
Be With Me: An Immersive Experience for Long Distance Couples

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Abstract

Many long distance couples use video communication technologies to stay connected, yet it can be hard to get a detailed understanding of the remote partner's location and experience. We propose an immersive experience sharing system designed for long distance couples. This system will provide access to a 360-degree view of a partner's environment with an independent perspective of the remote view. We expect couples to use the system for sharing their daily activities, experiences, and an understanding of each other's physical space. However, it is unclear of what the nuances of these shared experiences will entail and how we should design such a system to support various appropriations. We explore these topics in our position paper.

Author Keywords

Appropriation, immersive.

ACM Classification Keywords

H.5.1. Information Interfaces and Presentation (e.g. HCI): Multimedia Information Systems

Introduction

Couples stay connected on a regular basis by relying heavily on communication technologies like text messages and phone calls. They also talk about their

daily experiences when they meet each other in person [6,10]. Yet some couples are separated by distance, which causes computer-mediated communication to become critical for maintaining their relationship [1,10]. Video communication technologies are now becoming a popular tool for supporting such needs [10,13]. They support face-to-face conversation that allows long distance couples to share their facial expressions, gestures, and voice. However, the challenge with these systems is that their design tends to suggest and support conversations as the sole use of the system when, in reality, couples may wish to do far more over a video connection.

For these reasons, we are proposing the design of a mobile video communication system called Be With Me that supports a greater sense of *collaborative appropriation* amongst long distance partners. By collaborative appropriation, we are referring to the manner in which the users can explore and use the system in a way that makes sense to them to support a range of user-selected behaviors and activities [5]. In our case, the collaborative aspect comes from the negotiation, conversation, and rhythm between long distance partners that defines in what ways they adopt and use the system over time.

People often adapt and use technology around them in ways that designers never envisaged [2]. Appropriation is a common phenomenon for new technology use and seen as an important sign of users' acceptance towards technology [2]. Yet as designers, it can be difficult to envision how users will appropriate and adapt a new technology: "designing for appropriation is often seen as oxymoron; it appears impossible to design for the unexpected" [3]. We expect couples for sharing

experiences such as walking, hiking, sightseeing, shopping, and other day-to-day activities, which the couple would normally do together if they lived in the same location, will use our system. There might also be other needs or experiences that we have not thought about and couples might appropriate our technology for such purposes. In the remainder of this paper, we describe how we plan to design our system to support a range of behaviors and uses.

Related Work

Many couples rely on video communication to stay connected [6,10,11]. Video communication tools are increasingly important for connecting couples over distance and even increases feelings of closeness [2], build trust, and improve relationship satisfaction [3]. Research has shown that some couples even use open video links during the evening to connect one another and simulate shared living [6,10,11].

Video communications are now occurring in settings outside of the home such as for major life events including weddings, parties, and funerals [11]. People may even make video calls during shopping, touring locations, and sight-seeing [12,14]. Research has shown that mobile cameras can be challenging to use for such activities and require extra efforts by the cameraperson to provide a good view of the remote location [7]. Earlier attempts to provide a wide field of view [4] of the remote person's environment have identified concerns around image quality, frame rates and expensive hardware [8,9].

Overall, our research builds on the related work carried out by researchers to understand how couples make use of a video communications technology that allows

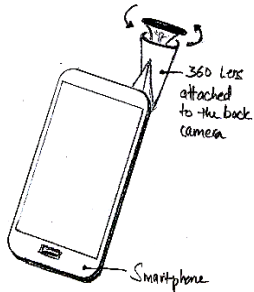


Figure 1: Smartphone with Lens to capture the 360 view

them to stay connected throughout the day, indoor or outdoor, in an effort to maintain their relationship, feel connected and share their daily life activities and experiences.

The Design

Our goal is to immerse distant partners into each other's remote location so they can feel a greater sense of presence and better understanding of each other's physical environment. We plan to support this goal by using a Smartphone and transforming it to a head mounted display with the help of an inexpensive mount like Google Cardboard along with affordable hardware to capture the 360-degree view using their Smartphone.

The partner sharing his/her view would simply attach a 360-degree lens to their Smartphone to share their environment as shown in Figure 1. The partner viewing the remote context will see the 360-degree rendered view on a mobile screen. This partner would be able to move and pan in the remote context with the help of gyroscopic sensor (measures rotational motion and orientation changes of a device). This will allow the viewer to understand and explore their remote partner's view with an independent perspective. This view can be converted to a stereoscopic view using the Google Cardboard mount as shown in Figure 2. This mount transforms the mobile screen into a stereoscopic view. This will provide the user with a more immersive effect, as they would now pan and move their head to render the remote partner's view. It would give them the feeling of actually looking around in their own physical space to explore the remote context.

We plan to support appropriation by long distance couples through the inclusion of two setups within the system:

1) One-Way Immersion: In this setup, only one of the partners is sharing his/her shared experience with the remote partner. The remote partner will be using the Google cardboard mount with their Smartphone while the other partner will be using the 360 lens with his/her Smartphone and streaming the video to the remote partner. We anticipate this will help couples collaborate in situations where only one of them wants to share their experience, observe or view activities. Appropriation will take place when couples try to use our system in different ways, various contexts and for various kind of activities, unimagined by the designers, to share their experience. They might adjust the lens orientation to get a better understanding of the shared context. They might use it for indoor or outdoor experiences. The remote viewer would have the flexibility to either view the context on a mobile screen or on a head mounted display.

