

# Intimate Mobiles: Grasping, Kissing and Whispering as a Means of Telecommunication in Mobile Phones

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## ABSTRACT

In this paper, we explore how direct physical cues of interpersonal nearness can be achieved in mobile phones. Exemplarily, we present three novel means of communication for mobile phones: grasping, kissing and whispering. Reviewing the related work, we point to a research gap in direct physical near-body actuation in mobile telecommunication. To assess this gap, we present three prototypes that implement the proposed novel means of communication. We present initial user comments on the prototypes, which point to acceptance issues. We conclude in a set of research questions for future explorations in this field.

## Author Keywords

Mobile phone, grasping, kissing, whispering, intimacy.

## ACM Classification Keywords

H5.m. Information interfaces and presentation: Miscellaneous.

## INTRODUCTION

Conceptualizing the past decades' changes in the ways in which we interact with computers, Dourish proposes *Embodied Interaction* [6] as the new paradigm: it combines *Tangible Computing* and *Social Computing*.

The social and the tangible, both taken to their extremes, can lead to the *intimate*. A substantial body of research about the psychology of intimacy exists, including research that investigates different levels of proximity and a theory of an 'intimacy equilibrium' [2], variations between individuals [14], the therapeutic effects of touch [8] and a scale for the 'need for touch' [12]. Its role in HCI, however, may not have been fully explored yet.

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**Figure 1: Grasping prototype, grasping telecommunication through pressure sensing and tightness actuation.**

In their current form, mobile phones rely primarily on text, speech, and video communication. This may suit information exchange, but may lack the capacity to give users a feeling of physical proximity.

The question that this project seeks to answer is how mobile communication devices could provide users with direct physical cues of interpersonal nearness, in order to stimulate a discussion on how we want to communicate in the future.

## BACKGROUND

Intimate interaction and physical telepresence are emerging fields of research. On the theoretical side, research includes Paulos et al.'s work on personal tele-embodiment [13] and Tollmar and Persson's analysis of remote presence [16], Vetere et al.'s proposals of mediated intimacy [17], and – most recently, Hassenzahl et al.'s work on technology for people in love [9].

As for the practical side, most works in the field of intimate interaction and physical telepresence draw on different *mappings*, which will be analyzed in this section.



**Figure 2: Kissing prototype, kissing telecommunication through wetness sensing and actuation on front side.**

The majority of projects found in our literature review draws on *symbolic mappings*: Strong and Gaver’s objects make use of subtle cues like airborne feathers and scents to symbolize one user thinking of the other [15]. IDEO’s Kiss Communicator, through which users were able to ‘blow’ a kiss over a distance, for instance, maps kisses to LED lighting. Further early proposals in this area include IDEO’s Social Mobiles [1], mapping sounds to electric shocks, and the ComTouch project [4], mapping pressure to vibration. These projects were followed by proposals for everyday integration in long-distance relationships, like the Lover’s Cups [5], which symbolize drinking through lit LEDs.

Other works involve pairs of *synchronized objects* that allow for manipulation and remote actuation at the same time, and thereby for communicating through them. These include, for instance, Brave et al.’s inTouch [3], a pair of synchronized rolls. Similarly, Eichhorn et al.’s stroking device [7] proposes a synchronized shape for telecommunication.

A few further proposals, like Werner et al.’s United-Pulse ring [19], *directly transmit* physical cues. In the case of Werner’s work, it is the communication partner’s heartbeat, mapping vibration to vibration. Direct transmittal is also in the focus on Wang et al.’s pioneering work, Touch & Talk, which is a non-mobile haptic telecommunication device, based on a contracting shape memory alloy [18].

Interestingly, the majority of projects in this field draws either on *symbolic mappings* or *synchronized objects* – only a small portion makes use of *direct transmittal*.

This is the research question that this project attempts to assess: How can mobile communication devices allow for direct physical cues of interpersonal nearness? In two workshop position papers, we have explored the technical (i.e. the necessary organic actuation systems – ‘pressure, moisture, and atmosphere’ [11]) and physical aspects (i.e. ‘tightness, wetness and airflow’ [10]) of such a style of mobile telecommunication.

This paper focuses on the *feeling of near-being*, by the example of grasping, kissing and whispering – and in how much these means of communication could be transferred to mobile phones. It discusses a set of input/output-enabled prototypes and initial user insights.



**Figure 3: Whispering prototype, whispering telecommunication through airstream sensing and actuation on front side.**

## PROTOTYPES

The proposed exemplary means of communication, grasping, kissing, and whispering, are explored through mobile phone-shaped and -sized boxes that were equipped with the necessary sensors and actuators. The prototypes do currently not involve voice communication, and parts of the actuation systems were kept externally.

