

Optimize AllTrails Route Visualization and Planning

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1 INTRODUCTION

During the holidays, hiking somewhere, enjoying a short rest or seeing some beautiful scenery is the first choice for many people. Before they conduct their hiking, there might be tons of preparation work they need to do, especially for experienced hikers. Specifically, they might search online by google many trip websites, seeing the destination comments, seeking comments and checking the specific routes, getting the latest news or the contact method of journey destination and so on.

One of the websites they might visit is “alltrails.com”, which is also what we concentrate on. There are few problems existing in the website. First, the users can't know the mountain condition in different weathers. Then, it lacks time and official calorie suggestions for downhill users. Last, there are no emergency warnings on the website. Therefore, to get a better schedule, the users need a way to estimate the hiking time consumption. Then, to be safe, the users also need a way to understand emergencies, such as the weather change or the traffic condition. What's more, the users also need a way to familiarize the route, such as obtaining the specific information of the destination.

Our research goal is: How can we help experienced hikers to plan their route suitably and personalize their hiking experience? The target users are the experienced hikers. We are working on “User Control and Freedom” throughout the project, which is an important usability-related problem. [1] It will illustrate more about the specific details and generate processes.

There are few reasons that the project is important and meaningful. The first and the most important is, everyone puts safety into the highest position. With the help of VR, which was added in our new design, users could see the dangerous view ahead more clearly, which would be helpful for them to have a further hiking exploration. Then, it is helpful for users to do the knowledge sharing. For example, we achieve this by adding the interesting list, which would show in the demo of the paper. Hence, it's easier for the users to find the higher interesting point when hiking.

Our new idea is to provide users with a VR simulation tour function of scenic spots to make up for the lack of information provided by the original website. Existing applications usually use maps and landmarks to show users routes, which contain less information, and users cannot know the location of dangerous places. After our optimization, the website gives the users a more intuitive experience. For example, we added VR functionality to users, enabling them to provide more route details and allowing users to plan their trips in advance. At the same time, we have increased the sharing function between users, allowing hikers to browse the hiking experiences shared by other users on the website. For a certain route, hikers can also browse dangerous places or interesting places shared by other users. Additionally, through the real-time update of the website information by the user groups, the new application will provide the latest information on dangerous locations, ensuring the safety of hikers to the greatest extent.

2. USERS

Our target users are experienced hikers who have four years or more hiking experience. Through observing and interviewing users, we have obtained a user need statement: users need a way to familiarize the route in advance to avoid getting lost and other potential hazards. And we also got some interesting insight from user research:

- Senior hikers are more inclined to challenge difficult locations.
- Even if other people's photos are of little help, hikers are still happy to view other people's photos for reference.
- For senior hikers, what they are most concerned about is not the most recent comments but the comments from the same period last year.
- When arriving at a famous location, the most annoying thing for hikers is finding a parking space.
- Hikers are likely to share their hiking experiences through social networks.
- Participants find VR useful for finding parking

places.

- People who used the website before are more familiar with the website.
- We have added many navigation buttons between pages in the design, but users still think that our design lacks mutual navigation or mutual pointing buttons between pages.
- Two users had different opinions on the map icon. One thought it was a good idea to add a dangerous list to the map; the other thought it would make the map too complicated.

