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WanderVault App: Smart Trip Planner Powered by Generative AI

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A B S T R A C T

This project presents WanderVault, an AI-powered smart travel planning system that automates the generation of personalized travel itineraries. By integrating Google Gemini AI with React Native and Firebase, the application collects user preferences such as destination, duration, traveler type, and budget to create tailored trip plans. The system uses Google Places API for dynamic location search and Gemini AI to return structured JSON itineraries including hotels, flights, and places to visit. User authentication and real-time trip storage are managed via Firebase. The final application, deployed on mobile platforms using Expo, offers an intuitive interface for real-time travel planning and itinerary management. WanderVault demonstrates how generative AI can revolutionize the travel experience by offering convenience, personalization, and automation.

Keywords: Smart Travel Planner, React Native, Firebase, Google Gemini AI, Itinerary Generation, AI Travel App, Mobile Application

Introduction

In today's digital era, trip planning remains a complex task, characterized by extensive research and real-time decision-making. Wander-Vault addresses these challenges head-on by leveraging Generative AI and Data Science to create personalized, AI-driven travel itineraries. Utilizing advanced machine learning algorithms, the system dynamically adapts to user preferences, budget constraints, and real-time updates, providing a tailored travel experience that simplifies the logistical complexities of planning a trip. This intelligent travel assistant simplifies the complexities of trip planning, allowing users to focus on the excitement of their journey rather than the logistics.

Wander-Vault ensures seamless cross-platform compatibility, allowing users to access the application on both web and mobile devices with a single codebase. In conclusion, Wander-Vault embodies the convergence of AI, Data Science, and cross platform development, offering an autonomous and adaptive solution for modern travel planning, enhances every aspect of travel planning, making it smarter and more efficient.

The Smart AI Trip Planner is an innovative travel planning solution powered by modern technologies such as React-Native, Gemini AI, Firebase, and Tailwind CSS. It offers personalization to travel itinerary creation, reducing manual input and optimizing user experiences. The system is designed to provide real-time, intelligent suggestions for destinations, accommodations, and activities, based on user preferences, budget, and travel dates. One of the core strengths of the planner lies in its ability to combine travel data, user context, and advanced AI to deliver real-time recommendations and adjustments. Unlike traditional travel planning tools, which require multiple applications and manual data collection, this solution simplifies the user experience by centralizing all necessary planning tools into one application. Users can input simple preferences or queries using natural language, and the AI will interpret these inputs to create a customized itinerary. This eliminates the hassle of searching across platforms and services. The integration with Firebase ensures secure and synchronized data access, while React Native provides a responsive UI across platforms. Tailwind CSS enhances design and usability.

Overall, the Smart AI Trip Planner improves accessibility, customization, and decision-making for users, offering a reliable digital travel companion that is adaptable, intelligent, and highly efficient.

2. Literature Review

In [1], Venkat Manideep et al. present a comprehensive AI-powered Trip Planner that analyzes user preferences, historical data, and real-time factors to deliver optimized travel recommendations. The system integrates transportation, accommodation, and activity data while enabling natural language interaction, enhancing personalization and adaptability.

In [2], Khudaija Pinjari et al. propose a Smart Travel Planner that simplifies the travel planning process through a web-based AI system. It generates structured itineraries based on user inputs and preferences using intelligent algorithms, reducing the complexity of manual planning.

In [3], Nikita Gaur et al. introduce an AI-Powered Travel Planning System combining rule-based logic and machine learning to suggest destinations and activities aligned with the user's budget and interests.

In [4], Amit Kumar et al. develop a Personalized Trip Recommender System using collaborative filtering and clustering to recommend travel places and build itineraries tailored to user behavior patterns.

