HikiGo

Group:15

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1. ABSTRACT

As hiking gains popularity, beginners struggle with route selection and group formation. Our AI hiking app addresses these challenges through intelligent route planning, intelligent team-matching, and an ice-breaking AI guide, while real-time navigation ensures safer and more social experiences.

2. Introduction and Problem Statement

Hiking's growing popularity highlights key challenges: beginners struggle with route planning, time management and group coordination, while current apps' static recommendations and manual matching fail to address these needs. These limitations not only diminish user experience but also raise safety concerns, particularly for inexperienced hikers.

Our AI-powered solution embraces human-centric computing principles by:

1.Providing adaptive route planning using real-time environmental and user data.
2.Facilitating intelligent partner matching and real-time coordination.
3.Enabling AI-guided social interaction support.

This approach prioritizes human needs by enhancing accessibility, building trust through smart matching, and fostering social connections - key elements for enjoyable group hiking experiences.

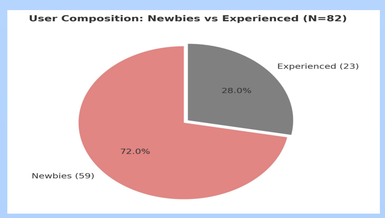
3. DSCOVERING REQUIREMENTS

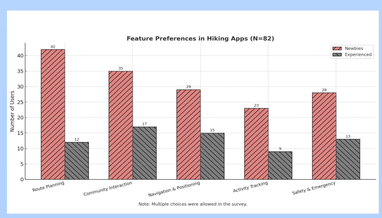
Design Process

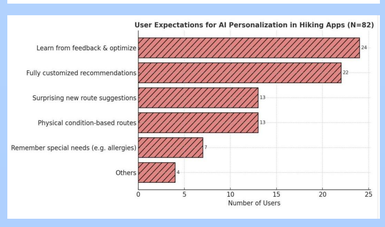
We conducted a semi-structured many-to-one interview involving four hiking enthusiasts. In addition, we distributed an survey containing both open-ended and closed-ended questions, from which we collected 82 valid responses.

Requirement Analysis

Below, we present the data collected from the online survey:







Scenario

Persona

When Lily came across a poster featuring a breathtaking golden ginkgo forest during her walk, she was instantly inspired to hike there. After exhausting her search efforts but still failing to find the desired results, she turned to HIKIGO, the AI-powered hiking app she recently downloaded. By uploading the image through the app's Smart Route Planning feature, the AI promptly identified the location as Ginkgo Valley near Mount Moganshan and generated a personalized hiking plan. Guided by the AI, Lily successfully completed her dream hike and later shared her experience, inspiring fellow hiking enthusiasts.

User Functional Requirements

1.Offer AI-powered, personalized route planning tailored to individual hiking skills and preferences.
2.Provide multiple route plans for the same trail tailored to different user profiles and hiking preferences.
3.Continuously improve route suggestions by learning from user feedback and hiking history.
4.Provide real-time safety evaluations and environmental updates to ensure secure hiking experiences.
5.Support intelligent teammate matching for group hikes with similar experience and goals.
6.Recommend scenic points and gear based on route characteristics.

7. CONCLUSION

HikiGo revolutionizes hiking through AI-driven route planning and socially intelligent guidance, though current technical constraints include device compatibility requirements and uneven geographical coverage.

Future Work:

- Immersive AR trail markers.
- Accessibility-first navigation (bone-conduction/haptic).
- Eco-scoring for sustainable trails.

4. METHODOLOGY

Design Process

Our interaction design follows the interaction design lifecycle model, iteratively performing four basic activities. To describe the requirements, we created an atomic requirements shell and a persona. Through weekly meetings, we define the requirements space, covering functional, non-functional, data, environment, and user requirements.

In data collection, we conducted questionnaires and interviews, designed open-ended questions[2] and closed-ended questions to obtain a wide range of input. To ensure that the system effectively meets user needs and project objectives, we explore a variety of design options and evaluate the system.

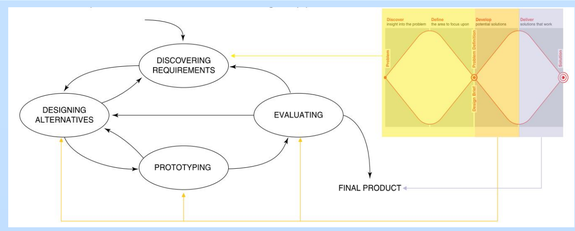


Figure 1 Interaction design lifecycle model[1]

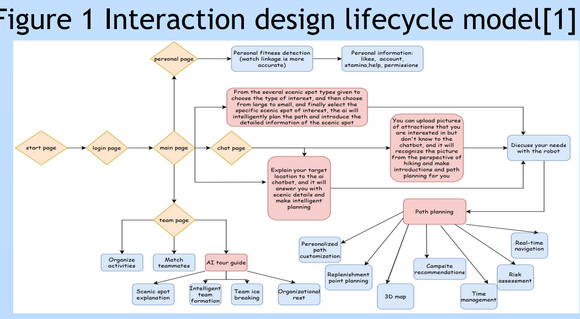


Figure 2 Software interface structure diagram

Iterative process

We adopted the evolutionary prototyping method and pilot study, carried out two rounds of iterative optimization on the hiking software. The whole process strictly follows the four methods of demand acquisition (observation, interview, questionnaire survey, data analysis), according to the user needs of the interview and survey analysis, to ensure that the product is always evolving around the real user needs.

