

AI-POWERED TRAVEL GUIDE FOR PERSONALIZED TRIP PLANNING

Project Reference No.: 48S_BE_4442

College : JSS Science and Technology University, Mysuru

Branch : Computer Science and Business Systems

Guide(s) : Prof. Vinutha Prakash

Dr. Vanishri Arun

Student(s): Ms. Jahnavi M R

Ms. Prithvi J P

Ms. Purvika S Bennur

Ms. Shree Harshini

Keywords:

Intelligent Trip Guide, Personalized Itinerary, Mood-Based Recommendations, Smart Tourism, Machine Learning in Tourism.

Introduction:

In Travel planning has always been a complex and often tedious process involving several decision layers such as budgeting, destination selection, trip duration, and activities. Traditional methods require extensive manual effort to research and organize information, often leading to less personalized experiences. With the evolution of Artificial Intelligence (AI) and Machine Learning (ML), it is now possible to create intelligent systems that can handle this complexity in a dynamic and user-friendly way. Our project presents an AI-powered web application for personalized trip planning. This system is designed to understand a user's preferences through adaptive questioning and then generate optimized travel itineraries based on those preferences. The platform uses modern AI techniques to dynamically respond to user inputs and suggests places, activities, and travel schedules that best fit the user's profile. It removes the guesswork and hassle from planning, offering a seamless experience tailored to each traveller's style and interest. This solution is especially relevant in today's digital era where users demand efficiency, customization, and smart decision support.

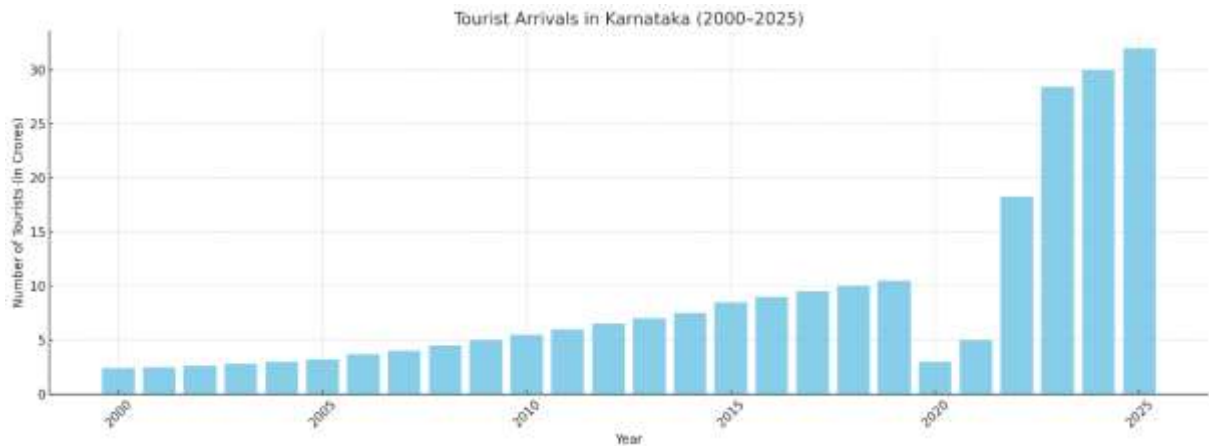


Figure 1: Tourist Arrivals in Karnataka (2000–2025)

Objectives:

- To build a unified AI-powered travel planning platform for end-to-end itinerary generator.
- To develop an AI-driven personalized itineraries with the novelty feature of integrating real-time local events based on travel dates, seasons and user preferences.
- To recommend destinations based on user's mood using clustering and similarity algorithms.
- To automate itinerary creation with according to the budget.
- To provide real-time location tracking by integrating Google Maps API for smooth navigation.

