

Travel Planning Application: Integration of Itinerary building and Budget tracking using React Native

Sushant Gupta¹, Shashank Mehta², Tarun Kumar³, Shreyas L⁴

¹ B.E. Final Year, Dept. of ISE, Global Academy of Technology, Bangalore, Karnataka, India

² B.E Final Year, Dept. of ISE, Global Academy of Technology, Bangalore, Karnataka, India

³ B.E. Final Year, Dept. of ISE, Global Academy of Technology, Bangalore, Karnataka, India

⁴ Asst. Professor, Dept. of ISE, Global Academy of Technology, Bangalore, Karnataka, India

Abstract - Planning group travel involves coordinating various tasks such as organizing destinations, managing expenses, and ensuring collaboration among participants. This paper introduces a cross-platform mobile application developed using React Native that simplifies the travel planning experience, especially for group trips. The app integrates secure user authentication through Google OAuth, with session management handled via JSON Web Tokens (JWT), ensuring data security and user privacy.

Once authenticated, users can create personalized trips that are stored in a MongoDB database. Each trip features multiple tabs, including Overview, Itinerary, Explore, and Budget, each designed to streamline different aspects of travel organization. In the Overview tab, users can add points of interest using Google Places Autocomplete. The application also utilizes geolocation services to display recommended places within a 5-kilometer radius using Google Places and Geocoding APIs (Application Programming Interface).

The Itinerary tab allows users to schedule visits to selected locations by assigning them to specific dates, helping users construct a day-by-day travel plan. The Explore tab introduces nearby restaurants and attractions, enhancing user experience through contextual recommendations. The Budget section enables users to plan expenses by selecting activities and tracking who paid for what—individually or in a group setting.

To facilitate collaboration, the app includes a sharing feature that sends trip invites via email, allowing others to join and contribute. By integrating real-time cloud APIs and providing modular functionality, the application enhances user coordination and brings efficiency to group travel planning.

Key Words: React Native, Travel Planner App Itinerary Management, Budget Tracking, Group Collaboration, Cross-platform Mobile Application.

1. INTRODUCTION

Trip planning is often a complex task, particularly when coordinating with multiple people. From choosing destinations to organizing daily activities and managing expenses, travellers face challenges that require efficient

tools to streamline the process. With the growth of mobile technology and APIs offering real-time data, modern travel applications are evolving to become more intelligent, collaborative, and user-centric.

This paper introduces a cross-platform mobile application developed using React Native, designed to simplify the process of planning trips. The app, developed as a final year project by a team of three students, integrates various modern technologies including Google OAuth for secure login, JSON Web Tokens (JWT) for session management, and MongoDB for persistent data storage. The application allows users to create, manage, and share travel plans in a collaborative environment.

A notable feature of the application is its ability to recommend nearby attractions using the Google Places API and geolocation services, enhancing the trip planning experience with dynamic suggestions. The itinerary module enables users to organize destinations date-wise, while a dedicated budget management tab facilitates group expense tracking, categorizing spending based on individuals or groups. A trip sharing feature also allows users to invite others via email, enhancing the collaborative nature of the platform.

This paper presents the motivation, architecture, development process, implementation details, and potential future enhancements of the application. It also discusses how integrating various APIs and backend systems creates a scalable and user-friendly travel solution aligned with modern development practices.

1.1 Development Process and Formatting

Before beginning the development of the travel planner application, the team clearly defined the functional goals and system requirements. Core features such as authentication, trip creation, itinerary planning, and expense tracking were conceptualized and documented in a structured format. This initial planning phase was essential to ensure a smooth and organized development process.

The application was designed using a modular approach, with separate components for each feature to maintain code

clarity and scalability. Frontend components were developed using React Native, while the backend APIs were structured using Node.js and Express. All business logic and data models were managed independently before integrating them into a cohesive full-stack solution.

Just as formatting is critical in documentation, maintaining clean and consistent code throughout the project was a key priority. Proper naming conventions, avoidance of hardcoded values, and adherence to RESTful API standards helped streamline collaboration among team members. Version control was managed using Git to avoid conflicts and maintain code integrity.

