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Mediating intimacy in long-distance relationships using kiss messaging ☆

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ABSTRACT

Intimate interactions between remotely located individuals are not well supported by conventional communication tools, mainly due to the lack of physical contact. Also, haptic research has not focused on the use of a kiss as a mode of interaction that maintains intimacy in long distance relationships. In this study, we designed and developed a haptic device called Kissenger (Kiss-Messenger) for this issue. Kissenger is an interactive device that provides a physical interface for transmitting a kiss between two remotely connected people. Each device is paired with another and the amount of force and shape of the kiss by the user is sensed and transmitted to another device that is replicated using actuators. Kissenger is designed to augment already existing remote communication technologies. Challenges in the design and development of the system are addressed through an iterative design process involving constant evaluation by users after each stage. The devices are evaluated through a short- and a long-term user study with remotely located couples. The results point to an initial acceptance of the device with feedback from the users on directions to improve the overall experience. This study discusses potential issues that designers should be aware of when prototyping for remote intimate interactions.

1. Introduction and motivation

Lately, there has been an increasing movement from efficiency to affectivity in the study of intimacy in the human–computer interaction (HCI) community (Altman and Taylor, 1973; Mueller et al., 2005b). Humans have an important social and personal need to feel connected (Kjeldskov et al., 2005), especially for the maintenance of interpersonal relationships. Intimacy creates tight emotional bonds that maintain close connections. Cheal (1987) suggested that intimacy can be seen as a reminder of the fact that "each other is indeed significant", because an intimate relationship always consists of a private world of significant others.

Intimacy is of central importance in enduring romantic relationships; the level of it exerts a profound influence on attainment of marital happiness (Erikson, 1950; Fisher, 1982), and even health and well-being (Brown et al., 1977; Lynch, 1977). Experiencing intimacy has been identified as a factor that helps individuals to maintain their physical and mental health. Failure to obtain satisfactory levels of intimacy in a romantic relationship has been the largest category of behavior which motivates people to obtain outpatient psychotherapy (Horowitz, 1979) and as the most frequent reason given by couples for their divorce (Waring, 1988).

In this day and age, jobs or higher education requires people to live in different places or travel for longer durations, resulting in more spatially separated partners (Stafford, 2005; Stafford and Canary, 1991) and consequently, elimination of physical intimacy. Although, some of recent studies argue that Long-Distance Relationships (LDRs) could be of the same satisfaction compared to co-located ones (Crystal Jiang and Hancock, 2013; Stafford, 2010), still we cannot deny the importance of lost physical intimacy and other nonverbal cues in emotional convergence and relationship health (Strong, 2013).

Increasing intimacy is one of the main concerns of designers when developing affective devices for LDRs. Affective touch, like kisses, hugs or close physical proximity, as Field (2003) said, "Is critical for physical and mental well-being". They play a significant role in expressing an important part of intimacy that is better expressed through sensory evocations rather than

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linguistics. For romantic LDRs, distance has led to the absence of the physical being of the partner in one's daily life, making them lose the opportunity of haptic experiences from these affective touches. This is a serious problem in general as it strongly affects the intimacy and connectedness of the romantic relationship. Therefore, mediating affective touches through technology is a potential solution to address this problem by providing a haptic communication channel to trigger the "presence-in-absence" and exchange these emotion and affection laden messages. This will support remote communication between LDRs at a more affective and experiential level.

Kissing can express sentiments of intimacy as well as love, passion, affection, respect, greeting, friendship, and good luck. Kissing is one of the most important modes of human interpersonal communication (Hall, 1966). Despite the availability of haptic communication devices, not much attention has been given to the use of the kiss as a mode of remote social interaction. Considering this missing dimension of representing a kiss using current remote communication technologies, we aimed to design a device to facilitate the exchange of emotional content between people who are physically separated. We proposed to address this vacuum by designing a system that consists of two paired devices that can send and receive kisses simultaneously, giving humans a new dimension to express themselves. Our intention was not to replace, but rather to augment existing remote communication technologies with Kissenger. We approached this design problem carefully through iterative prototyping and evaluations, given the intimate nature of the interaction.

In Section 2, we describe related work of researchers who have undertaken projects for mediating intimacy. Section 3 describes our design methodology, an iterative development process where each iteration is based on feedback from a user evaluation. Section 4 describes our field study with 10 couples who used Kissenger in actual everyday situations over a period of time and developed a better understanding of the influence of Kissenger in mediating intimacy in LDRs. Discussion and design lessons are elaborated in Section 5. Finally, we conclude by summarizing our learning from this study.