3. Methodology

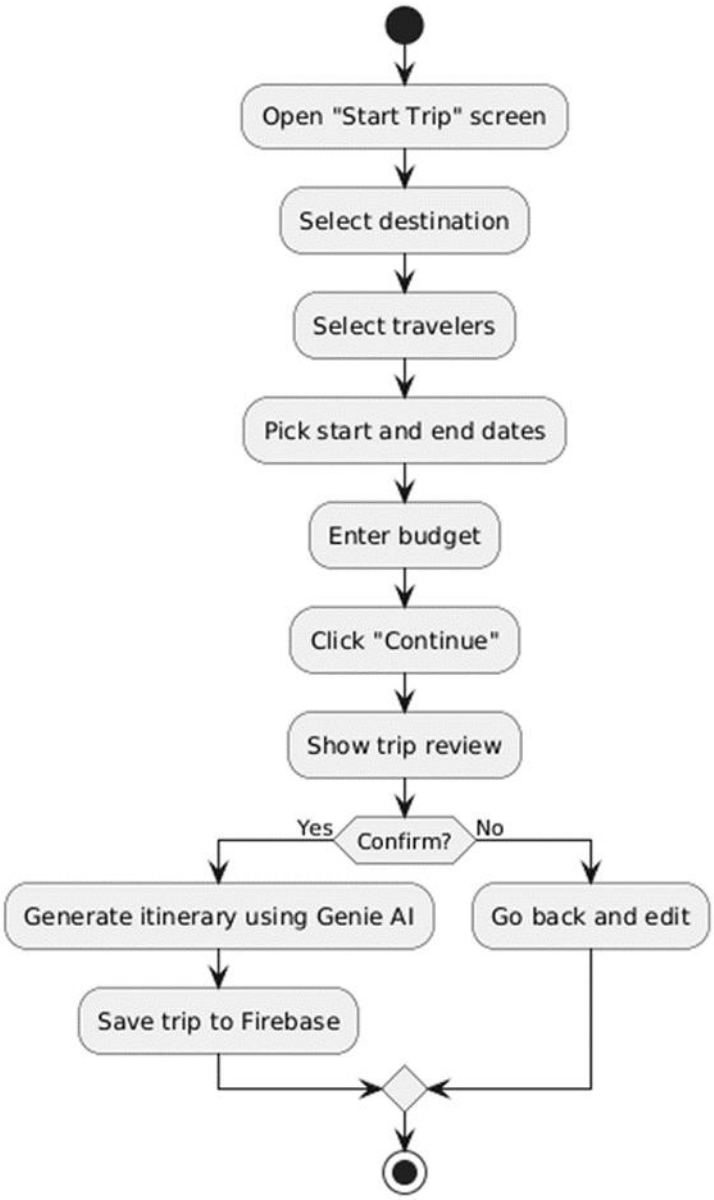


Fig. 1. Smart AI Trip Planner Methodology

The proposed system “Smart Trip Planner powered by Generative AI” is an intelligent, fully-integrated, cross-platform application that automates the travel planning process using Artificial Intelligence and real-time data. The primary goal is to offer a personalized, accurate, and efficient trip planning experience that minimizes manual effort while enhancing the quality of user decisions. Unlike existing travel apps that handle only bookings or provide static suggestions, this system combines multiple functionalities under one umbrella to deliver a truly smart travel assistant.

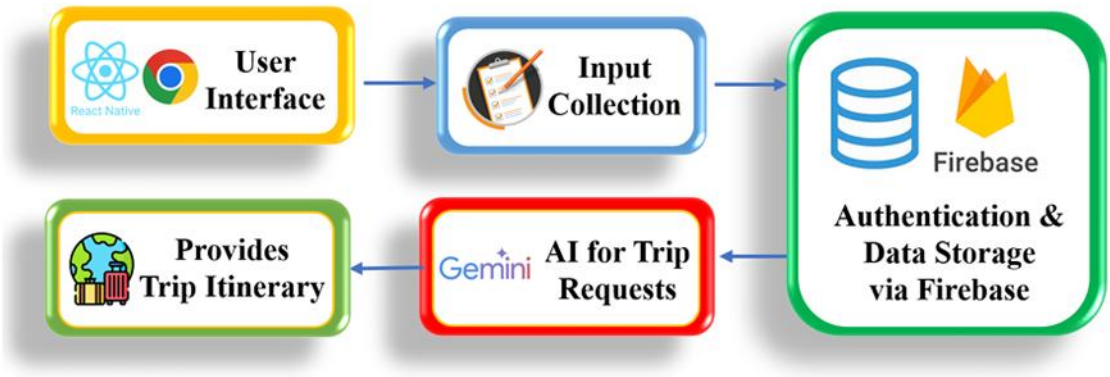
The AI Smart Trip Planner is built using the React Native framework for a responsive and unified mobile experience across Android and iOS platforms. Firebase is used for secure, scalable real-time data storage, user authentication, and database management. Gemini AI, a generative AI model, is integrated to handle natural language inputs and provide smart, context aware recommendations. Tailwind CSS ensures that the user interface is

visually appealing, fast, and mobile-first. Users begin by entering basic preferences such as destination, travel dates, budget, and interests (e.g., adventure, cultural experiences, relaxation).