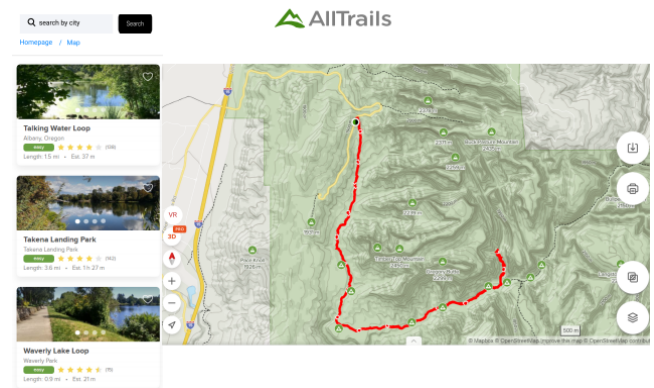


Figure 2. Map page

3 PROPOSAL APPROACH AND UI

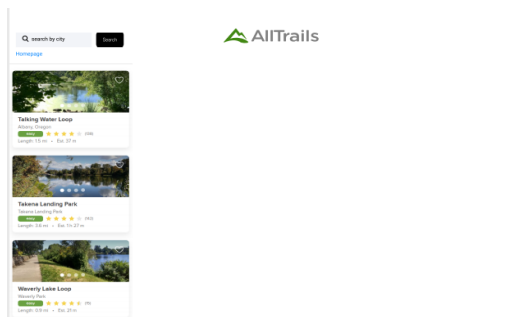


Figure 1. Initial page

The map page (see Figure 2) that provides users with route information. In the lower right corner, there is a "Routes" button that allows users to freely choose a route and evaluate the route. This page was designed based on Heuristics' Use control and Freedom [1]. In user testing, it is easy for users to back out of a page, which allows them to remain in control of the system.

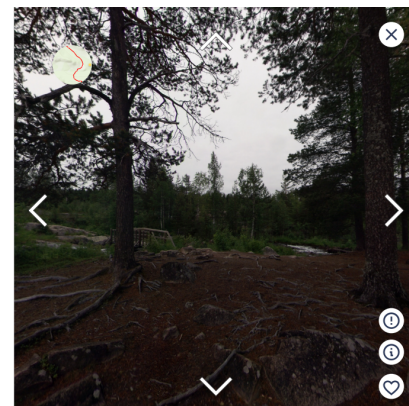


Figure 3. VR page

From the initial page (see Figure 1) of our function, users can enter the map page through the recommendation page on the left, or search for the target location using keywords in the search bar and enter the map page through the search list (see Figure 1-1). Our design is based on the Consistency and Standards Heuristic design principle.[1] According to our observation, users used this page very smoothly, which indicates that our design is in line with their user habits.

Users can access VR devices to browse the simulated surrounding environment (see Figure 3). There are four small features on this page: mini map, danger list, interesting list, like. Users can use these functions on this page and click the "X" in the upper right corner to end the VR journey, after which the time and calorie consumption of the trip will be shown to the user. This page was based on Consistency and standards design principle[1]. We used common icons to prompt the user with hazard lists and interesting lists.

4 ITERATION

#1. Added the interesting points function.

The experienced hikers may also be interested in sharing the interesting points, which are based on the oral presentation feedback. Apart from the dangerous list, we learnt that the audience may also have the function because finding the interesting scene is also one of their hiking activities.

#2. Reduce the multiple layers to solve the completed navigation issue.

According to “#7: Flexibility and efficiency of use”, we think users may be more clear about where they’re by incorporating function and lessen the number of pages by reducing the layers.

#3. Added the “recommandation rate” hints when choosing different routes.

In the routes page, the experienced hikers may be confused about whether it stands for route recommendation or hardness level, which is consistent with #1: Visibility of system status.

#4. Added a “favorite” function in the VR maps.

Since the experienced hikers may be concerned about the different conditions of the mountain route and miss the important notifications or warning after close the exploration. It is a better experience for users since they are not worried about losing the connection with the hiking place.

#5. Added the 360-degree photo perspective in the VR pages.

Since the experienced hikers may want to see the same place from different directions, it may also be the reason why experienced hikers choose the websites because of the specific feature. Furthermore, it offers a new way for experienced hikers to plan their routes ahead, which is consistent with the “#2: Match between system and the real world”.

5 USAGE SCENARIO

To test the usefulness of our design, we are going to create a character and make him the main character of the scene. This character is called Mike, who is a 25-year-old graduate student in electrical engineering. In addition to his studies, he likes outdoor activities and has 5 years’ hiking experience.

Now Mike plans to go hiking in bachelor mountain during the summer vacation, but he has never been there. He is worried about the danger he might encounter during the

hiking, so he uses the new feature of Alltrails to get some insight into bachelor mountain. First, he opened the Alltrails website and typed "bachelor mountain" in the search bar, as shown in Figure 1. After entering the map of bachelor mountain, the map showed that there are two routes, and Mike clicked the "Routes" button, and the scores and profiles of each route were displayed on the screen (see Figure 4).

