Supporting Interactivity on a Ski Lift

Anton Fedosov

Università della Svizzera italiana
Via G Buffi 13
Lugano, 6900, Switzerland
anton.fedosov@usi.ch

Evangelos Niforatos

Università della Svizzera italiana
Via G Buffi 13
Lugano, 6900, Switzerland
evangelos.niforatos@usi.ch

Florian Alt

Ludwig-Maximilians-Universität
LFE Medieninformatik
Amalienstr. 17
München, 80333, Germany
florian.alt@ifi.lmu.de

Ivan Elhart

Università della Svizzera italiana
Via G Buffi 13
Lugano, 6900, Switzerland
ivan.elhart@usi.ch

Abstract

Today, a wide variety of technologies and devices are available for skiers. Those gadgets perform a number of tasks to improve the overall skiing experience, such as collecting personal performance data, recording memorable moments, or assisting in communication with group members. In this position paper we outline our empirical findings from unstructured interviews with skiers and ethnographical observations during several field trips to skiing resorts. In particular, we aim to understand the challenges and opportunities of using personal and situated devices on a ski lift. Based on the findings, we discuss appropriate interaction techniques and propose possible applications that could support user needs and enhance the overall skiing experience.

Author Keywords

Outdoor sports; skiing; interaction; public displays.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Skiing is a fascinating outdoor activity that brings people together to the mountains – not just to enjoy great views but also to catch up with friends and to carry out physical exercises while sliding down the slopes. Skiing is a social activity and people with the same level of

expertise often form groups among friends and acquaintances to spend the day.

HCI researchers provided some examples of how technology interventions can augment skiing activity. In particular, their focus was on improving performance and style [4], supporting social interaction [7], and decision making [2]. Pfleging et al. provide an overview of technology use during skiing, presenting evidence about the ubiquitous penetration in the mountains [6].

In this paper we take a different perspective, focusing on how technology could be used to bridge *idle times* while skiing, e.g., on the lift. We argue that in such situations it is not only easier to catch a user's attention and interest, but users are also more likely to engage. This is similar to waiting situations in front of screens deployed in public spaces [5]. A major difference, however, is the fact that in skiing lifts, people are much more constrained (e.g., compared to walking around at a bus stop), in general less objects in the visual field of view distract them, and people are almost always in groups (compared to commuters). Hence, we argue that findings from prior research in public displays cannot easily be applied. At the same time, there is the opportunity to investigate complex content and interaction techniques that require the user's attention and it provides a fertile ground to investigate multi-user interfaces. Researchers, however, need to keep in mind that still a tangible social benefit needs to be provided for the user [1].

Empirical observations

At the outset of our research, we conducted ethnographical observations at a ski resort in Austrian Alps during one week in late January 2015. Aiming to assess technology interventions during skiing vacations and, in particular, during *idle times* we have interviewed twelve participants, ranging from 23 to 45 years of age. Their self-reported skill level of skiing varied from "intermediate" to "advanced". We have documented our findings in the form of notes, recorded interviews, and pictures. Additionally, to refine our observations, we went to a second ski trip in a French Alps resort in early February, where we have recruited seven experienced backcountry skiers (25-31 years of age) and organized a group interview to identify their information sharing practices while skiing [3]. All participants owned a smartphone and routinely used it on a daily basis. We recorded all sessions using a voice recorder, and later transcribed the footage verbatim. Two researchers applied grounded theory approach and employed an open coding technique to analyze the collected qualitative data.

Types of ski lifts
There are three common types of ski lifts available at skiing resort: a gondola lift, a chair lift and a T-bar. The former two are promising for potential technology interventions, since users sit there comfortably with no need to balance own bodies in order to reach a summit. At chair lifts a horizontal bar is set up for safety reasons. The handle of the bar sometimes has a mounted billboard that shows a ski map of the resort or, more frequently, static advertisement as shown in Figure 1.

Activities on the ski lift
During our ethnographical observation and interviews we have discovered that the time during a ride on a ski lift is spent in different ways: fellow skiers are chatting, texting, making phone calls, taking pictures of a landscape, discussing a next move, consulting a resort ski map, sharing impressions of a previous run, listening to

Figure 1: Currently the space on the safety bar is used for placing advertisements.
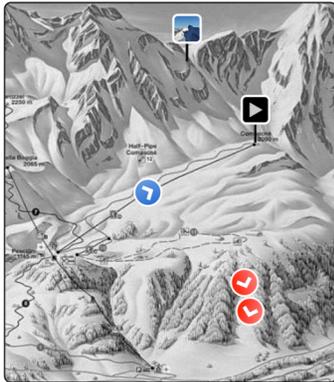
Figure 2: Proposed UI of the public display app on a ski lift, featuring location and heading of individual skiers in the same group, their captured photos and videos on the interactive ski resort map. First, the app detects the presence of mobile devices on the ski lift with installed mobile counterpart application that transfers images, videos, and location data. Second, the transferred information is shown on an interactive map where skiers can preview content. Third, skiers can share content shown on the map to online social platforms through the connection on their mobile phones. Finally, when skiers leave the ski lift, all content from the display app is removed. Background image source: authors' personal photo of resort map.