The AI then processes this input to generate a tailored itinerary that includes accommodations, places to visit, food spots, activities, and even suggested travel routes. It pulls data from APIs related to weather, maps, transport availability, local events, and accommodation pricing. The planner dynamically adapts based on user feedback and environmental changes. For example, if rain is predicted at the chosen destination, the system automatically suggests alternative indoor activities or nearby dry-weather locations. If a user skips a suggested activity, the AI learns and refines future plans.

3.1 System Architecture

Client side Architecture



Client side Architecture

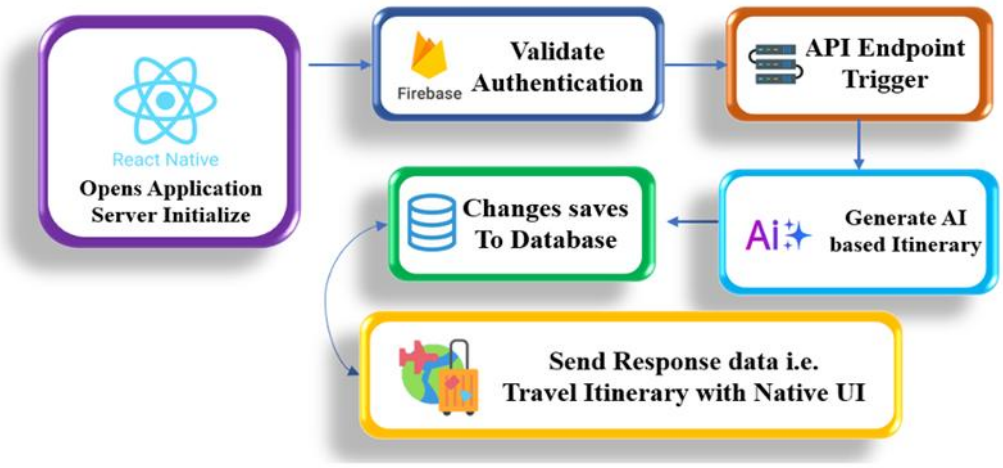


Fig. 2. Architecture

Smart Retention has been developed with a user-friendly, modular architecture that enables businesses to predict customer churn and take timely retention actions using AI-driven insights. The system consists of five main modules, each handling a specific part of the churn prediction workflow. It is lightweight, built using a graphical web interface (Streamlit), and suitable for real-time business decision-making.

1. **Firebase User Authentication**

The application should support secure user authentication using Firebase. This includes user registration, login, and logout functionality. Session management should ensure users remain logged in across sessions unless they manually log out.

2. Input Preferences

The user provides key customer information such as age, gender, tenure, and monthly charges through simple input fields. This data forms the basis for the prediction and is processed to ensure it matches the format used during model training.

3. Itinerary Generation

The system should utilize Gemini AI to automatically generate a travel itinerary. This itinerary must include accommodations, transportation options, and local attractions tailored to the user's preferences and budget.

4. Trip Editing

Users must be able to modify their generated trip plans. Changes could include replacing activities, adjusting the number of days, or changing accommodations, with updates reflected instantly.

5. Budget Management

The system must monitor the user's specified budget and recommend cost-effective options throughout the trip. It should provide a summary of estimated expenses and highlight areas where users can save money.

6. Trip History Storage

The application must save each generated trip plan to Firebase Firestore under the user's profile. Users can view all past trips from the User Trips section.