Version	AI-Powered Route Recommendation	AI Hiking Assistant	User Experience Optimization
Iteration I	Upgraded AI interaction system: Expanded from text-only to multimodal interaction (image/voice). Uses learning algorithms to accurately understand user intent, combining environmental data and personal preferences to deliver precise personalized route recommendations.	New AI tour guide feature: Machine learning generates personalized guiding services. Handles team formation, ice-breaking, conflict mediation, and role assignment initially; provides real-time member tracking and proactive safety alerts during hikes.	Redesigned core homepage with intuitive UI. Elevated AI planning function to primary visual module. Streamlined workflows significantly improve feature discoverability and interface readability for effortless core function access.
Iteration II	Added wearable integration: Continuously monitors vital signs, using AI fitness algorithms to dynamically adjust route difficulty and pace. Combines real-time physical data with historical patterns to deliver scientifically optimized route suggestions ensuring safety and comfort.	Enhanced AI guide: Added context-aware scenic explanations and image recognition commentary with voice prompts. Introduced "rest coordination" - privately request breaks via AI to intelligently adjust group pace while maintaining harmony.	Upgraded guide interface: Visual guidance system with dynamic indicators reduces cognitive load. Community UI: Implemented preferred card-style waterfall layout.

Table 1 Process of three iterations

5. DESIGN ALTERNATIVES AND PROTOTYPES

Feature

Logo design: warm and friendly style, the letter "O" use a map location icon. Reflects the navigation function.

AI Route Planning (Figures 2-9): For users without a specific destination, our app offers various hiking location options. After selection, they're directed to an AI chat for detailed planning. Users with a clear location in mind can directly communicate with our AI, which provides conversation prompts and generates personalized hiking routes based on the user's fitness level and goals.Final route recommendations are shown in Figures 8 and 9.

AI Guide (Figures 10-11):AI creates personalized guides based on user preferences. Users can select alternatives or customize settings. During hikes, AI provides real-time guidance and information about points of interest.

Team Formation (Figures 12-16): Team Building function matches users for group hikes where AI serves as icebreaker, leader, and safety officer.

Community (Figure 17): Users share photos and experiences.

Personal Page (Figures 18-19): Allows fitness testing via connected watches and viewing detailed stats. Users can also check their historical travel experiences.

These features create a comprehensive solution addressing both practical and social aspects of hiking.

Prototype

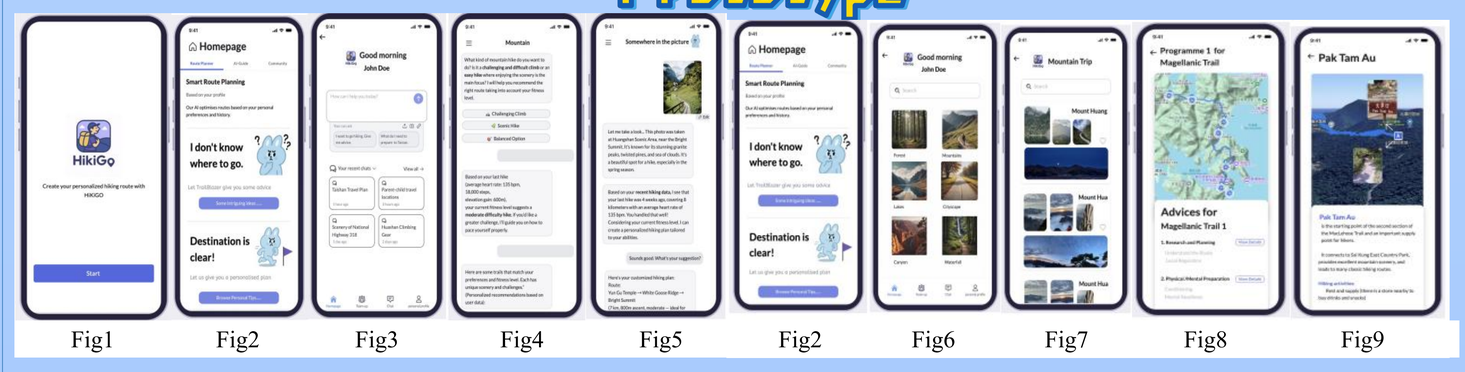


Fig1 Fig2 Fig3 Fig4 Fig5 Fig2 Fig6 Fig7 Fig8 Fig9

Fig10 Fig11 Fig12 Fig13 Fig14 Fig15 Fig16 Fig17 Fig18 Fig19

6. EVALUATION

We used a triangulated evaluation combining heuristic evaluation, 12 user interviews, and 48 survey responses to assess usability and user needs.

key findings

Users praised the intuitive interface and AI-generated personalized routes. Quantitative data showed that ease of use reached 77.6% and overall satisfaction was 73.4%, aligning well with the positive qualitative feedback. AI guides and group trekking promoted social inclusion.

Experts recommended exploring augmented reality (AR) features, allowing users to visualize waypoints, historical landmarks, and ecological information directly through their devices—further enriching the trekking experience.

Younger users, particularly those under 25, expressed a preference for simpler, more relatable language in both the interface and the AI assistant's communication style. Some suggested integrating visual storytelling elements and emoji-based cues to make navigation and interactions more engaging and accessible.

Human-centric impact

Our app improves accessibility, enhances user experience, and supports inclusive, personalized trekking by adapting to diverse user needs and promoting social connection through technology.

REFERENCE

[1] Sharp, H., Preece, J., & Rogers, Y. (2007). Interaction design : beyond human-computer interaction (2nd ed.). Wiley
[2] P. Hadler, "The Effects of Open-Ended Probes on Closed Survey Questions in Web Surveys," Sociological Methods & Research, vol. 54, no. 1, pp. 106–139, 2025

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