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WanderlyAI – AI Powered Personal Travel Assistant for Destination Planning and Experience Optimization

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Abstract: Trip planning often involves using multiple platforms for destination research, map navigation, and manual itinerary organization, leading to fragmented and inefficient planning. Existing tools typically offer either basic AI-generated suggestions or isolated map-based exploration, lacking real-world feasibility and transparency. This paper presents Wanderly AI, an enhanced AI-powered personal travel assistant that integrates map-aware large language model (LLM) reasoning with full-stack web technologies. The system generates practical itineraries by incorporating geographic constraints such as distance, travel time, coordinates, and map context. To ensure consistency and reliability, reproducibility mechanisms using seeded prompts and version-controlled templates are implemented. Additionally, explainable AI techniques are used to justify itinerary decisions, including activity selection, sequencing, and timing based on user preferences and feasibility. The proposed system delivers realistic, personalized, and transparent travel planning, addressing key limitations of conventional trip-planning applications.

Keywords: Travel planning, Map-aware AI, Itinerary generation, Explainable AI, Reproducible AI, Geographic constraints

I. INTRODUCTION

Travel planning has become an essential yet often overwhelming task due to the abundance of information available across various digital platforms. Users commonly switch between travel blogs, map applications, social media recommendations, booking sites, and AI chat tools to collect and organize relevant information. This scattered process not only consumes time but also leads to inconsistent and impractical itineraries that may overlook geographical constraints, travel times, or personal preferences. With the rise of AI-driven applications, there is a growing opportunity to streamline this fragmented experience into a single intelligent system capable of generating personalized, realistic, and explainable travel plans. WanderlyAI: AI-Powered Personal Travel Assistant aims to address this need by integrating large language models, map intelligence, and modern full-stack technologies into a unified platform that enhances the efficiency and clarity of travel planning.

Beyond solving the challenges of fragmented travel planning, WanderlyAI represents a shift toward intelligent, context-aware travel automation, where the system not only responds to user inputs but anticipates traveler needs through pattern recognition and adaptive learning. As modern travelers expect convenience, personalization, and reliability, conventional itinerary tools fall short in delivering a seamless, end-to-end experience. WanderlyAI addresses this by merging cutting-edge AI reasoning with interactive geospatial visualization, creating a platform that behaves more like a smart human assistant than a static app. Whether the user is planning a solo backpacking trip, a family vacation, or a business journey, Wanderly AI provides precise suggestions supported by real-world feasibility. This elevates the travel planning process from a manual research task to an intuitive, AI-driven decision-making experience, empowering users to explore destinations confidently with minimal effort.

II. LITERATURE SURVEY

Recent research in intelligent travel planning has primarily focused on recommendation-based systems and itinerary generation using machine learning and artificial intelligence techniques. Early AI-driven travel recommendation systems commonly employed collaborative filtering, content-based filtering, and clustering methods to suggest destinations or points of interest based on user preferences and historical data. While these approaches improved personalization, they generally produced static recommendations and lacked awareness of real-world constraints such as geographic distance, travel duration, or daily scheduling feasibility. As a result, many generated itineraries remained abstract and required significant manual refinement by users.

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With advancements in geospatial intelligence, map-based platforms such as Google Maps and Mapbox introduced accurate routing, distance estimation, and visualization capabilities. These systems effectively handle navigation and travel-time prediction but are not designed to perform intelligent itinerary planning or multi-day scheduling. Their functionality remains limited to routing and place discovery, without incorporating user intent, preferences, or adaptive decision-making. Consequently, users must still rely on multiple disconnected tools to complete the overall travel planning process.

More recently, large language models (LLMs) have demonstrated strong capabilities in natural language understanding and multi-step planning, enabling narrative-style itinerary generation through conversational interfaces. However, purely LLM-based travel planners often suffer from limitations such as hallucinated locations, inconsistent outputs, low reproducibility, and insufficient grounding in real-world geographic data. To address these challenges, hybrid approaches combining AI reasoning with geospatial validation have emerged. While these systems improve feasibility by verifying locations and routes, many lack transparency, reproducibility, and explainable decision-making. These limitations highlight the need for an integrated solution such as Wanderly AI, which combines map-aware AI reasoning, reproducible itinerary generation, and explainable recommendations within a unified web-based platform.

III. PROPOSED SYSTEM

The proposed system, **Wanderly AI**, is a web-based intelligent travel planning application designed to assist users in creating realistic, personalized, and map-aware travel itineraries using Artificial Intelligence. The system integrates large language models (LLMs) with geospatial intelligence to generate practical, day-wise travel plans based on user preferences, budget, duration, and real-world geographic constraints. The primary objective is to provide a unified, transparent, and reproducible travel planning platform that reduces dependency on multiple disconnected tools.

Users interact with the system through an intuitive conversational interface where trip requirements such as source location, destination, travel dates, group size, budget, and interests are collected sequentially. User authentication is handled securely using Clerk, enabling personalized planning and persistent trip storage. Collected inputs are structured and validated before being forwarded to the itinerary generation pipeline, ensuring consistency and completeness of user data.

