

Meari: Interactive Smart Screen Designed to Tailor Personal Hiking Routes

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1. Introduction

Hiking is a popular outdoor activity in Korea. In 2021, 35,902,000 visitors visited the Korean National Parks (National Park Basic Statistics, 2022). As social distancing measures extended for prolonged periods, and travelers sought to minimize contact, traveling patterns changed to be more individualistic, where travelers sought hidden destinations, moved in small groups, and increasingly sought nature and tranquil scenery. In this rise of numbers, it is interesting to note the growing number of hikers and also the steady record of safety accidents. There is a need to incorporate digital tools to strengthen their capability to efficiently manage park resources and derive insights to better operate their park facilities and services (Korea National Park Research Institute, 2021). Our research aims to explore the hidden needs and common hiking behaviors of these relatively young hikers and ultimately derive a design solution to provide a better hiking service to the young hikers.

2. Related Works

The Korean National Park Service implemented various policies such as the ‘Trail Grading System’ and ‘Trekking Time Restriction Policy’ to prevent and reduce the number of safety issues (Cho & Sung, 2015; Shin et al., 2011). However, these policies and facilities faced limitations. The current Trail Grading System focuses on the upper slopes of the trail, and research studies point out the need to look at the trail in its entirety from its surroundings (Park et al., 2020). As of now, the park does not have sufficient facilities to reflect the increasing numbers of hikers who prefer to hike in solitary, especially during the times of the pandemic. Previous studies have presented development of technologies that can possibly assist hikers. On top of maps, location-based navigational technology was often implemented (Juhlin & Weilenmann, 2013). since finding the correct route grants a safe and fulfilling hiking experience. Furthermore, there are technological approaches that foster one’s hiking experience such as providing algorithm-based individualized route (Calbimonte et al., 2021; Pitman et al., 2012) and even analyze visitors’ hiking patterns through volunteered geography data to provide better recommendations (Goodchild, 2007). In case of applications, there have been apps that focus on featuring famous mountains such as EveryTrail, Ola, and SanGoMante, or allow users to record their own hiking experiences such as Rambler and Relive. However, these applications have a commonality that they all require cellular data and contain overloaded amount of information that a user may find it hard to seek appropriate data for their preferences.

3. User Research

3-1. In-Depth Interview

The target sample for this interview was active hikers, and here ‘active hikers’ imply those who go hiking on a frequent basis. Total 14 hikers participated, with a mean age of 25.2 (3 Female and 11 Male). Interviews revealed some common behavioral patterns of the active hikers. First one was taking pictures. Some shared pictures on Instagram, and some just kept it to themselves. Also, common motivation for hiking was a sense of accomplishment and healing. Users tended to care a lot about safety due to common fear of natural disasters and accidents as well, but at the same time many found the process of exploring exciting. However, this was under the condition that they were on the right track while hiking. To organize interview insights, we used an affinity diagram (Figure 1).



[Figure 1] Affinity Diagram for Interview Insights

3-2. Field Study

In order to observe behavioral patterns mentioned in the interview, we conducted field study and on-site unstructured contextual interviews to observe the actual user journey and gain additional insights. Two active hikers (Male, age 26 and Female, age 26) – active hikers defined as those who go hiking on a frequent basis –, one hiker who goes hiking once or twice a year (Male, age 27), and one researcher who observed and asked questions to participants went hiking together to Ansan Mountain. The hike approximately lasted one hour. A notable common behavior was that the participants read every signage they came across. They mentioned how they like reading official information provided through these signages and enjoyed a sense of entertainment through its viewpoint and history guide as well. None of the participants took pictures during hiking but just took pictures when they arrived at the top as sort of a proof shot and record. With these insights, we proceeded with a solution ideation. Through a discussion and voting, we narrowed down into building a smart screen based on user’s frequent mention of on-site guidance and need for personalized information, while a smart screen could be implemented at the mountain site and display information on the monitor without additional internet connection required from the users.

3-3. Idea Verification Workshop

After the medium of the solution was decided with few ideas listed for functions, we conducted a participatory design workshop to identify how potential users would view our solution design. Using Mural online software where it enables real-time online whiteboards with sticky notes, four participants and two moderators participated. All participants were active hikers and were recruited through

convenience sampling (2 Male and 2 Female). Taking turns, participants talked about their pain points and needs in hiking experience. Overall, all users had a positive reaction towards the idea of an interactive screen located at the entrance of the mountain. The functions that got the most votes were two functions: trail builder and monitoring distance and approximate time spent on the course. The function that got the most votes after these two functions was key spots, which shows famous spots or viewpoints. Users' interests mainly centered on hiking courses and customizing them with necessary information such as distance and estimated duration.

4. Prototype Design

With the insights gathered from step-by-step user research, we found that personalized customization for hiking courses to be the center of users' interests. To meet this user need, we narrowed down key functions of our solution to provide trail recommendation and customizable trail building. We made a solution prototype using Figma and Protopic. The solution design is named 'Meari' which means echo in Korean, in a form of on-site interactive screen that will be placed at the entrance of the mountain as shown in Figure 2.



[Figure 2] Smart Interactive Screen Meari

It provides two main functions of trail recommendation and trail building, with an additional function of providing real-time information on hiking roads and weather conditions. In order to maximize usability and simplicity of the service, we built the user interface as simple as possible and included instructions on each function for better user understanding. First, the trail recommendation, which is labeled as 'Course Recommendation,' a function that provides recommendations for hiking trails according to individual preferences (figure 3). When the user chooses the preferred hiking features including hiking level and expected duration, Meari recommends several hiking trails options that best fit the selected preferences.



[Figure 3] Course Recommendation Function

Second, the trail building function labeled as 'Build my own trail' allows users to build one's own hiking course (figure 4). The starting point would be set as the current location of Meari as a default, but users can select to change their starting point. Then, users can build one's hiking course step by step, selecting where to go between the two trails that are divided by a crossroad.



[Figure 4] Trail Building function

5. Discussion

Through several steps of user research, there were notable pattern of users throughout the study overall. We noticed that there was a common need for customized and personalized information, more specifically on hiking trails. This ultimately reduced hikers' stress on planning phase and concerns for injuries. Meari targets both segments of users who are familiar with the mountain and who are not, by providing both recommendation and customizable trail building functions. Meanwhile, general information on mountain such as weather and closed roads were essential for users as well and were repetitively mentioned since it affects availability of the hiking activity itself. For designing solution, intuitiveness of the function and visualization for the hiking course were crucial for both usability and usefulness.

6. Conclusion

While the popularity of hiking keeps increasing, there has been a lack of studies specifically aiming to discover user's unsatisfied needs. This research conducted multiple steps of user research in order to first track down the common hiking behavioral pattern, then find user needs and pain points that could be solved through technical approach. Although it has a limitation that it has focused mostly on users with their age in 20's and 30's. Our solution Meari provides hiking course recommendations and user-customized trail building functions which would assist hikers to find a perfect hiking trail for them. Overall, results from our user studies and design implication showed that hikers wanted specific information on hiking courses that suits their preferences.

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