

# Executive summary

The relatively new field of mediated social touch allows people to touch each other over a distance by means of haptic feedback technology. It explores whether interpersonal touch that is mediated has the same social and cognitive effects as unmediated touch, and in particular how rich the medium needs to be to induce certain responses. The increased interest in mediated touch for interpersonal interactions that has been developing over the recent years has resulted in various studies and prototypes. The application of these prototypes shows interesting potential: communication of simple ideas, establishment of emotional connectedness between distant lovers, or even recovery from stress.

An intriguing component of human touch is physical warmth. Warm physical contact could potentially increase feelings of interpersonal warmth, causing a subconscious influence on our social judgment of others as having a 'warm' (generous, caring) personality. The suitability of thermal stimuli as a modality for the communication of specific information has been investigated on several occasions. It appears particularly suitable for communication of emotionally charged messages.

## Assignment

Earlier studies in the interpersonal communication domain investigated the expressive quality of heat by studying how users interacted with a prototype heat-based communication device in a daily life setting. To gain a deeper understanding of the opportunities and limitations this medium presents, the purpose of this assignment is to explore how thermal stimuli can be used in an interpersonal mediated touch interaction set in a specific context.

The discrete nature of thermal stimuli and apparent suitability for affective communication, alongside the supposed ability to increase psychological interpersonal warmth, create plausible reason to think that it could be a valuable medium for individuals who have trouble recognizing and expressing emotional information through more traditional channels. This inability to recognize and express emotions is part of a personality construct called 'alexithymia'. Furthermore, there are research results that suggest warm skin stimulation in the context of an intimate exchange can lead to increased oxytocin levels, which in turn can lead to improved emotion recognition and sharing.

Whereas the purpose of most mediated social touch applications is to close a physical distance, the intent of this application will be to bridge a mental distance between alexithymic individuals and their romantic partners. The focus lies in exploring the potential and value of warm, mediated touch in the specified context (with an emphasis on emotional confrontations) through interaction design. A concept proposal is developed based on the findings.

## Project activities

Project activities include an analysis of the user context, the development of a basic concept for a thermal messaging device, a creative session with a focus group of industrial designers, semi-structured explorative user tests using a simple prototype and the evaluation of the final concept.

## The concept

The concept has been developed for the specific scenario of emotional confrontation or conflicts between an alexithymic and a non-alexithymic partner. In these situations, the alexithymic tends to shut down due to his inability to express himself emotionally. This gives the partner the impression that they don't care about them.

The concept consists of two bracelets that are connected to each other wirelessly. Each bracelet has a touch-sensitive part. When this part is touched, the inside of the other bracelet warms up. These bracelets are meant to offer a way for members of the romantic couple to feel emotionally connected by using the bracelets to express affection to one another. The underlying thought is that the inherently intimate and positive character of a thermal expression gives off a simple and clear signal that can't be misinterpreted.

## Findings

The insights from the creative session and user test indicate that thermal messaging is perceived as particularly suitable for expressing love and comfort. The sensation is experienced as unique and meaningful in an inexplicit way. These characteristics make thermal messaging unsuitable for transferring

explicit emotional information. Most information for correctly interpreting the intention of a sent thermal message comes from the common context the couple finds themselves in.

An explicit meaning could be tied to the thermal expression by contextualizing it through additional communication channels such as text messaging or voice calling, but the appeal of a thermal message is that it is meaningful on its own and does not necessarily need an explanation.

Although one type of expression is strongly present in thermal messaging, applications could be imagined for a large variety of situations. In difficult situations, the intent of sending a thermal expression lies in expressing affection to the receiver in order to comfort or convey good intentions.

The aspect of personalization is likely to increase the effectiveness of the medium, because it makes the interaction more personally intimate.

The experience of the interaction can be enhanced by creating a straightforward link between the expressive value of the input gesture and the output expression.

From the user's perspective, the focus is not on expressing oneself emotionally through this medium but on the effect the expression has on the receiver.

## Conclusions

By conducting explorative user tests with the thermal messaging prototype, a comprehensive overview has been formed of the importance of certain themes for creating the desired interaction. The tests have also provided rich insights on the user perception and experience of using thermal messaging to communicate affectively in this specific context.

The results from the investigations conducted in this project are positive towards the capability of the concept to achieve the desired effects. In 'desperate' situations, with no better alternatives, communicating via thermal messaging might be what keeps the connection alive enough to lower the threshold for the next steps in affective communication.

Important determinants for the effectiveness of the concept are the perception of the intention of the sender, and the sense of presence. The mere act of sharing an affective thought with someone according to the process of self-disclosure could lead to increased familiarity and trust, which could eventually improve empathy. Whether it actually results in an increase of either affective empathy or cognitive empathy, can only be determined through empirical studies spanning over a period of use.

This project shows how the use of simple technology can already induce certain social effects that are associated with touch, without having to do complex simulations of real interpersonal touch. Using metaphors and associations in the design of the interaction and the physical form of the messaging device have strong effects on how users perceive and interpret things. The perception of intention, the context of the interaction and the sense of presence

are important determinants for generating the desired social effects.

Many underlying mechanisms in the interaction were mentioned that might be of influence on generating desirable social effects. For further research, whether these mechanisms are actually at play here should be demonstrated scientifically.

For further development of the concept, areas that might be interesting to investigate further are:

- 1) The effect of variations in size of skin surface that is warmed on perception and meaning.
- 2) Whether dynamic warmth (that moves from one side of the device to the other, for example, based on stroking velocity of the input) adds value to the interaction and how it should be implemented (the density of heating elements?).
- 3) The effect of touch input gestures in combination with sending a thermal expression on how the interaction is perceived.
- 4) Testing with a focus group of target users over a period of time, to evaluate the effects of using the concept on communication in the relationship and on the empathic bond.