
Communicating More than Nothing

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Abstract

Strong social connections permeate one's daily life. With the numerous means available, these connections can easily dominate one's communications, though one only wants to convey and have a sense of presence in each other's lives. Portal Frame fosters this feeling of connection between individuals while keeping the amount of active communication that must take place to a minimum. Individuals are provided a means to glimpse the lives of intimate friends through a well known and established physical medium, the picture frame.

Keywords

Photographs, connections, GPS, sensors, tangible devices

ACM Classification Keywords

H5.3 Group and Organization Interfaces: Asynchronous Interaction.

Introduction

Families have been spread across the nation and world because of school, jobs, and the draw of other places. Combined with increasingly pervasive communication, social networks have become less dependent on location as a result [7]. Email, instant messages, and phones are common devices used to keep long distance

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relationships strong. However they produce a new set of hurdles to overcome.

Email, instant messages, and telephone calls take essentially no time to transit from one point of the globe to another. In fact, telephones and instant messages also directly interrupt activity; if attention is allocated to them, their demands are immediate. Email offers a more asynchronous means of communication, but for many, it has become an essential aspect of life and work [4].

The Portal Frame is designed to foster these social connections but also to do so with as little demand of attention from users as necessary.



figure 1. A photograph is an object that provides a connection to the pictured individual. The frames are relatively static and hold whatever picture is placed into it. Portal Frame makes this setup more dynamic by altering the image to one more indicative of present day life.

Motivation

The picture frame is a device that has been used to display portraits of family and loved ones for a number of decades. Over the course of a life, an individual's

appearance and image is not static; however, the portrait often is, creating a discrepancy between the representation and the represented individual leading to continual refreshing of portraits. A photograph taken at age 10 is not indicative of an individual's personality and lifestyle after graduating college. As an individual grows, physical frames often hold different photographs.

We seek to use the physical medium of the frame while updating the pictures more appropriately and more subtly. The frame itself is the portal to a collection of pictures preset by the associated person. The frame displays a single picture, but only the picture that is deemed most appropriate based on the context of its associate. Additionally, the connection is more communicative of personality as one watches the transitions between images. In this manner, the frame holds more than just a photo it becomes a portal with which one can see more of a person.

Related Work

In the project WatchMe, contextual information such as location, acceleration, and speech are abstracted and conveyed between family and intimate friends [5]. Individuals carry a watch with sensors to detect the context. A pre-selected image associated with the remote individual is shown in the background. Using this context, an individual can then choose to initiate communication. WatchMe is used to monitor individuals in order to facilitate communication or a simple status check. Our system was designed to provide similar indicators but with a much more passive interface.

LumiTouch is a tangible interface to transmit information via a single bit of transmitted data [2]. Two

individuals would control separate picture frames, each frame containing a photograph of the other person. The interface was the frame itself; when one frame was touched the complementary frame would light up. It conveys passive information by glowing when presence is detected on the remote end; it conveys active interaction, touching the frame, by lighting up LEDs. LumiTouch was meant to convey one person was thinking of the other across a distance without having to initiate conversation.

Virtual Intimate Objects is a project out of Cornell in which individuals press a button in order to brighten an indicator that then fades over the course of a day [3]. Like LumiTouch, it sends essentially one bit of communicative data. While this might be used to indicate individuals are thinking about one another, it could easily become a chore and provide disparate meanings to the individuals involved.

InTouch is a device that provides a physical connection between individuals [1]. By interacting with a specially crafted device, one can feel the influence of the remote individual as a set of three rollers move. However, InTouch is based in synchronous and active participation modes rather than residing in the ambient environment as does Portal Frame.

The Digital Family Portrait used photographs bordered by icons to provide status information on relatives separated by distance [6]. Icons were displayed based on sensor data. Portal Frame incorporates sensor data to select an image rather than to display the data.

Digital Picture frames are increasingly being connected to the internet. Recently, a frame was announced that

connects to photostreams on www.flickr.com [8]. This frame, however, lacks support for two way communication and focuses on recent activity rather than current activity.

Design

Portal Frame is to take the role of a standard picture frame. It is a tangible device that should be hung on the wall, placed on a mantle, or displayed with other, traditional, photos. The frame is connected to a server over the internet that determines the appropriate image to display.



figure 2. The prototype system uses two handheld devices to simulate the frame as well as the tracking

The current system utilizes two Dell Axim X50vs, a Pharos GPS Navigator SDIO, and a separate machine to run a server to which both connect. One handheld operates as a model for the frame. It remains stationary and is meant to be displayed. The other

handheld is meant to track the remote user via GPS and offer an interface to correct the displayed image.

The determination of image is done using machine learning techniques. The remote user can see the current image on some handheld device. If the image displayed is incorrect, the user can specify the correct image to be displayed: providing a training example to further define the hypothesis of the machine learner. In addition to the picture, the remote device sends contextual information. Presently we only utilize location, but this could be expanded to utilize velocity, time of day, calendar data, cell phone activity, relative location to friends and family, etc.

The remote user specifies the images to best represent his or her state. If a user is at work, he or she might choose to show a picture working diligently to the audience of the frame. At home, one might want a picture relaxing on the couch. The frame might display a photograph of the exciting nightlife of downtown Champaign, were it ever appropriate. With the integration of velocity data, pictures on a bike or in a car might be the most fitting image. The frame communicates intimate information automatically and effortlessly after the initial setup.

