TravelMinds: Personalized Travel Planning Application

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Abstract

TravelMinds [7] is a web-based application developed as part of the University of Helsinki's CSM11006 Computer Science Project. It aims to simplify travel planning by generating personalized itineraries based on user preferences, including destination and activities. Leveraging technologies such as Next.js [4], Node.js [5], MongoDB [3], and GROQ API [2], TravelMinds offers a seamless and interactive user experience.

1 Introduction

Planning a trip involves numerous decisions, from selecting destinations to organizing daily activities. TravelMinds addresses this challenge by providing users with customized travel plans that align with their interests and schedules. By inputting specific preferences, users receive detailed activities, enhancing the efficiency and enjoyment of their travel experiences.

2 Technical Overview

The technical architecture of TravelMinds integrates modern technologies to ensure efficiency, scalability, and a seamless user experience. The application has a modular structure consisting of frontend, backend, data processing, and API integrations. These components work together to deliver a robust travel planning solution, as illustrated in figure 1.

Users begin by selecting their destination, choosing activities (e.g., sightseeing, dining and adventure sports).

The application processes the inputs and recommends activities close to the user location.

The integration of GROQ API [2] enhances data querying, allowing for efficient retrieval of complex data structures and improving the application's responsiveness.

2.1 Frontend

The frontend is built using Next.js [4], a React-based framework known for its server-side rendering and static site generation capabilities. This choice ensures a responsive and dynamic user interface, facilitating smooth interactions and quick load times.

2.2 Backend

The backend utilizes Node.js [5] for its event-driven architecture, enabling efficient handling of multiple requests. MongoDB [3] serves as the database, storing user data and travel information, ensuring scalability and flexibility.

2.3 Data Processing

Data processing in the application is handled by the GROQ LLM API, which processes user requests to generate personalized itineraries. The user's preferences, such as destination, activities, and trip duration, are analyzed through the API to create tailored suggestions for locations and activities. Additionally, the application integrates the Google Maps API to visually display selected locations, providing users with an interactive and engaging way to explore their travel plans. This combination ensures accurate and efficient itinerary generation while enhancing the user experience with intuitive map-based features.

2.4 GROQ API Integration

TravelMinds integrates the GROQ API [2] to enhance data querying capabilities. GROQ (Graph-Relational Object Queries) allows for efficient retrieval of complex data structures, improving the application's responsiveness and accuracy in generating itineraries.

3 Key Features

TravelMinds offers several features designed to enhance the travel planning experience. Its unique value lies in its ability to personalize itineraries while maintaining simplicity and ease of use.

3.1 Personalized Activity Generation

We tried to employ Ollama [6] and Gemini [1] but so far Groq [2] seems to be the best option. By leveraging the Groq LLM, TravelMinds provides meaningful activity suggestions,

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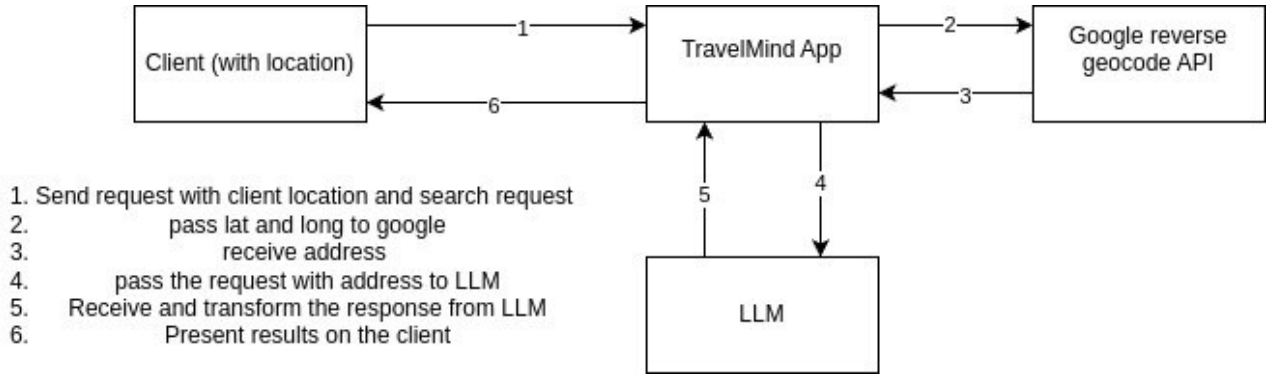
Figure 1. The flow of data during the searching process.

ensuring that the recommendations are relevant and enriching.

Users can view their stored list of preferred activities or make a new search. The application processes this information to generate a customized search that aligns with the user's interests. These features make TravelMinds an indispensable tool for travelers seeking efficiency and personalization.

3.2 Interactive User Interface

The frontend is powered by Next.js [4] and offers a clean and intuitive interface, allowing users to easily navigate through options and view their locations and activities.

The user enters the search text on the search bar and the Travelminds App gives suggestions that can be seen on the map. The user may then click the place of interest to get more information on this location, as can be seen in figure 2. This location can be stored on top the preference list in the Preferences. The link for the Google Map search is available from the Favorites page after the user has added the activity to the Favorites page with the heart button.

4 Conclusion

Planning a trip involves numerous decisions, from selecting destinations to organizing daily activities. TravelMinds addresses this challenge by providing users with customized travel plans that align with their interests and schedules. By inputting specific preferences, users receive detailed itineraries, enhancing the efficiency and enjoyment of their travel experiences. TravelMinds integrates modern web technologies and efficient data processing ensuring a seamless user experience, making travel planning more accessible and enjoyable.
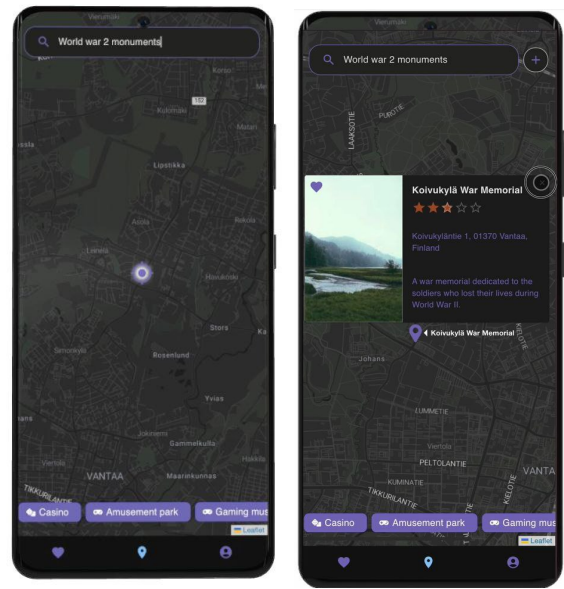
Figure 2. Making a new search in the TravelMinds app. The user enters a text in the search bar. The application gives suggestions and the user chooses a location by tapping it and gets more information. The exact location may be copied from the map and given to Google Maps to find out how to arrive there.

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