2) Two-Way Immersion: In this setup, both of the partners will be using Google Cardboard and a 360-degree lens simultaneously as shown in Figure 3. Both of them will be streaming video to each other and viewing each others environment. This mode may be used when both of the partners are doing some activity and want to share their experience simultaneously. We anticipate couples will use this mode when both of them are involved in a similar activity.

In both of these modes, the partner viewing the immersive environment may not be aware of his actual surrounding as they would be wearing a head mounted

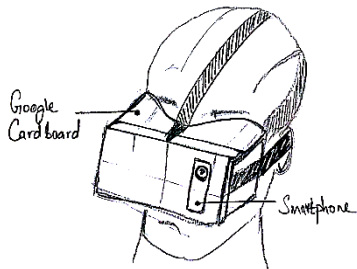


Figure 2: Smartphone with Google Cardboard to view the 360-degree view.

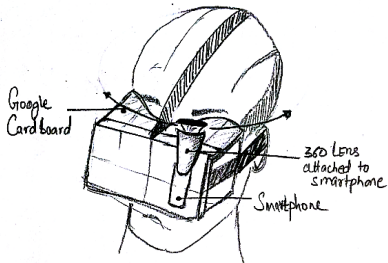


Figure 3: Setup showing two-way Immersion with Lens and Google cardboard

display. We propose a feature for the cardboard users to switch their view to their actual surroundings so they can see them as needed. For example, if two partners are going for a walk together, they may normally see a view into their own environment. However, if they stop to view a lookout, they can switch to see their partner's view.

Usage Scenarios

We imagine couples would want to do a variety of activities together using our system. The following scenarios detail two ideas as initial base cases and we anticipate that the design will be used in a number of additional ways as couples appropriate the system.

1) Thomas and Laura are in a long distance relationship and both of them used to go hiking together in Sweden. Laura has now moved to Vancouver, Canada where she goes hiking and shares her hiking experience with the help of Be With Me. She takes out her Smartphone, attaches the 360 lens, and shares her hiking experience with Thomas. On the other side, Thomas sitting in his home uses Google Cardboard with his Smartphone to navigate the 360-degree view of Laura's environment. Thomas was a part of Laura's hike and made sure Laura was safe during the hike by looking where Laura was going. Laura would tell Thomas about the terrain and provided him information about the flora and fauna during the hike. Thomas assisted Laura by showing her alternative routes through a terrain using the Be With Me system. He even assessed the weather conditions to help Laura safely complete the hike.

Using this system, Thomas will be a part of Laura's experience rather than listening to Laura recounts her

experience at the end of the day through an audio or video conversation.

2) Ron and Anna were arts students who used to visit British Museum regularly and shared a common interest in artifacts. Since then, they enjoy visiting art museums together. Now they live in different counties due to their job requirements. Anna lives in France and shares her museum experience with Ron, who is working in UK. Anna shares her museum visits with Ron and feels as if they are walking together, browsing the artifacts together, and discussing their views with each other. Ron was able to view the artifacts as if he was actually in a museum and would ask Anna's help to locate some artifacts he found on the online directory. Ron could even view other artifacts that are close to Anna and can help Anna point to something she might have missed in her museum visit.

Of course, we as designers are speculating the activities and experiences of this system for distant couples. Couples will have their own needs and utilize the system for their activities. We anticipate that the decisions of how to use the system will be jointly made by the partners as they discuss what they would like to do together as a couple. This may reflect their shared interests, past experiences, or new experiences they want to have together. They may try out some activities with *Be With Me*, learning about the technology through these experiences, and then trying out different experiences over time to see which they like most.

Given this likely appropriation, we will ensure our system is open to interpretations and the design is not limited to a fixed purpose or activity. We will make the

functionality of the system visible to users so that they can know the likely effects of their actions. Overall, we feel this presents a stark contrast with the design of existing video communication systems (e.g., Skype, Google+ Hangouts, and Apple's FaceTime). Such systems typically support narrow fields of view and are overly focused on supporting conversations as opposed to activity sharing. Moreover, the remote viewer must rely on the local user to control the shared context.

With our initial design of this system, we plan to support the likely shared collaborative experiences and observe the ways in which this system will be appropriated through open-ended field trials. We will observe participants' usage patterns and document the ways they appropriate the setup, their activities, interaction and collaboration. This will lead us to the generation of a collective knowledge base, that would be much wider than that of the designers. We will then redesign this system to better support the newly discovered activities.

Workshop Goals

We are very interested in attending this workshop so that we can network with other researchers and designers and help move the design space of *collaborative appropriation* forward. We would highly value discussions around the ways in which technologies appropriate through the artful and social negotiations of multiple users, as opposed to individuals.

Author Biographies

Samarth Singhal is a Masters Student in the School of Interactive Arts and Technology at Simon Fraser University. He is part of the Connections Lab, where he

is designing systems to facilitate better video communication for sharing major life events over distance to enhance their experience and exploring the use of video communication during outdoor activities to share their parallel experience. Currently he is designing an immersive video communication system to connect long distance couples with an open-ended design to support couple appropriation. For more information, see: <http://clab.iat.sfu.ca/people/samarth-singhal-msc>

Dr. Carman Neustaedter is an Associate Professor in the School of Interactive Arts and Technology at Simon Fraser University. He is the director of the Connections Lab, an interdisciplinary research group focused on the design and use of technologies for connecting people through technology. Research projects heavily focus on technology designs for family communication using innovative ubiquitous, mobile, and situated displays. He has designed and built a variety of communication and coordination technologies where all have focused on flexible design to support user appropriation. For more information, see: <http://clab.iat.sfu.ca>

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