Furthermore, testing and debugging were performed iteratively, and care was taken to avoid redundancy and ensure high code readability. As emphasized in technical documentation practices, attention was paid to detail, such as removing unused code blocks, handling exceptions, and following indentation standards—practices that enhanced both code quality and long-term maintainability of the application.

1.2 Sub Heading 2

The entire application was developed using modern full-stack development technologies to ensure scalability, responsiveness, and a seamless user experience across mobile platforms. The frontend was built using **React Native**, which allowed for efficient cross-platform development and a native-like interface. On the backend, **Node.js** and **Express.js** were used to handle API requests, authentication, and data operations.

For data storage, **MongoDB** was chosen due to its flexibility in managing semi-structured trip data, including itinerary items, budgets, and user collaboration records. To ensure secure and scalable authentication, **Google OAuth 2.0** was integrated and enhanced using **JWT (JSON Web Tokens)** for session management.

The user interface was designed to be minimalistic yet functional, adhering to responsive design principles. The Google Places API and Geocoding API were utilized to enable location-based recommendations, such as nearby attractions within a 5 km radius, based on user-selected destinations.

Special attention was given to consistency in codebase design and UI layout. All screens were styled using standardized components to ensure visual harmony. Just as consistent fonts are vital in documentation, consistent component styling and layout grids were maintained throughout the app.

This technological stack not only supports the current project requirements but also provides a foundation for future enhancements such as multi-user trip collaboration,

expense visualization, and integration with travel service providers.

2. System Overview

The proposed Travel Planner Application is a mobile solution developed using React Native, aimed at simplifying trip planning and enhancing group travel experiences. This system integrates several modern technologies and APIs to offer a streamlined and interactive interface for users. The first layer of the application includes secure user authentication using Google OAuth 2.0, combined with JSON Web Tokens (JWT) for session management and data protection.

Upon successful login, users can create a trip, which is stored in a MongoDB database and immediately reflected on the home screen. The app interface is divided into several functional tabs: **Overview**, **Itinerary**, **Explore**, and **Budget**. In the Overview section, users can search for places using Google Places Autocomplete and add them to their trip. This is further enhanced by showing ten nearby recommended locations within a 5-kilometer radius, derived using geolocation data (latitude and longitude) through the Google Places API.

The Itinerary tab allows users to assign these selected places to specific dates, enabling a day-wise plan. The Budget section enables users to track expenses and categorize them by individual or group contributions. The Explore tab is intended to list restaurants and social links related to the trip destination, which is still under development. The application also supports group travel features, such as trip sharing via email invitations, allowing others to join collaboratively.

This section outlines the fundamental structure and modular architecture that supports the application's core functionality.

Table -1: Project Overview

Features of application			
Platform	React-native	Database	Mongo DB
Authentication	Google OAuth	Trip creation	Create, view and manage trips
Overview tab	User can add places	Recommendation places	Using google geocoding and places Api
Itinerary tab	Date wise planning	Explore tab	Restaurant and social places(future plans)
Budget Tab	Track expense and assign payers	Trip sharing	Share trip via emails

The above table outlines the core functionalities integrated into the travel planner application developed using React Native. The platform provides a seamless experience for users to create, organize, and share trips. Each module addresses a specific aspect of travel planning—ranging from trip creation and itinerary management to expense tracking and collaborative trip sharing. By incorporating Google’s Places and Geocoding APIs, the system also enables smart location-based recommendations, enhancing user engagement. Future enhancements, such as expanding the Explore tab to include dynamic listings of nearby restaurants and social venues, aim to make the application a more holistic travel companion.