2. Related work

With emerging Information and Communication Technologies (ICT), several remote communication tools like email, phone calls, online texts, audio and video chat are often adapted for facilitating and maintaining connections for LDRs, in spite of the fact that they were invented primarily for efficient collaboration in the workplace (Byrne and Findlay, 2004; Taylor and Harper, 2003). As these tools cannot fully address the remote lovers' emotional needs and encourage intimate interactions, there are a growing number of attempts to develop affective technologies specifically for mediating intimacy. Gibbs et al. (2005) introduced the term "Phatic Technologies" to describe these affective tools. Rather than exchanging any particular thought or fact about the world, they focus on strengthening, establishing, and maintaining bonds. In the context of mediated intimacy, these technologies can be categorized into two groups: those which are inspired by human physical intimate behaviors and those which are mediating non-physical dimensions of the intimacy. We have focused specifically on phatic communication between non-co-located intimate partners.

2.1. Mediating non-physical dimensions of the intimacy

This category refers to all dimensions of intimate communication other than physical behaviors that might happen when couples are co-located. Different design approaches are taken to support these dimensions of intimacy in which some of them are as follows:

One theme of this category is ambient communication through poetic interactions such as "LumiTouch" (Chang et al., 2001) in which remote couples can communicate through a pair of interactive photo frames that each of them will light up when its pair is touched. Another design theme is mutual activity, which refers to the technologies that facilitate doing activities that normally happen when couples are co-located, such as "Lover's cups" (Chung et al., 2006) that simulates co-drinking and "sleepyWhispers" (Gooch and Watts, 2012b) that supports sharing "Goodnight" messages are in this category. Fictitious co-habiting is another design perspective in which sense of co-habitation is conveyed through sharing homes, furniture, or other objects in the home. Some examples of this category are "The bed" (Dodge, 1997),"Peek-a-drawer" (Siio et al., 2002), "Habitat" (Patel and Agamanolis, 2003), "SyncDecor" (Tsujita et al., 2007), and "Digital Selves" which are proposed by Grivas (2006). Personalization and embodying the media with features of the remote partner is another design theme. Examples include "Mini-surrogate" (Saadatian et al., 2013) in which the appearance of telepresence robot corresponds to the remote partner, and "magic sock drawer" (Gooch and Watts, 2011b) which supports the serendipitious sharing of handwritten notes in a drawer as a private location. Overall, the general trend that can be seen in all of them is conveying illusive co-presence in an emotionally provocative manner. Our study could address this dimension of intimacy through the aesthetic of the design and mutual exchanges.

2.2. Human physical intimate behaviors inspired technologies

In order to support physical intimacy across distance some prototypes have been proposed, which are designed based on the mimicry of co-located physical intimacy between couples. The researchers have approached this area by mimicking the nonverbal cues perceived due to close physical proximity. These nonverbal cues could be either physiological signals (heartbeats, tactile pressure, vibrations, heat, whispers), the whole intimate gesture, or the combination of both. For example, "Mobile feelings" (Sommerer and Mignonneau, 2010) supports the exchange of heartbeats and breath implicitly via light blinks and micro-ventilator.

"Thermal hug" (Gooch and Watts, 2010) belt was built to simulate the sensation of a hug by warming up a band of heat around the lower back. "The Hug" (DiSalvo et al., 2003), "Hug over a distance" (Mueller et al., 2005a), "Second Life HugMe" (Rahman et al., 2010), and "Huggy pajama" (Teh et al., 2009) are other examples of mediated hug gesture. Also"HaptiHug" (Tsetserukou, 2010) intelligently finds hug keywords in second life text messaging, and visualize and communicate them by haptic stimulation in a remote location. Similarly, in "iFeel-IM" (Tsetserukou and Neviarouskaya, 2010), other social touches are detected based on their chat keywords and are reproduced via a wearable robotic interface.

There has also been several attempts on co-located hand-holding and hand-shaking behaviors, such as " YourGlove, HotHands and HotMits" (Gooch and Watts, 2012a) which are three prototypes, in which movement and heat are used to present hand holding and handshaking. In "YourGlove" (Gooch and Watts, 2011c, 2012c) a pair of robotic hands covered by a soft haptic glove mediates handholding. Whereas in HotHands and HotMits this gesture is emulated by thermal insulation. "Tele-handshake" (Alhalabi and Horiguchi, 2001) and "Feelybean" (Kontaris et al., 2012) are the other examples of hand gestures.

Although the above-mentioned intimate cues are also associated with interactions from very close distance, kisses should not be underestimated. To further elaborate mediated physical intimacy we explore kissing. Until now within HCI literature, there is very small research based around teleporting kisses.