Mike chose Route 1, which had a higher score, and then clicked on the VR button, and after confirming that the VR was safe to use, Mike entered the VR page, as shown in Figure 3. He browsed the environment around Route 1 in the VR page and clicked on "Dangerous List". A window popped up on the screen, showing all the dangerous locations in Route 1, with their locations marked. One of them warned of a slippery road and be careful of falling down. Mike decided to buy a new pair of slip-resistant shoes. At the end of the VR tour, the page shows the approximate time and calories spent on the hike (see Figure 5), and Mike modifies his original travel plan based on this value. Now Mike is confident that it will be a safe and wonderful hike.

Link of video:

https://media.oregonstate.edu/media/t/1_9748g4oc

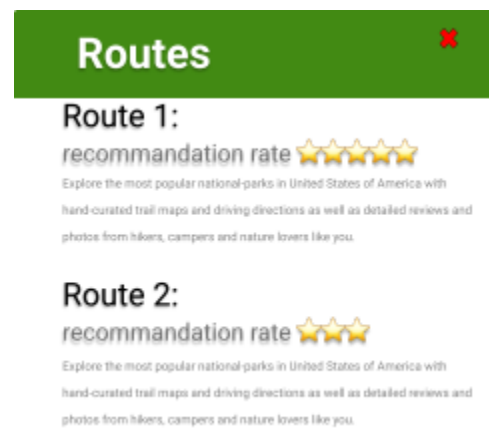


Figure 4. Routes Choose

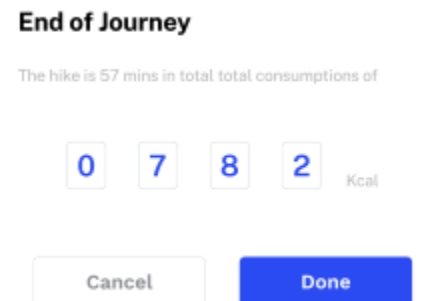


Figure 5. End of Journey

6 DISCUSSION

We have added a VR function to AllTrails, which gives experienced hikers enough information and helps them avoid danger during hiking. We used Figma to design the prototype of the VR function. However, due to our unfamiliarity with Figma and limitations, We cannot realize many users' familiar operations and expected functions.

In addition, we found many areas for improvement based on the second user evaluation. For example, we found that users can quickly complete exploration through the second user test by clicking and blank areas. Apart from putting ourselves in the user's role, we also consider the user's habits. Furthermore, based on interviews with participants, we learned that our text size and color would make it difficult for a few people, such as the disabled to read. Unfortunately, due to our insufficient number of participants, we could not obtain more user experience data. Therefore, we can expand the number of participants or enough data to improve the interface design.

After the second user test, some interface issues, such as font size, were resolved. In the future, we will conduct another user test based on the latest changes. Also, we will expand the number of participants to obtain more data. After analyzing the user experience and making changes to the interviews, the new features of the Alltrails website will be more complete and more convenient for experienced hikers.

7 CONCLUSION

This project developed a VR feature based on the AllTrails website to help experienced hikers get familiar with the trail and avoid hazards in advance. First, we interviewed and observed three experienced hikers. Based on the results of the interviews and feedback, we developed a figma prototype. Then, we invited the interviewees to use our system to conduct their further interviews and observations. Later, we optimized the prototype based on the problems they encountered while using it. Our optimized AllTrails

website starts with a list of different routes for the user, the users can observe the hazards along the route as well as the interesting scenery through VR after selecting a route. After completing the simulated hike, the site will give key information, such as time and calorie consumption. Based on our observations of respondents, we believe our prototype has initially completed our aim. In the future, we plan to develop web pages that integrate our VR functionality into a simulated hiking system with high-fidelity prototype and make an improvement of the designed interface based on more user studies.

8 CONTRIBUTION STATEMENT

Shih-Chao Hung: Improve digital prototype, fix bugs, provide key ideas for presentations and papers, part of speeches.

Xingjian Su: As the team leader, I allocated time for the team to meet; the video part of this project; provide ideas for presentations and projects; writing for USAGE SCENARIO and UI; part of the speech.

Qingxiao Yuan: iteration written & majority introduction written & idea contribution & proofreading of this paper, part of speeches.

Miao Zhou: Improve figma prototype, conclusion & proposal approaches and UI of project 7, part of speeches.

9 REFERENCES

- [1] Jakob Nielsen. 10 Usability Heuristics for User Interface Design. Retrieved June 6, 2021 from <https://www.nngroup.com/articles/ten-usability-heuristics/>