The frame itself is not just a picture to behold. It offers a mechanism allowing the remote user to see that

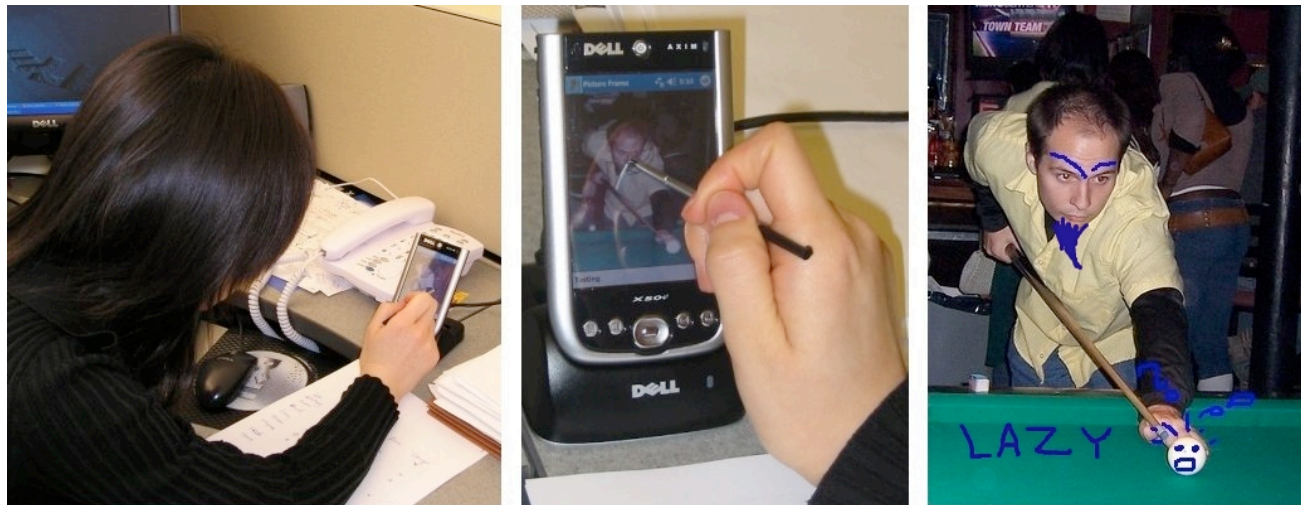


figure 3. The remote individual is spending some time in downtown Champaign, a location associated with images of bars and billiards according to what the system has been taught. The frame owner (left) glances at her frame and the image. Noting that he should be studying or otherwise working on a paper and they had been recently joking about his work ethic, she chooses to draw a sketch to let him know he has been seen (center). The resulting image, composed of the original image with the sketch overlaid (right), is relayed back to the remote user who will see it on his handheld device the next time he checks.

someone has been paying attention or thinking of them. The frame utilizes a touch screen to allow the viewers to interact by sketching on the image. One could write a short note or annotate the picture and send it to the remote user. The sketch is displayed over the image upon which it was drawn. This was implemented to be asynchronous. The remote user is not informed of the new sketch in an effort to avoid active communication. Remote users might expect an immediate response similar to LumiTouch if users are alerted. We designed PortalFrame avoid demands on the user.

Privacy and Intimacy

The device shows only as much detail as it is provided. A default image is set to be displayed if nothing has been selected. If an image is inappropriate for display, it should not be added. However, there are concerns that the frame could give false indication of actual activity. Showing a picture of the remote user out partying while he or she is supposedly studying for exams or working on a research paper in a coffee house could create tension and disparity. Hopefully, such a mistake is never encountered; however, there is sufficient plausible deniability just in case. The machine learner is not guaranteed to be completely accurate as some data, like GPS, is not always recoverable, or the sensing device could run out of power, or generally the context of two altogether different activities might closely match each other.

Allowing an individual access to this otherwise private or inaccessible information strengthens the connection between individuals. Giving the frame shows that the two are close or at least that one wants to be close. The frame allows a kind of vicarious understanding to

occur. Unlike other attempts to create this connection, the Portal Frame requires relatively little to maintain.

Ideally this setup is suited to friends, family, or significant others. One could give a frame to his or her advisor, but the intelligent student would be sure that the advisor would only see the student working and sleeping (at appropriate times). The frame is not a tracking system; rather, it is designed to create a connection by offering a glimpse into another's life.

The physicality of this system is vital. The frame is an object with a location. It is not a website that can be checked at any time of the day and it does not provide a pop up or message when it changes status. It is, however, an object that can be kept in a location that one frequents, such that one can glance at it from time to time.

Future Enhancements

Expansion of the context is a major area to pursue. Using only location data and the most basic machine learning hypothesis is effective for this prototype, but a most robust system needs to be developed for future work. As a part of this expansion, local friends could be incorporated into the image. The devices we use to track individuals can also be used to detect nearby friends via Bluetooth or something equivalent. In this case, the frame might indicate one's company by displaying an image of the two together if such an image exists or by showing the friend's image occasionally in the frame.

The design seems to be intuitive for a single frame and a connection between individuals. One always knows what is being displayed and if the image is appropriate

for the viewer. However, a person might want to share with a significant other, parents, and best friend simultaneously. Incorporation of multiple frames would likely increase the require manipulation of images on the remote user's behalf. There is no problem if all were to see the same images, but accounting for the different relationships could require disjoint sets of pictures. Setting permissions for each picture to each frame would be possible but against the underlying theme of intimate communication with little work. Investigation will be pursued to determine the desirability of these options.

Conclusion

As we try so hard to remain connected to other people via cell phones, instant messages, blogs, and forums, each medium contributes to a growing demand for attention to devices. By using Portal Frame, some of this demand can be offloaded into a passive and less demanding mode of interaction. Additionally, the amount of demand to generate the input stream is kept to a minimum by utilizing sensors.

Aside from less demands, the sharing of one's daily activity can provide for a vicarious connection between individuals. This glimpse of life can be used as a status check or insight into the changing / steady nature of the remote individual.

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