music, looking up some reference information or just resting. When asked what they would like to do during an ascent if they had an interactive public display available at a ski lift, participants came up with several ideas. These included watching video clips, locating friends at a resort, sharing pictures, reviewing their to-date ski performance, and looking up their traversed paths on an interactive ski map.

Interaction challenges
All participants reported that it was rather inconvenient to take off ski gloves on a chair ski lift, in particular on a cold day, to interact with their smartphone. Due to a projective capacitance technology used in modern touch screens an electrical conductor is required to perform interactions. Designers of applications for ski lift ride should take this "glove problem" into consideration and explore alternative technologies (touch interaction with gloves-on) or interaction techniques (e.g., mid-air gestures). Manufacturers of winter sport devices tackle this problem by introducing a dedicated physical remote controller to interact with a gadget while wearing gloves (e.g. GoPro camera, Recon Snow 2 goggles).

Application Ideas for Public Displays
Based on the interviews with skiers and ethnographical observations from two ski trips, we identified several types of display applications for a ski lift that could be combined with existing advertisements: entertainment applications, recommendation applications, reference applications, and sharing applications. However, in this position paper we concentrate on sharing applications. Sharing applications allow skiers to view and share their own content from personal devices on a larger screen. These applications could show skiers' personal statistics, traversed paths, images and videos taken

using mobile phones and camcorders. Also, these applications could allow skiers to upload these data to online social media platforms directly from the ski lift display. In addition, the applications could provide a personalized navigation (when changing slopes and ski lifts) and help share own location to other fellow skiers. In the remainder of this position paper we report on ongoing work with regard to sharing content with other co-located skiers in the ski lift and remotely located friends online. Ultimately, we propose a display prototype (Figure 2) that will enable skiers to view and share their own content on a ski lift.

Towards a Sharing App for Ski Lifts
We propose to mount a tablet on a safety bar that is currently used for showing static advertisement. We plan to allow skier to automatically transfer images and videos taken on the ski slope to the tablet using a Bluetooth connection without taking their phones from the pockets. The initial connection can be established through a mobile app installed on the phone. The mobile app can be also used to access the files and connect to the social media applications. Using a Bluetooth connection the tablet can get additional ski preferences and information about locations of fellow skiers. In addition, a more open content sharing is possible through direct connection of the tablet to online media servics such as Instagram. We plan to show all available information on an interactive map on the tablet and provide an option to interact with the map (preview and share images, videos, and location) using a Leap Motion device and simple gestures. In this way, skiers can interact with the tablet while still wearing their gloves. We plan to evaluate our proposed prototype on a real ski lift using semi-structured interviews. However, we see a number of requirements and challenges that need

to be met for such a deployment and evaluation. First is predicting the duration of interaction. Similar to other micro-entertainment applications, the duration of interaction needs to be adjusted to the length of the ride. A chair lift ride is typically ranging from 3 to a dozen minutes or more. This is challenging since operation is frequently interrupted to ensure safety of people boarding and leaving the lift (e.g., children or novice skiers). Second is identifying the end of interaction. The application needs to ensure that users can safely exit the lift, either by providing an explicit hint on the screen or turning it off. This moment can also be used to obtain feedback from participants or show a quick advertisement. Third is data gathering. Operators need to give permission and consent needs to be obtained from skiers. While quantitative data can be gathered from using the screen, it would be interesting also to interview people. However, once off the lift, users' motivation to provide feedback may decrease rapidly. Hence, feedback could be gathered during a later ride.

Future Work

In a subsequent work, we plan to investigate social "negotiation" and behavior that the skiers will exhibit when interacting with a tablet mounted on a chair lift's safety bar. Particularly, we will focus on the way skiers will use a sharing app for reviewing their captured content and for sharing it amongst their peers and on social media. We expect that despite privacy concerns, skiers will still perceive the sharing app as a useful, resourceful and convenient way of sharing that conserves energy and mobile data costs as well as, provides a larger area for content review. An initial step toward this would be to evaluate our design idea with different group of skiers in order to see how this application meets their sharing needs during a lift ride.

Conclusion

In this position paper we introduced the concept of bridging idle times on ski lifts with public displays. We reported on data gathered from 2 field observations and sketched possible applications.

Acknowledgements

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