Shared Geocaching Over Distance with Mobile Video Streaming

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Abstract

Shared geocaching is an outdoor activity where pairs of individuals geocache together but in different locations. Video streaming allows two players to see each remote person's view and converse during the activity. This allows players to help each other out while searching for geocaches. We envision that shared geocaching will provide a way for family or friends to share experiences together over distance where they are both participating in the same activity at the same time, only in different locations.

ACM Classification Keywords

Video conferencing, families, media space

Author Keywords

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

Introduction

Video chat technologies allow family and friends to connect over distance so they can see and hear each other in real time. This has been found to create strong feelings of connection between distance-separated family members [1][7][8]. Researchers have explored the use of video chat amongst family members [1], grandparents and grandchildren [16], teenagers [2], childhood friends [18], and even long-
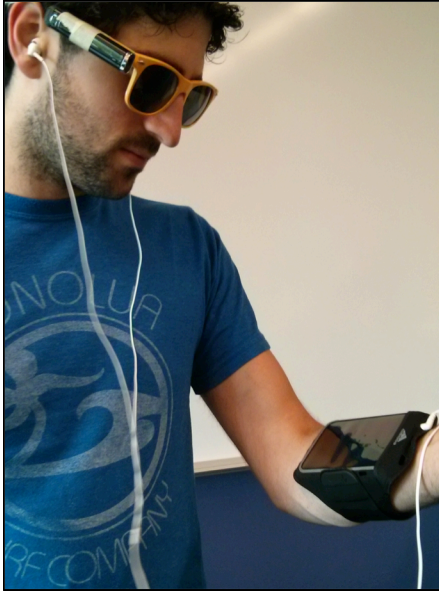
Figure 1: Our technology probe for shared geocaching.

distance partners [11]. One dominant theme that has emerged is that, in addition to simply conversing, people enjoy sharing experiences together over distance, such as … [2][7].

Our interest was in exploring how mobile video chat could support the sharing of everyday outdoor activities between people who were geographically separated. We were particularly interested in *parallel experiences*: situations where *both* the local and remote family member or friend were doing the same activity in parallel together, rather than one person passively watching the activity from home. This reflects many situations in life where co-located people, in parallel, go out and participate in an activity together (e.g., walking, running, playing sports, sightseeing). In these situations, people may not be sharing in the other person's activity, but they are in essence doing the same general activity at the same time and in the same location.

To explore this scenario, we created *shared geocaching:* geocaching amongst two people where each is in a different location and hunting for his or her own geocache. To support interactions over distance, we created a video streaming technology probe [10] that provides a view of each person's remote area along with an audio connection to support conversation (Figure 1). We envisioned that people could geocache together over distance and help each other out as needed or simply be 'together' while doing the activity. We chose to explore geocaching as it includes a range of activities, including walking or hiking, navigation, coordination, and socializing. Geocaching can also be done in a variety of areas, including urban settings. This allows one to explore the use of video streaming in

public settings. Geocaching has also been shown to make people feel more connected and emotionally-close to others when they geocache together [13].

Related Work

Geocaching is a GPS-based treasure hunt where players search for hidden containers that include a logbook to sign one's initials. Geocaching originated in forests and parks but can now be found in everyday urban centers [4]. Research has shown that people geocache for a variety of reasons including experiencing new places, participating in activities with family and friends, giving purpose to walks, improving profile statistics, challenging oneself, and competing with others [5][15]. We also know that geocaching has a strong sense of community where players create and maintain the game long term by hiding geocaches and monitoring their own caches and those of others [13]. To date, nobody has explored how geocaching may work amongst people who are separated by distance and wish to play together.

We have also seen little research to date on how people utilize mobile video chat to share experiences when away from their home where the experiences go beyond just conversing. Notable exceptions include the Peek-A-Boo system, which supported a video link between a smartphone and an in-home picture frame to share outdoor activities (e.g., child soccer games) with a grandparent at home [12]. Experiences2Go also provided a live-video feed between a mobile device and an in-home display for similar sharing purposes [6]. There also exist online reports of the unique ways in which Google+ Hangouts is being used for "Virtual Photo Walks" [17] where a person shares video of an experience with people who are unable to leave their

Figure 2: A Looxcie 2 camera attached to a pair of sunglasses.
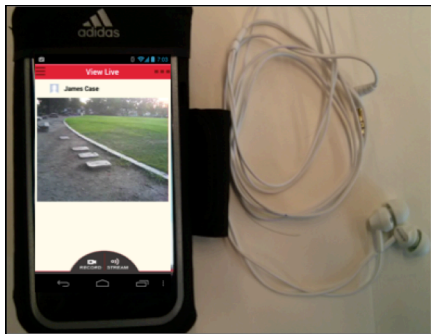
Figure 3: The armband containing a smartphone along with earphones.

home (e.g., on bed-rest). While these systems and experiences are valuable, they all explore situations where one person is at home and another is mobile. In contrast, shared geocaching explores parallel experiences where both people are out and actively participating in the same activity at the same time.

Shared Geocaching Technology Probe

To explore shared geocaching, we created a technology probe shown in Figure 1 that consisted of existing commercial software and hardware. It included a wearable mobile video camera that captured the wearer's field of vision by being attached to an article of clothing such as a hat or a pair of glasses. We used a Looxcie 2 camera and an ordinary pair of sunglasses to prototype the experience (Figure 2).

Using a Bluetooth connection and a specially designed smartphone application (by Looxcie), the camera transmits live streaming video to a local smartphone. By leveraging the smartphone's mobile Internet connection, the application broadcasts the video to a remote user's smartphone at 640 x 480 resolution and 24 fps, in the best case. At times, this resolution is algorithmically reduced if network bandwidth becomes constrained. The camera also captures and transmits audio to the remote person, so users can talk to one another throughout the experience. Both parties can send and receive video simultaneously to establish a symmetrical exchange where each can view the other's field of vision.

We modified a wearable runner's armband to hold a smartphone that shows the remote user's video (Figure 3). This frees up the users' hands to hold a GPS device (for geocaching) if they want to. It also allows them to look periodically at the remote user's video by looking at one's arm. This contrasts a head-mounted display (e.g., smartphone attached to a helmet, or augmented-reality glasses), as we wanted to make video selectively available to users. Thus, they can choose when to look at the remote user's video feed. This also means that the video feed does not obscure a person's normal vision.

Even though our technology probe looks rudimentary, it has allowed us to explore shared geocaching without investing in large development efforts. This is an important goal for technology probes [10].

Participating in Shared Geocaching

In shared geocaching, players participate with a remote person where each searches for a hidden geocache in his or her own geographic area. Video streaming allows each player to see the remote location and exchange conversation with the other player. It is largely impractical to have identical geocaches in multiple locations so that people search for the 'same' geocache yet in different areas. Instead, we imagine that people will be looking for different geocaches where they use the video streaming system to help each other out and share the experience of geocaching.

Our initial explorations have found that people highly value the shared experience of geocaching with others, especially if they are not able to play with them in face-to-face situations. The video stream, including the audio and video link, provides a strong sense of intimacy with the remote player. This connection is so strong that, in some situations, players forget about the 'outside world' because they are so focused on experiencing the situation with their remote partner.

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