

AI-Assisted Travel Guide

J. Sarika, M. Savita, A. Sanket, Z. Shamson, A. Arudra

Department of Computer Science and Engineering, Rajiv Gandhi Institute of Technology, Bangalore, Karnataka, India

Published October 2026

Abstract

The AI-Assisted Travel Guide is an intelligent system designed to deliver personalized, budget-friendly, and seamless travel experiences. It integrates sentiment analysis, budget-based recommendations, an AI chatbot, direction suggestions, real-time weather updates, and personalized travel planning into one platform. By analyzing user mood, preferences, interests, travel dates, and budget, the system recommends destinations, accommodations, transportation, and activities tailored to individual needs. The AI chatbot provides instant assistance, answers queries, and helps design itineraries. Direction suggestions optimize navigation, while weather updates minimize disruptions. The personalized planner creates itineraries based on preferences, time, and financial constraints. Unlike traditional travel apps focused on bookings, this system emphasizes intelligent decision-making, personalization, and user satisfaction, making travel smarter, efficient, and enjoyable.

Keywords: travel recommendation; sentiment analysis; AI chatbot; budget-based recommendation; personalization; natural language processing

1 Introduction

Travel planning often requires users to collect information from multiple sources, compare expenses, understand reviews, find suitable destinations, and manage unexpected changes during a journey. The proposed AI-Assisted Travel Guide is designed to provide a unified and intelligent solution for these challenges. The system uses sentiment analysis to understand travelers' opinions and preferences from reviews and interactions. Based on the user's budget, interests, travel dates, and preferences, it generates personalized and budget-friendly recommendations for destinations, accommodations, and activities. The system also provides real-time updates related to weather, transportation, and other travel conditions, along with direction suggestions to support navigation. An offline support feature allows users to access important travel information even when internet connectivity is limited. An integrated AI chatbot enables users to interact with the system using natural language and receive travel-related assistance. Overall, the system aims to make travel planning more convenient, personalized, economical, and reliable.

2 Literature survey

Existing research in modern intelligent transportation systems reveals a significant transition from static itinerary tools toward adaptive, context-aware platforms. Early frameworks primarily relied on Rule-Based Systems and basic Collaborative Filtering, which often struggled to deliver highly tailored recommendations under dynamic constraints.

To overcome these boundaries, contemporary literature integrates Natural Language Processing (NLP) with Machine Learning (ML) architectures to refine personal preference mapping. Incorporat-

ing Sentiment Analysis (such as fine-tuned BERT or VADER models) enables systems to extract real-time emotional nuances and authentic feedback from crowdsourced user reviews, significantly outperforming simple numeric rating systems. For financial optimization, researchers have deployed multi-objective Budget-Based Recommendation algorithms (like Knapsack optimization and dynamic heuristic search) to balance cost constraints against user satisfaction metrics without compromising travel quality.

Furthermore, recent developments focus on situational responsiveness. Combining external Geospatial APIs with event-driven backends facilitates Real-Time Updates and optimal Direction Suggestions, rerouting users dynamically based on traffic congestion or live location context. To prevent service disruption during low-connectivity scenarios, lightweight localized databases (such as SQLite or Realm) coupled with offline spatial caching mechanisms provide seamless Offline Support.

3 Methodology

The proposed AI-Assisted Travel Guide follows a modular approach to provide intelligent, personalized, and reliable travel assistance. The process begins with user input collection, where details such as destination, budget, travel dates, interests, preferred activities, and accommodation requirements are obtained. This information is processed to understand the traveler's needs.

For sentiment analysis, travel reviews and user feedback are collected and preprocessed by removing unnecessary characters, handling missing data, and converting text into a suitable format. Natural Language Processing techniques are then applied to identify whether opinions are positive, negative, or neutral. These results help improve destination and activity recommendations.

The recommendation module combines user preferences, sentiment results, estimated expenses, and available travel options to generate budget-based and personalized suggestions. The system prioritizes options that match the user's interests while remaining within the specified budget.

The real-time update module obtains current information such as weather, transportation conditions, and travel alerts through appropriate APIs or online services. The direction module provides route and navigation suggestions using digital map services. To improve accessibility, important destination details, saved itineraries, and essential travel information are stored locally for offline support.

An AI chatbot acts as an interactive assistant, allowing users to ask questions in natural language and receive relevant travel guidance. Finally, all modules are integrated into a single application, tested using different user scenarios, and evaluated for recommendation accuracy, response quality, usability, and overall system performance.

4 Existing system

Existing travel technology relies on a fragmented ecosystem of specialized platforms rather than a unified solution.

Commercial navigation services like Google Maps and Apple Maps lead in real-time updates and direction suggestions, leveraging live telemetry to dynamically reroute users around traffic jams or road closures. They offer baseline offline support through manually downloaded map regions, but their itinerary capability remains basic and lack proactive, multi-day budget optimization.