4. Output Screens

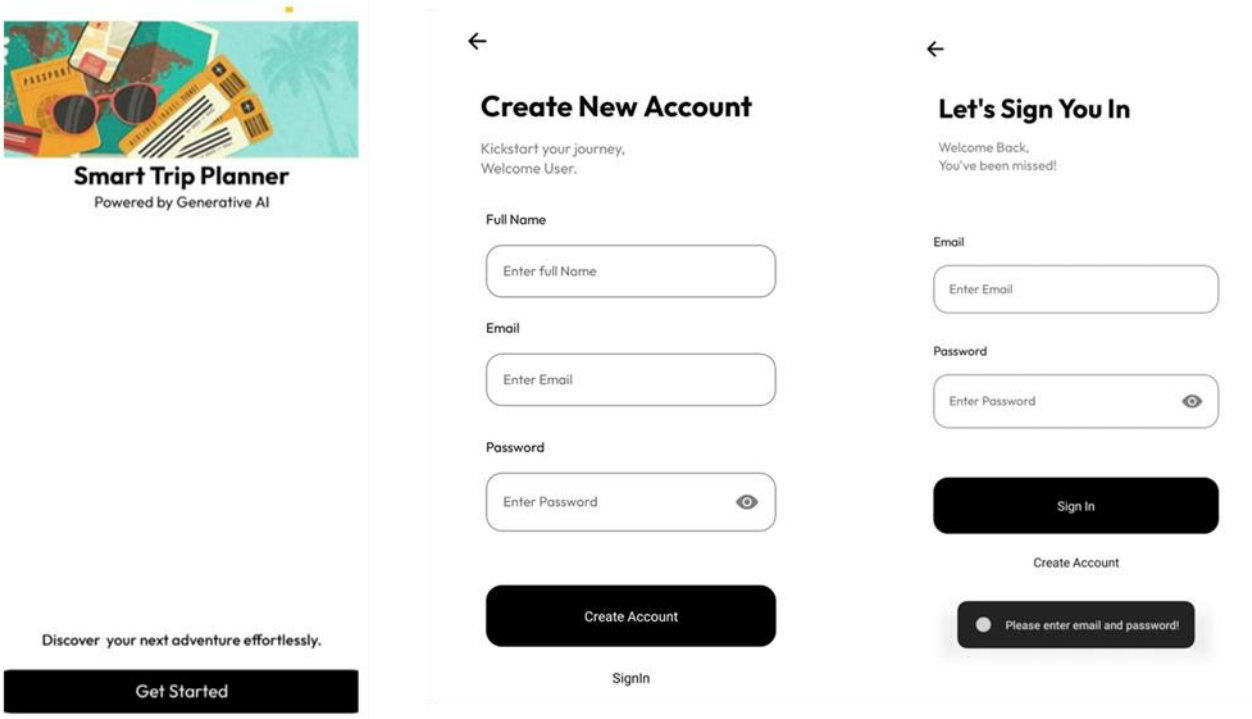


Fig 3. Login Screen

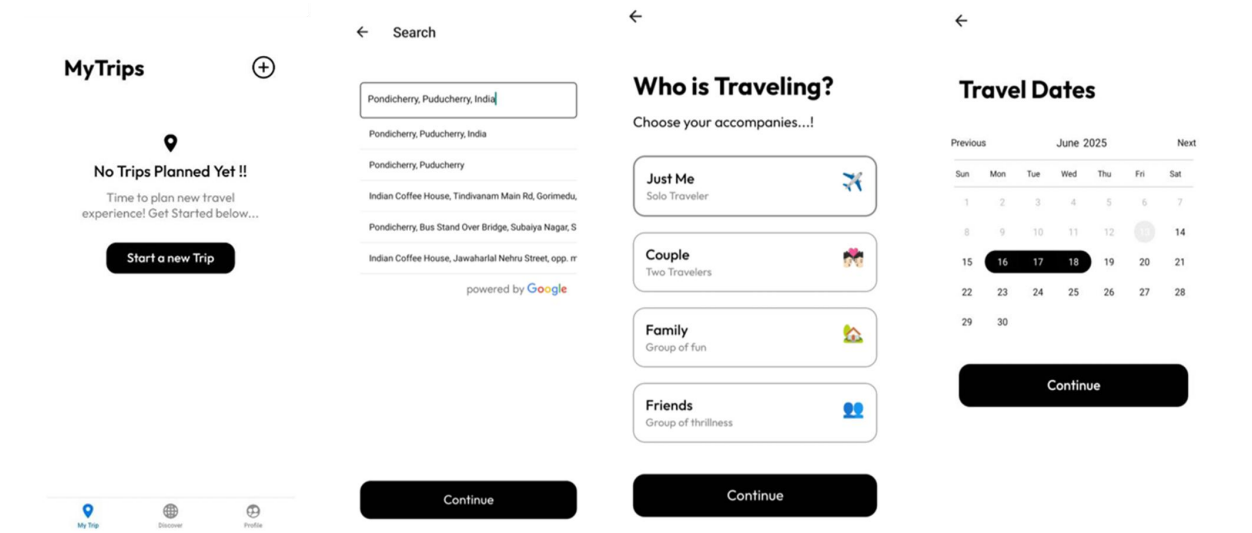


Fig 4. Trip Creation

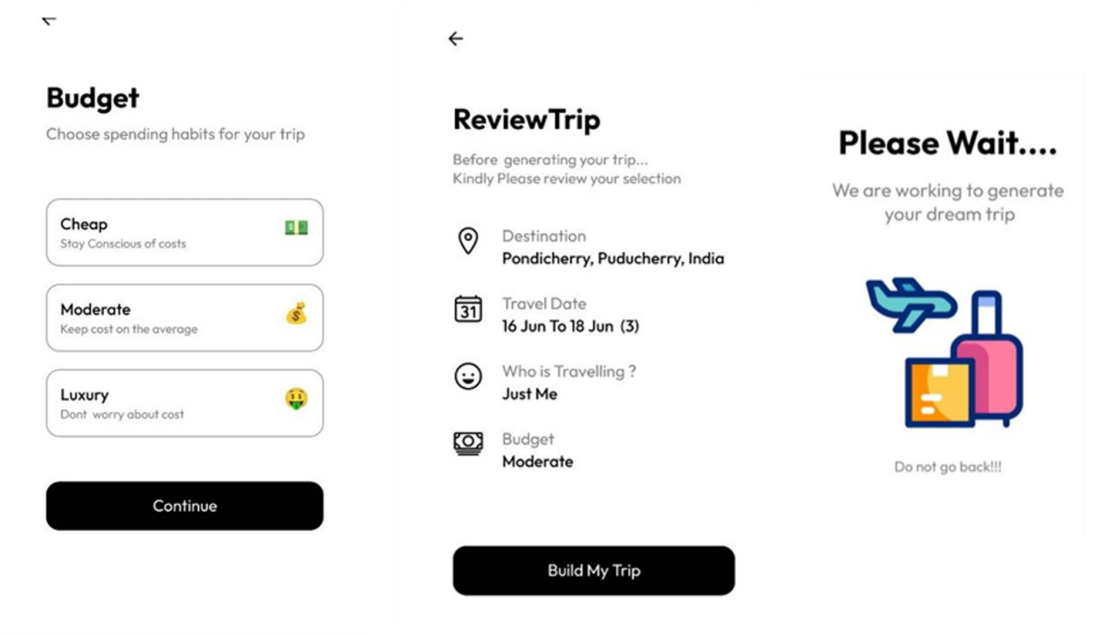


Fig 4. Trip Generation

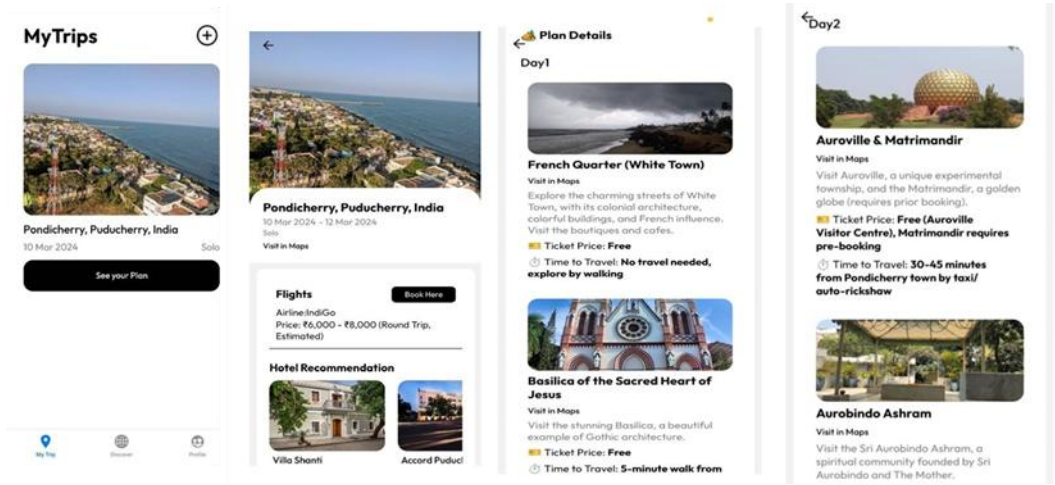


Fig 4. Trip Saved

5. Work Flow:

The Smart Retention system uses a streamlined process that integrates machine learning with a graphical interface to deliver real-time customer churn prediction and retention suggestions. The full workflow is outlined below:

Step 1: Launch the Application

The user opens the WanderVault mobile application on their Android/iOS device (built with React Native and Expo).