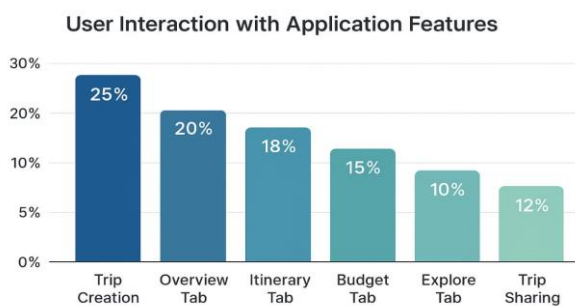


Chart -1: User interaction with Application Features

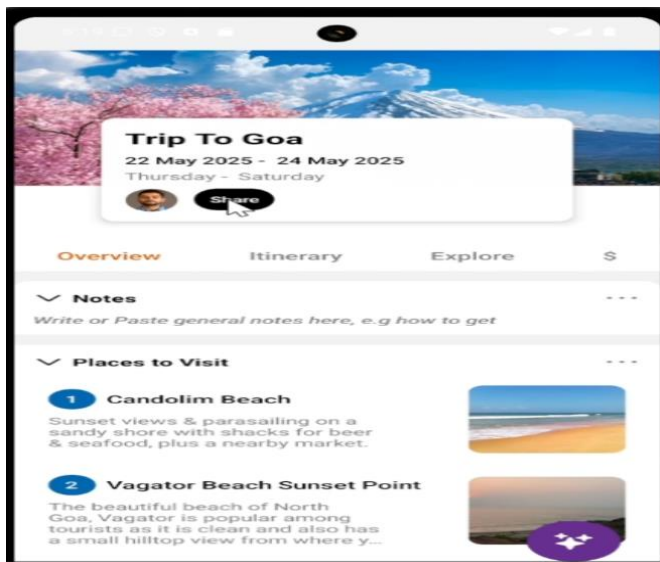


Fig -1: Overview tab

The figure displays the Overview section of the travel planner mobile application, where users can view trip details, add notes, and manage a list of places to visit. Locations are added using the Google Places Autocomplete feature, and the app offers nearby recommendations within a 5 km radius using Google’s Geocoding and Places APIs. This screen is designed to provide a centralized view of the trip and serves as the foundation for building a personalized itinerary.

3. CONCLUSIONS

The travel planner application developed using React Native successfully addresses the complexities of group travel planning by integrating features such as itinerary creation, budget tracking, and collaborative trip sharing. With the use of modern technologies like Google OAuth for authentication, JWT for secure sessions, and MongoDB for data storage, the system ensures both functionality and scalability. The incorporation of Google Places and Geocoding APIs enhances the planning experience by offering intelligent location-based recommendations. Through a modular design and user-friendly interface, the application simplifies the organization of trips while enabling real-time collaboration among users. This project demonstrates the potential of cross-platform mobile development in creating practical solutions for real-world problems and lays a strong foundation for future enhancements such as dynamic restaurant listings, expense visualization, and multi-user role management.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the Department of Information Science and Engineering, Global Academy of Technology, Bangalore, for providing the necessary guidance and resources to carry out this project. We are especially thankful to our mentor, Mr. Shreyas L, Assistant Professor, for his constant support, valuable feedback, and encouragement throughout the development of this application. We also acknowledge the contributions of our teammates for their collaborative efforts in successfully completing this final year project

REFERENCES

- [1] Gautham Vijayan, "Implementing React Native Map Routes with Google’s Routes API," Medium, Nov. 24, 2024. [Online]. Available:
- [2] M. Young, *The Technical Writer’s Handbook*, Mill Valley, CA: University Science, 1989.
- [3] D. Kornack and P. Rakic, "Cell Proliferation without Neurogenesis in Adult Primate Neocortex," *Science*, vol. 294, Dec. 2001, pp. 2127–2130, doi:10.1126/science.1065467.
- [4] K. Elissa, "Title of paper if known," unpublished.
- [5] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.
- [6] React Native Documentation, "React Native – A framework for building native apps using React," [Online]. Available: <https://reactnative.dev/>

- [7] Google Developers, "Google Places API," [Online]. Available: <https://developers.google.com/maps/documentation/places/web-service/overview>
- [8] MongoDB Inc., "MongoDB: The Developer Data Platform," [Online]. Available: <https://www.mongodb.com/>
- [9] Auth0, "What is JSON Web Token (JWT)," [Online]. Available: <https://auth0.com/learn/json-web-tokens/>
- [10] Express.js, "Express - Node.js web application framework," [Online]. Available: <https://expressjs.com/>