Methodology:

The application uses a layered AI-driven methodology to deliver personalized travel itineraries based on mood, budget, travel dates, and user preferences. It is structured into three core modules powered by Adaptive Preference Classification (APC), Multi-Constraint Itinerary Optimization Algorithm (MCIOA), and Collaborative Filtering Ranker (CF-Rank). Adaptive Preference Classification (APC) begins the process by presenting 15 dynamic questions across categories like adventure, nature, and culture. User responses are scored, and the highest category is selected, provided it receives at least three “Yes” responses. If responses are ambiguous, additional refinement questions are presented. This rule-based AI and decision-tree approach ensures accurate identification of travel style. NLP and sentiment analysis may be applied to

interpret user moods and preferences. Once the destination, category, and travel dates are finalized, MCIOA fetches relevant places from a structured database. Clustering algorithms like K-Means or Hierarchical Clustering group nearby attractions to reduce travel time. Heuristic Optimization ranks places based on popularity, proximity, and estimated visit duration. Predictive analytics and constraint solvers are used to create a balanced, time-efficient plan. Budget optimization is performed using statistical methods such as Linear Programming to allocate funds across transport, activities, and accommodation within user limits. CF-Rank enhances personalization by analysing historical data from similar users through Collaborative Filtering. Content-based filtering complements this for users with unique preferences. Filters allow adjustment by traveller type (solo, family, etc.), and sentiment analysis refines suggestions by removing poorly rated options. A key novelty is the dynamic integration of real-time local events based on travel dates, enriching user experience. Google Maps API provides route planning, location guidance, and real-time updates, completing the system's responsive, personalized travel planning approach.

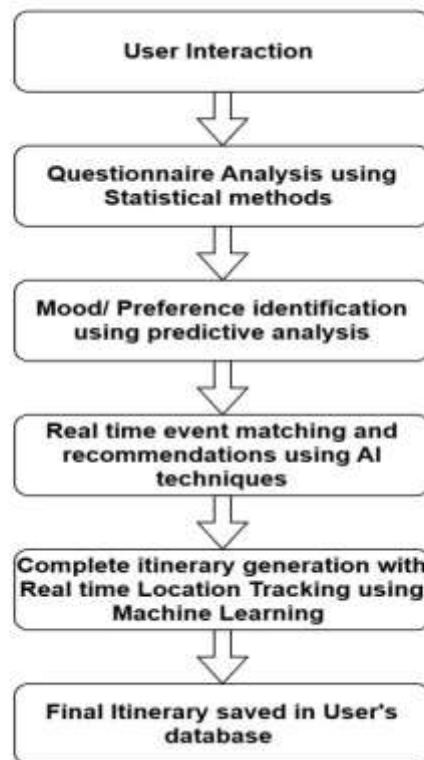


Figure 2: Flow Diagram of Methodology

Result and Conclusion:

In conclusion, the AI-powered travel planner successfully delivers personalized itineraries by integrating adaptive user classification, itinerary optimization, and collaborative filtering techniques. The application was tested with a variety of user profiles including solo travellers, families, and adventure seekers, and consistently produced itineraries aligned with user preferences, budgets, and travel constraints. The Adaptive Preference Classification (APC) module effectively identified user travel styles through dynamic questioning. The Multi-Constraint Itinerary Optimization Algorithm (MCIOA) grouped locations efficiently, reducing unnecessary travel time. Budget optimization using Linear Programming ensured well-balanced expense distribution. The Collaborative Filtering Ranker (CF-Rank) improved place recommendations based on similar user behaviour and preferences. The integration of real-time local events added uniqueness and increased user engagement. Users expressed high satisfaction with the final itineraries, noting their relevance, efficiency, and personalization. Overall, the system showcases the practical and scalable use of AI and ML in travel planning.

Future Scope:

The future scope of this project includes:

1. Integrating real-time weather updates and event calendars for more dynamic planning.
2. Introducing voice-based and chatbot interfaces for easier interaction.
3. Expanding the platform to cover international travel with multi-language and currency support.
4. Adding smart budgeting tools and integrating booking APIs (hotels, transport, tickets).
5. Using reinforcement learning to continuously improve recommendations based on user feedback.
6. Allowing social features like collaborative trip planning among friends or family.
7. Enhancing UI/UX to support AR/VR-based previews of destinations.
8. Incorporating sustainability filters to promote eco-friendly travel.

9. Partnering with tourism boards for localized recommendations.
10. Enabling offline access or downloadable itineraries for remote locations.