The welcome screen is displayed, prompting the user to sign in or create an account.

Step 2: User Authentication

The user selects Sign Up or Login. Firebase Authentication handles secure user login via email and password. Upon successful authentication, the user is redirected to the home screen.

Step 3: Start a New Trip

The user taps on “Start New Trip”. A form is displayed to collect basic trip preferences.

Step 4: Enter Trip Preferences

The user provides input for personalized trip planning using interactive form fields: Destination – Name of the city or country the user wishes to visit. Number of Days – Total duration of the trip. Budget – User's overall travel budget. Traveler Type – Dropdown to select options like Solo, Couple, Family, or Friends. Start Date – The expected start date of the trip.

Step 5: Save Trip

The user clicks "Build My Trip". Users can go to the My Trips section to view all saved trips. They can tap any trip to view details or edit it by modifying days, replacing places, or adjusting plans. The itinerary is generated and stored in Firebase Firestore, under the authenticated user's account.

Step 6: AI Itinerary Generation

The system sends the input data to Google Gemini AI. Gemini processes the request and returns a structured JSON response that includes: Daily itinerary with places to visit and Recommended hotels. o Flight suggestions

Step 7: Display Itinerary and Real time Suggestions :

The JSON response is parsed and shown to the user in a clean card-based UI. The user can scroll through day-wise plans, accommodation details, and more.

In case of disruptions (like bad weather), the app can suggest alternate destinations or activities using AI.

6. Conclusion and Future scope:

The AI Smart Trip Planner successfully demonstrates how artificial intelligence can revolutionize travel planning. It intelligently processes user preferences, combines them with real-time data, and delivers customized itineraries that are not only relevant but also efficient and engaging. The project fulfills its goal of minimizing manual planning while enhancing the travel experience through personalization, convenience, and automation.
Key highlights of the system include: Dynamic itinerary generation, Real-time weather and traffic-aware planning, AI-driven recommendation system, Smooth and responsive user interface across devices.

The integration of multiple technologies such as React Native, Firebase, Gemini AI, and real time APIs contributes to a robust system architecture. Additionally, the project introduces the concept of adaptive planning—adjusting recommendations as conditions change (e.g., weather or user interest). This adaptability makes it future-ready and applicable for commercial deployment with additional features. The project also demonstrates the potential of merging AI with user-centric design to solve practical problems.

In conclusion, this AI-based Smart Trip Planner is more than just an app—it's a travel companion, simplifying decisions and creating memorable journeys through intelligent technology.

7. Future Scope:

Although the current version of the AI Smart Trip Planner provides a functional and efficient solution for travel planning, there are several areas where enhancements can be made to expand its capabilities:

1. Voice Interface Integration:

Adding voice assistant functionality using tools like Google Speech API or OpenAI Whisper can help users plan trips hands-free.

2. Augmented Reality (AR) Previews:

Implement AR features to allow users to view landmarks or hotels in 3D before selecting them. This improves decision-making and engagement.

3. Multi-User Itinerary Planning:

Enable group planning where multiple users can collaborate on a shared itinerary, useful for families or friend groups.

4. Budget Optimization Algorithm:

Implement machine learning-based budget planning that considers real-time pricing, discounts, and user-specified limits to deliver optimal plans

5. Sustainability Filter:

Introduce an eco-friendly filter to promote green travel options like trains over flights, or eco-certified hotels.

7.Acknowledgement:

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Lastly, we thank all the faculty members, staff for their constant encouragement and support.

8.References:

In [1], Venkat Manideep et al. present a comprehensive AI-powered *Trip Planner* that analyzes user preferences, historical data, and real-time factors to deliver optimized travel recommendations. The system integrates transportation, accommodation, and activity data while enabling natural language interaction, enhancing personalization and adaptability. Link: https://www.ijfmr.com/papers/2024/3/20089.pdf

In [2], Khudaija Pinjari et al. propose a *Smart Travel Planner* that simplifies the travel planning process through a web-based AI system. It generates structured itineraries based on user inputs and preferences using intelligent algorithms, reducing the complexity of manual planning.
Link: https://ijarsct.co.in/Paper11254.pdf

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