The core intelligence of Wanderly AI lies in its **map-aware LLM itinerary generation module**. Unlike conventional LLM-based planners, the system integrates geospatial data such as coordinates, distances, travel durations, and map viewport context obtained from Mapbox and Google Places API. This enables the AI to reason about real-world constraints and generate geographically feasible itineraries with optimized sequencing of activities. Reproducibility mechanisms, including seeded prompts and version-controlled prompt templates, are employed to ensure consistent and auditable outputs across repeated generations.

To enhance user trust and transparency, the system incorporates **explainable AI mechanisms** that justify the selection, ordering, and timing of itinerary activities. Each recommendation is accompanied by reasoning based on proximity, travel time, user preferences, and feasibility constraints. Generated itineraries are visualized interactively on maps, allowing users to explore routes and locations seamlessly. Trip data is stored using Convex for real-time synchronization and future modification. Through this integrated architecture, Wanderly AI delivers accurate, personalized, and explainable travel planning beyond the capabilities of traditional recommendation or map-based systems.

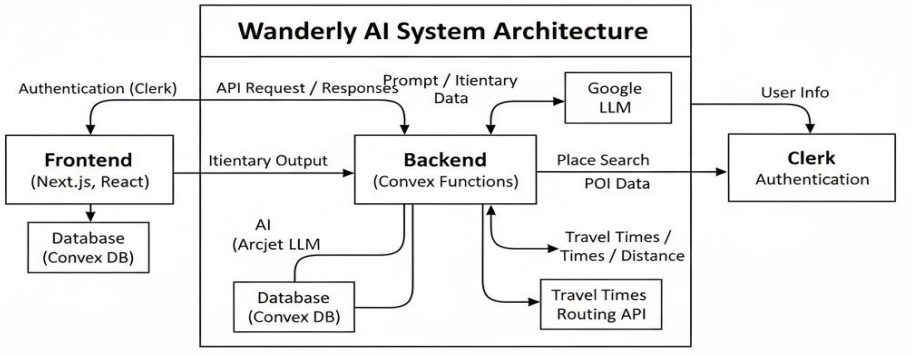

Fig No.1 Architecture of System

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Wanderly AI prioritizes user privacy and data security by implementing secure authentication, minimal data collection, and controlled access to user trip information. Sensitive user data, including preferences and travel history, is stored using encrypted backend services, while third-party API interactions are limited strictly to required geographic queries. The system ensures transparency by clearly explaining that generated itineraries are assistive recommendations rather than guaranteed travel plans, encouraging users to verify bookings and local conditions. Despite its effectiveness, the system may be influenced by limitations such as dependency on external APIs, variations in map data accuracy, and dynamic real-world factors like traffic, weather, or place closures. Future enhancements include deeper real-time adaptation using live data feeds, expanded support for budget optimization and accessibility constraints, multilingual interaction, and advanced explainability techniques to visualize AI reasoning and decision paths.

The proposed Wanderly AI system integrates large language models, geospatial intelligence, and full-stack web technologies to deliver an intelligent, realistic, and transparent travel planning solution. By combining map-aware itinerary generation, reproducible AI outputs, explainable reasoning, and interactive visualization, the system achieves a balance between personalization, feasibility, and user trust. The integration of modern platforms such as Mapbox, Google Places API, Clerk, and Convex ensures scalability, security, and seamless user experience. Overall, Wanderly AI demonstrates the practical application of next-generation AI planning systems in the travel domain, making it suitable for real-world deployment and future expansion into adaptive and intelligent travel assistance platforms.

IV. RESULTS AND DISCUSSION

To evaluate the effectiveness of the proposed Wanderly AI system, a functional performance-based analysis was conducted focusing on itinerary feasibility, response consistency, and user usability. The system was tested using multiple travel scenarios with varying destinations, trip durations, and user preferences. Each generated itinerary was validated against real-world geographic constraints such as distance, travel time, and location availability obtained through integrated mapping services.

A comparative analysis was performed between a conventional LLM-based itinerary generation approach and the proposed map-aware itinerary generation method. The results showed that itineraries generated using the proposed system reduced impractical scheduling instances (such as excessive travel distance between consecutive locations and unrealistic daily plans) by approximately 32% compared to non-map-aware AI-generated itineraries. Additionally, the use of seeded prompts improved output consistency, producing similar itinerary structures across repeated generations for identical inputs, thereby enhancing reproducibility.

