
ShareABeat: Augmenting Media Shared Through Social Platforms with Empathic Annotations

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Abstract

An increasing share of our daily interactions with others is mediated through communication technologies. However, these often fail to capture the rich and nuanced communications that we use in collocated, face-to-face settings. Previous studies have found that incorporating bodily functions into communication increases intimacy and makes it more personal. We introduce ShareABeat, an application combining a smartwatch and smartphone to make sharing media content on social platforms more personal with the addition of empathic annotations. These annotations come in the shape of vibrations based on the elevated heart rate measured through the smartwatch of the person watching the media content. By measuring the user's heart rate while watching shared media content, ShareABeat makes it possible to share ones personal 'highlights'. An exploratory study has shown that people have measurable responses to videos shared on social media platforms with respect to their heartbeat patterns.

Author Keywords

Smartwatch Interaction; Wearables; Empathic Computing; Mobile Computing; Mediated Interaction; Intimacy

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Introduction

Since the introduction of communication services such as text messaging, email and instant messaging, an increasing share of interactions are not taking place in face-to-face settings. Social networks and smartphones have enabled anytime, anywhere, and anyplace sharing of information, including media such as pictures and videos. However, these social connections are often still shallow [2]. Current communication technologies are unsuitable for carrying out tasks or social functions that require rich, detailed and nuanced communication. Even still, these technologies are used among people in close relationships (e.g., lovers, family, close friends). One of the main reasons for using social networking sites in close relationships is to monitor each other's activities. For example, Fox and Warber [4] found that relationship anxiety caused romantic partners to engage in higher levels of electronic surveillance.

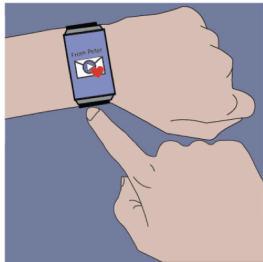
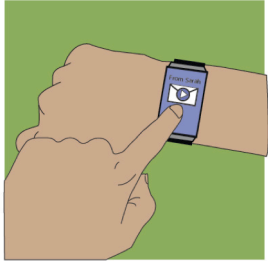
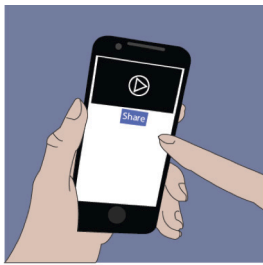
Another problem of electronic communication is that these services often lack many of the cues, which are available in face-to-face communications, such as a shared situation/environment (context), physical interaction and bodily functions. The situation and environment in which an interaction takes place contains contextual information that helps to disambiguate and clarify the exchanged information that is exchanged. In face-to-face interaction, physical interactions such as touch can play an important role. Where, how, who and in which situation someone touches you, conveys meaning [7]. Like touch, bodily functions can also be used to communicate emotional messages and thus contain meaning [8]. Additionally, they can enrich verbal communication and increase intimacy.

In this position paper, we introduce ShareABeat, a combined smartwatch and smartphone application that makes sharing media through social platforms more intimate and personal by conveying bodily functions. In particular, ShareABeat allows users to share their reactions to YouTube videos in the form of their heart rate (Figure 1). We also highlight a number of interesting opportunities to make interactions more personal by combining wearables and mobile devices.

Communicating using Bodily Functions

There are different bodily functions, where some can be perceived even from a distance (e.g., posture, gestures, facial expressions), and others are more discrete (e.g., pupil dilation, body heat, breathing rate). Hall [5] defined four different proxemic zones, characterizing how people interpret interpersonal distance. Within close proximity to another person, all the communicated bodily functions are perceivable. However, this distance is not appropriate for everyone [3]. Intimate distances are appropriate for lovers, family and close friends.

Experiments by Janssen et al. [6] showed that the perception of others' bodily functions increases the perceived level of intimacy. When participants thought they heard the natural heartbeat of someone they approached in a virtual world, they reported a higher amount of intimacy. This indicates that communicating bodily functions can simulate closeness. Participants in Janssen et al.'s study also kept a bigger distance when they noticed a heartbeat, which shows that people try to maintain intimacy at an appropriate level. This level is dependent on the relationship between people—people who do not know each other often keep a social distance to each other. Having a close relationship then



entails a willingness to share personal information such as discrete bodily functions and the acceptance of a high level of intimacy.

