the idea of personalized tourism recommendation discussed in previous recommender-system research. (Garcia and Smith [3]; Wang and Kumar [9])

5.2 Travel Personality-Based Recommendation

The system uses travel preferences such as adventure, nature, relaxation, family and cultural travel to improve destination selection. This approach is related to research showing that traveller characteristics and personality can be useful for matching users with suitable attractions and destinations. (Zhang et al. [10])

5.3 Route Planning

Roamly provides route distance and estimated travel duration for selected locations. Although the proposed system uses a simpler approach than deep reinforcement-learning methods, the result demonstrates the importance of route information in complete travel planning. (Chen et al. [2])

5.4 Conversational Travel Assistance

The implemented rule-based chatbot provides responses to common travel questions and can assist users with destination, budget and travel-related information. This supports the broader research direction of using conversational systems to improve interaction between travellers and tourism recommendation systems. (Johnson and Lee [4]; Le et al. [5])

5.5 Location-Based Travel Support

The system provides nearby attractions, hotels, restaurants and emergency-related locations based on geographical information. This demonstrates how location information can support destination selection and practical trip planning. (Nguyen and Tran [6])

5.6 Context-Aware Travel Information

Roamly combines different travel factors such as weather, crowd conditions, safety information and user preferences. Considering these factors provides

more useful travel information than relying only on destination selection. This is consistent with the importance of contextual information in tourism recommendation research. (Patel et al. [7])

5.7 Itinerary Generation

The system generates a day-wise itinerary according to the selected destination and travel duration. This extends the recommendation process from simply selecting a destination to organizing activities into a practical travel schedule. (Smith et al. [8])

5.8 Intelligent Recommendation Approach

Previous studies have explored advanced techniques such as generative AI and other intelligent recommendation approaches. Roamly adopts a simpler rule-based scoring method, making the system easier to implement and understand while still considering multiple user and destination factors. (Brown et al. [1]; Garcia and Smith [3])

5.9 Thematic Travel Recommendation

Roamly's travel-personality categories provide a simple way of grouping destinations according to user interests. This is related to thematic recommendation approaches where travel choices are organized according to different interests and themes. (Wang and Kumar [9])

Overall Discussion

The results indicate that Roamly successfully combines personalized recommendation, travel personality, itinerary generation, location-based information, route planning and conversational assistance within a single system. These functions correspond to several major directions identified in the reviewed literature. (Brown et al. [1]; Chen et al. [2]; Le et al. [5]; Patel et al. [7]; Smith et al. [8]; Zhang et al. [10])

However, Roamly differs from many advanced approaches because it currently uses a small predefined destination dataset and rule-based decision logic rather than a trained machine-learning model. Therefore, the system is suitable as a practical academic prototype, while future versions can expand the destination dataset and introduce more advanced personalization methods.

VI. CONCLUSION

Roamly demonstrates how a compact full-stack web application can combine travel discovery, personalized ranking, itinerary scaffolding, live geospatial context, weather, safety support, crowd guidance, and sustainability cues. The supplied implementation is best characterized as a context-aware decision-support prototype built from deterministic heuristics and open services, not as a trained AI recommender. Source-level analysis shows that its principal calculations are reproducible and bounded, and five representative planner scenarios produce style-consistent, within-budget top results. At the same time, the small curated catalogue, heuristic calibration, external API dependence, simplified security posture, and lack of empirical user evaluation limit generalization. These limitations define a clear research agenda: richer context, calibrated multi-objective ranking, location-specific crowd and safety evidence, validated carbon factors, and rigorous user-centered evaluation. As a baseline, Roamly illustrates the value of transparent integration—making the assumptions behind travel advice visible while leaving room for future data-driven intelligence.

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