Dedicated itinerary generators (such as TripIt and Wanderlog) centralize scheduling and travel documentation, but they rely heavily on static user input. These tools miss modern AI chatbot capabilities, failing to allow natural language modifications or dynamic planning during a trip. Specialized commercial AI planners (like GuideGeek or Expedia's ChatGPT integration) provide interactive conversational interfaces; however, they rely heavily on static prompt parsing. They lack deep sentiment analysis extracted from unstructured crowd-sourced reviews, often recommending tourist spots based purely on aggregate numerical stars rather than nuanced sentiment.

From an academic perspective, models like SBTRec integrate sentiment modeling from user reviews to map preferences, while hybrid systems like TRIP-PAL combine Large Language Models (LLMs) with automated solvers to handle constraints. Yet, these theoretical frameworks operate as isolated prototypes. Most existing implementations fail to execute real-time context updates and cost optimization simultaneously while operating under low-connectivity conditions.

Key gaps in existing systems:

- **Fragmented Functionality:** Users must switch between mapping apps for navigation, travel forums for reviews, and spreadsheets for budgeting.
- **Shallow Sentiment Integration:** Most commercial platforms rely on star ratings rather than NLP-based sentiment analysis of real traveler experiences.
- **Connectivity Bottlenecks:** Advanced AI features degrade completely when offline, lacking localized model runtime or intelligent caching.
- **Rigid Budgeting:** Financial tools track historical expenses post-trip rather than offering predictive, budget-based recommendations during initial planning.

5 Proposed system

The proposed AI-Assisted Travel Guide is an intelligent travel management system designed to provide users with personalized assistance throughout the travel planning process. The system combines Artificial Intelligence, Natural Language Processing, sentiment analysis, recommendation techniques, and real-time information services in a single platform.

The system first collects user details such as destination, available budget, travel dates, interests, preferred activities, and accommodation choices. A sentiment analysis module processes travel reviews and feedback to identify user opinions and preferences. These insights are used to improve the quality of recommendations.

A budget-based recommendation module analyzes the user's financial limit and suggests suitable destinations, hotels, restaurants, attractions, and activities while attempting to keep the overall travel cost within the specified budget. The personalization module further refines recommendations according to individual interests and previous choices.

The system provides real-time updates by obtaining current information such as weather conditions, transportation status, and relevant travel alerts through external services or APIs. A direction suggestion module helps users identify suitable routes and navigate between selected locations.

To support travelers in areas with poor connectivity, the system includes offline functionality, allowing essential saved information, itineraries, and destination details to remain accessible without continuous internet access.

An integrated AI chatbot enables natural-language interaction and provides quick answers to travel-related questions. By combining these components, the proposed system aims to make travel planning more convenient, economical, adaptive, and user-friendly while reducing the need to depend on multiple separate applications.

6 Implementation

The implementation of the proposed AI-Assisted Travel Guide is carried out by integrating artificial intelligence, natural language processing, recommendation techniques, external APIs, and local storage into a unified application. The system is divided into several functional modules so that each component can perform a specific task while communicating with the others.

The implementation begins with the user registration and preference module. Users provide information such as destination, travel dates, budget, interests, preferred activities, and accommodation requirements. This information is stored securely and used as input for generating personalized travel plans.

The sentiment analysis module processes reviews and feedback related to destinations, hotels, restaurants, and tourist attractions. Text preprocessing techniques such as tokenization, removal of unnecessary words, and normalization are applied before classification. A suitable machine-learning or NLP model determines the sentiment of the review as positive, negative, or neutral. The resulting sentiment information is considered while ranking travel options.

The budget-based recommendation module estimates the expected expenses for transportation, accommodation, food, and activities. It compares these estimated costs with the user's available budget and filters unsuitable options. A recommendation algorithm then ranks the remaining destinations and services according to budget, interests, ratings, and sentiment information.

The personalized travel guide module combines user preferences with recommendation results to generate a customized itinerary. It can suggest destinations, attractions, restaurants, accommodation, and activities according to the traveler's requirements. The itinerary can be modified when the user changes the budget, interests, or travel schedule.

The real-time information module connects with suitable external APIs to retrieve updated information such as weather conditions, transportation details, travel alerts, and other relevant data. The system periodically refreshes this information so that users can make decisions using current travel conditions.

The direction suggestion module integrates mapping and location services to provide routes between selected locations. It can assist users in identifying suitable paths and estimating travel distances or durations.

For offline support, important information such as saved destinations, itineraries, maps or route-related data, and essential travel details is stored locally on the device. Users can therefore access previously saved information when internet connectivity is unavailable.

Finally, the AI chatbot module provides a conversational interface for travel-related queries. Natural-language input is processed and relevant information is retrieved from the system's available data and services. All modules are integrated through the application's backend and tested using different travel scenarios to evaluate functionality, recommendation quality, response time, usability, and reliability.