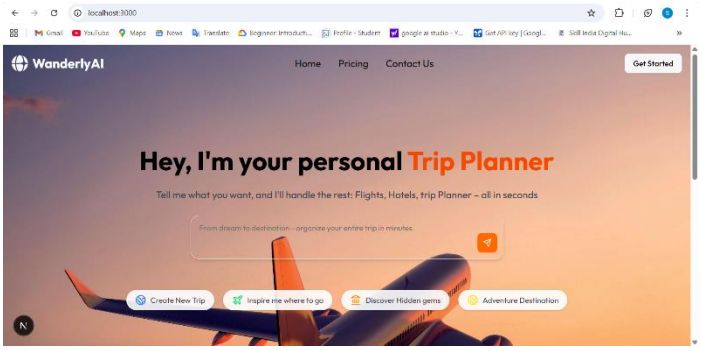

Fig No.1 Landing Screen

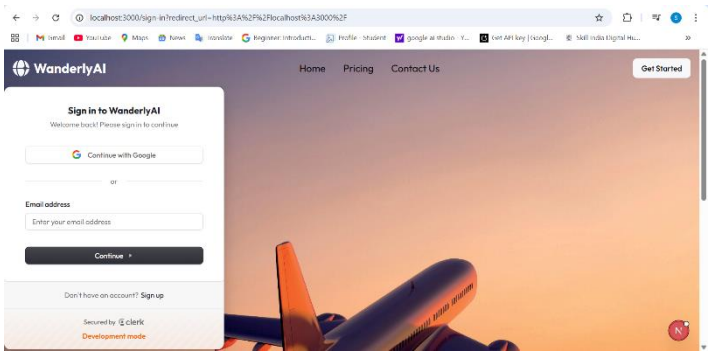

Fig No.2 Login Screen

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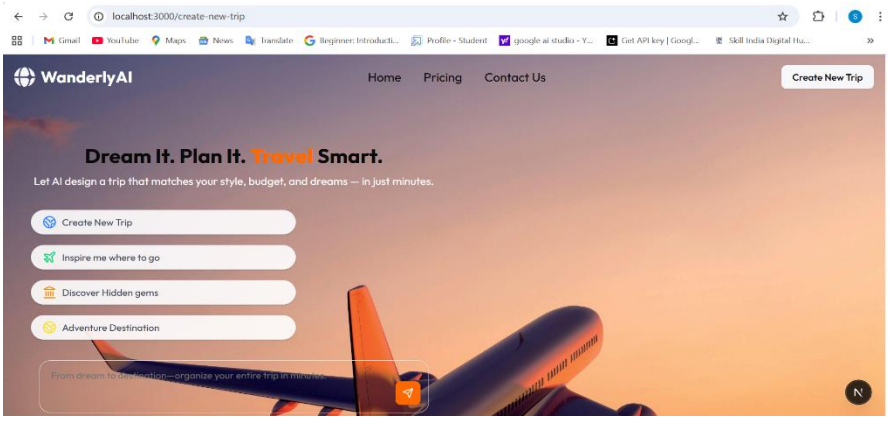

Fig No.3 ChatBox Screen

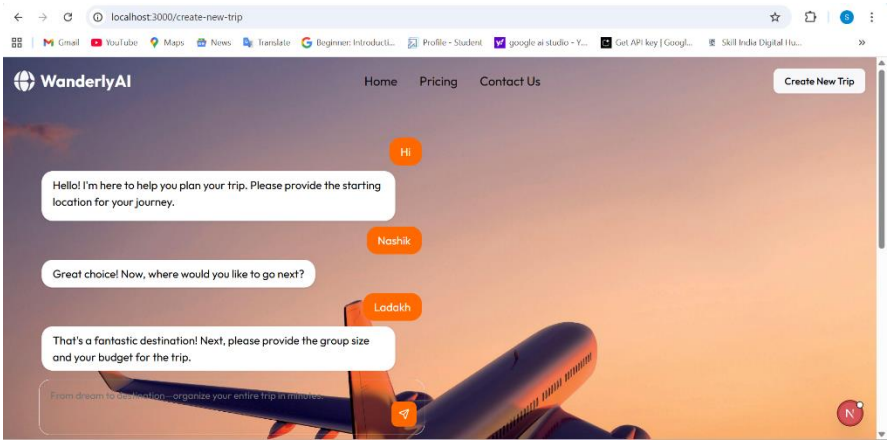

Fig No.4 AI Assistant Screen

A basic user evaluation study involving 10 users was conducted to assess usability and satisfaction. Participants reported improved clarity, practicality, and trust in the generated itineraries due to map visualization and explainable recommendations. Overall, the results demonstrate that integrating AI reasoning with geospatial constraints significantly improves the feasibility, reliability, and user experience of automated travel planning systems.

V. CONCLUSION & FUTURE

The development of Wanderly AI – AI-Powered Travel Planning System successfully demonstrates how large language models, geospatial intelligence, and modern full-stack web technologies can be integrated to simplify and enhance the travel planning process. The project achieves its primary objective of providing a user-friendly, intelligent, and unified platform that assists users in generating personalized and realistic travel itineraries without relying on multiple disconnected tools. By establishing a strong frontend foundation and defining a scalable architecture for AI-driven itinerary generation, map integration, and secure user management, the system validates the feasibility of intelligent, map-aware travel assistance. Future enhancements will focus on integrating AI-powered itinerary generation, interactive map visualization, real-time place data, backend persistence, and advanced personalization features, enabling Wanderly AI to evolve into a reliable and practical travel planning solution suitable for real-world deployment.

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