ShareABeat

When sharing media content in a non-collocated setting, it is difficult to fully experience the receiver's reaction to this content. The receiver's reaction however is an important part of sharing media, as evident from the popularity of mechanisms such as likes, upvotes, and favorites on social media websites. Knowing that others react the same way to the shared content leads to a sense of social acceptance.

ShareABeat allows users to share their reactions to YouTube videos in the form of their heart rate (see Figure 1). The empathic annotations—in our case the parts of the video where the viewer showed the most intense reaction—are sent back to the other user together with vibrations based on the measured, elevated heart rate. In an exploratory study, we observed that people did indeed have measurable responses to videos with respect to their heart rate. While showing students both funny and scary videos, we observed a clear increase in heart rate.

The emergence of smartwatches and other wearable technologies provides opportunities to enrich mobile interaction by combining smartphones with more personal, wearable devices (e.g., [1], [9]). ShareABeat combines a smartphone for displaying the shared media with a smartwatch that unobtrusively measures the user's heart rate and transmits the empathic annotations (in the form of vibrations).

Use of the application consists of the following steps (see Figure 1):

- Tom (blue background) sees a video on his smartphone and decides to share it with his close friend Lisa (green background).
- Lisa receives a notification on her smartwatch that a video has been sent to her.
- She views the video on her smartphone, while her smartwatch records and displays her heart rate.
- After having seen the video, she decides to share her reaction to the video with Tom.
- Tom receives a notification on his smartwatch that Lisa has shared her reaction to the video. Lisa's reaction consists of fragments from the video that aroused her most (sensed through an elevated heart rate) combined with a sequence of impulses.
- Tom experiences Lisa's reaction to the video. His smartphone shows selected scenes from the video that aroused Lisa most, while his smartwatch simultaneously vibrates based on her recorded heartbeat.

Implementation

The application runs on a Samsung Android 4.3 smartphone that is connected via Bluetooth to the Samsung Galaxy Gear Live smartwatch (running Android Wear), which features a heart rate sensor.

Details such as user accounts and sent or received YouTube videos are all stored in a database that is exposed through a web service. The heart rate is sent from the smartwatch to the Android app playing the video, where it is then aligned to the video. People's reactions to videos are created from generating a shortened version of the video. The video is shortened

Figure 1: A user (green background) shares a video with a user (blue). After blue has watched the video, green receives the moments of the video, blue was most excited about.

by selecting a '10-heartbeats' window around the moment in the video with the highest recorded heartbeat. The user's heartbeats are also transformed into vibrations and conveyed on the other user's wrist.

Opportunities for More Personal Interactions

Given the personal nature of wearable devices, sharing them between different people will likely require a close relationship between both parties. Instead, we feel there are opportunities for employing the available sensors in wearable devices to make interaction with mobile (and possibly shared) devices more personal, in both collocated and non-collocated settings:

- *Secure device connections*: the user's heartbeat pattern could be sensed to securely connect mobile devices together, or uniquely identify users—similar to the Nymi wristband (<http://www.getnyimi.com/>).
- *Subtle communication and awareness cues*: wearables could be used to send subtle cues between people, or to remain aware of each other's activities. An example is communicating heartbeats/screen taps as in Apple's smartwatch¹. Future research could investigate whether this indeed results in more intimate connections.
- *Making existing services more personal*: existing mobile applications could be augmented with personal information obtained by the user's wearables. ShareABeat is an example of this, but we can also envision other applications. For example, collocated multiplayer mobile games could adapt the difficulty level to each player's excitement obtained from their heart rate.

¹ <http://www.apple.com/watch/new-ways-to-connect/>

Conclusions and Future Work

We believe there is significant potential for more intimate messaging and communication tools. The available sensors in smartwatches and other wearables (e.g., activity trackers) provide interesting emphatic information such as the user's physical activity or measured heart rate that can make interactions with mobile devices more personal.

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