7 Conclusion

The AI-Assisted Travel Guide provides an intelligent and integrated approach to modern travel planning by combining multiple useful features within a single platform. The system is designed to reduce the difficulties travelers face when searching for destinations, comparing costs, understanding reviews, planning activities, and obtaining reliable information during a journey. By bringing these functions together, the proposed system aims to make travel planning simpler, faster, and more convenient.

The sentiment analysis component helps the system understand opinions expressed in travel reviews and feedback. This information can support better identification of destinations, hotels, restaurants, and attractions that match user expectations. The budget-based recommendation feature considers the traveler's financial limitations and suggests suitable options based on estimated expenses. Along with this, the personalized travel guide uses individual preferences, interests, and travel requirements to create more relevant itineraries.

The integration of real-time updates improves the usefulness of the application by providing current information related to weather, transportation, and travel conditions. The direction suggestion feature assists users in finding suitable routes between selected locations, making navigation more convenient. Furthermore, offline support allows important saved travel information and itineraries to remain accessible when internet connectivity is limited.

The AI chatbot provides an interactive communication interface through which travelers can ask questions and receive travel-related assistance using natural language. This reduces the need to search through different applications or websites for basic information.

Overall, the proposed system demonstrates how Artificial Intelligence and related technologies can be applied to create a more personalized and practical travel experience. The combination of sentiment analysis, budget awareness, real-time information, navigation, offline accessibility, personalized recommendations, and chatbot assistance makes the system adaptable to different traveler requirements. In the future, the system can be enhanced by incorporating voice-based interaction, augmented reality navigation, improved predictive recommendations, multilingual support, and more advanced real-time services, making it an even more comprehensive intelligent travel companion.

References

- [1] He X, Liu Z. *Leveraging large language models for sentiment-based POI recommendations in social networks*. Information Technology & Tourism. 2026;28.
- [2] Hartatik H, Isnanto RR, Warsito B. *Data-driven destination intelligence: From tourist reviews to personalized recommendations with BERT-CNN sentiment analysis*. 2025.
- [3] Xu C, Wang M, Ren Y, Zhu S. *Enhancing aspect-based sentiment analysis in tourism using large language models*. 2024.
- [4] Ho NL, Lee RKW, Lim KH. *SBTRec: A transformer framework for personalized tour recommendation with sentiment analysis*. 2023.
- [5] Aho AV, Ullman JD. *Artificial intelligence: A modern approach*. 4th ed. Pearson; 2021.
- [6] Russell S, Norvig P. *Artificial intelligence: A modern approach*. 4th ed. Pearson; 2021.
- [7] Jurafsky D, Martin JH. *Speech and language processing*. 3rd ed. Pearson.
- [8] Abbasi-Moud Z, Vahdat-Nejad H, Sadri J. Tourism Recommendation System Based on Semantic Clustering and Sentiment Analysis. *Expert Systems with Applications*. 2021;167:114324.

-
- [9] Brown T, et al. Language models are few-shot learners. In: *Advances in Neural Information Processing Systems (NeurIPS)*. 2020.
 - [10] Chen L, Zhou G, Wang F. Personalized Itinerary Recommendation Using Deep Learning and Textual Information. *Expert Systems with Applications*. 2020;127:79–90.
 - [11] Alrasheed H, Alqarni A, Alshammari M. A Multi-Level Tourism Destination Recommender System. *Procedia Computer Science*. 2020;170:333–340.
 - [12] Devlin J, Chang MW, Lee K, Toutanova K. *BERT: Pre-training of deep bidirectional transformers for language understanding*. 2019.
 - [13] Cai G, Lee K, Lee I. Itinerary Recommender System with Semantic Trajectory Pattern Mining from Geo-Tagged Photos. *Expert Systems with Applications*. 2018;94:32–40.
 - [14] Vaswani A, et al. Attention is all you need. In: *Advances in Neural Information Processing Systems (NeurIPS)*. 2017.
 - [15] Chen T, Guestrin C. XGBoost: A scalable tree boosting system. In: *Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*. 2016.
 - [16] Goodfellow I, Bengio Y, Courville A. *Deep learning*. MIT Press; 2016.
 - [17] LeCun Y, Bengio Y, Hinton G. Deep Learning. *Nature*. 2015;521:436–444.
 - [18] Borràs J, Moreno A, Valls A. Intelligent Tourism Recommender Systems: A Survey. *Expert Systems with Applications*. 2014;41(16):7370–7389.
 - [19] Anacleto R, Figueiredo L, Almeida A, Sousa B. Mobile Application to Provide Personalized Sightseeing Tours. *Journal of Network and Computer Applications*. 2014;41:56–64.
 - [20] Mikolov T, Chen K, Corrado G, Dean J. *Efficient estimation of word representations in vector space*. 2013.