### Grasping

Firstly, we propose a system for simulated grasp that reacts to pressure on one phone (Figure 1), and contracts a loop around the user’s hand on the other (Figure 4).



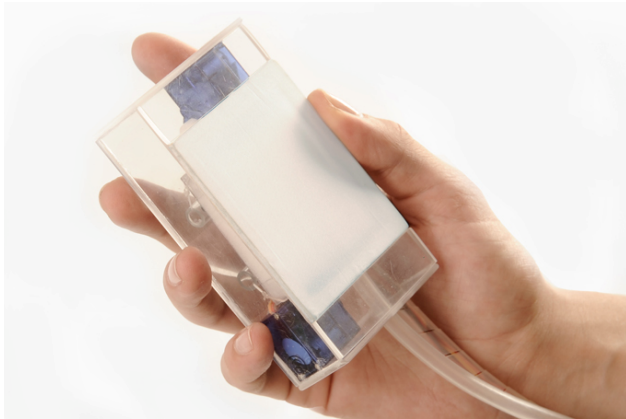
**Figure 4: Grasping prototype, actuated hand loop.**

The system enables two users, speaking on the phone, to use manual grasp as a means of telecommunication: force sensors on the phone’s outer case enable the sender’s phone to be force-sensitive, while a motor on the receiver’s phone’s inside enables it to contract the hand loop with the same force exerted on the sender’s phone. Pressing the sender’s phone harder will cause the receiver’s phone’s hand loop to pull tighter.

The hand loop includes heat-reflective material, in order to reproduce the human skin’s temperature. It can be affixed in different angles, in order to suit the proportions of the user’s hand.

### Kissing

The second proposal is a system to telecommunicate a kiss (Figure 2). It involves a moisture sensor on the sender's phone and a semi-permeable membrane over a wet, motorized sponge on the receiver's phone (Figure 5).



**Figure 5: Kissing prototype, fluid outlets and semi-permeable membrane.**

The membrane permits liquids to go out of the device, but not into it. The system uses water to moisturize the membrane, which is currently infused through a nearby pump and valve. Input wetness and output wetness are mapped linearly: The wetter the sensor on the sender's phone gets, the more wetness will be actuated in the receiver's phone. Besides kissing, the device enables the telecommunication of sweating and crying, depending on the emotional context.

### Whispering

The third proposal is a system to enable whispering as a means of telecommunication (Figure 3). It involves piezo-based airstream sensors on the sender's phone and a low-pressure air jet on the receiver's phone (Figure 6).

The air jets allow for simulating nostril airstreams and the airstream caused by verbal plosives and guttural sounds, through two slanted air jets at the device's top and a single, larger air jet at the device's bottom. The air is infused through an external pump.

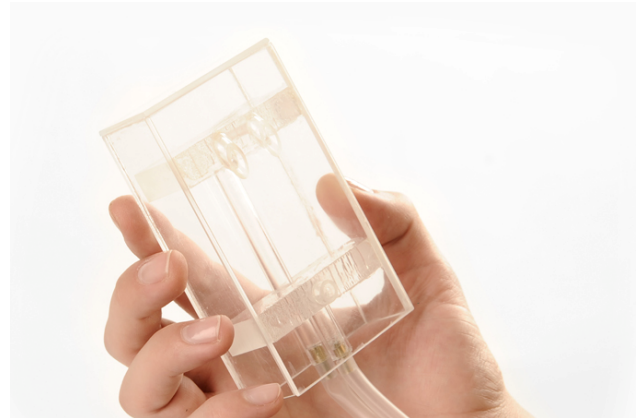
The prototype allows for communicating through airstream, e.g. when whispering, sighing or shouting. Blowing more air into the sender's phone will result in more air being blown out of the receiver phone.

### USER REACTIONS

Informal user confrontations, in which we presented the prototypes and concepts to four (2m, 2f) of our research fellows, users found the proposed means of communication to be 'creepy', 'awkward', 'disturbing' or 'disgusting'. Users were sceptical and pointed out that the presented visions would need a lot of discussion, in terms of whether this would be the way in which we want to telecommunicate in the future.

User comments implied that there would be differences in the desired style of communication, depending on the type of their relationship with the communication partner, e.g. distinguishing between business contacts, relatives, and lovers. They also pointed out that even when being in love with someone, physical near-being is not always desired.

Generally, users preferred the 'whispering mobile' over the two others, and were the most irritated by the kissing-based interaction.



**Figure 6: Whispering prototype, air jet output system.**

### DISCUSSION

Tightness, as in the 'grasping mobile', is usually not considered to be feasible as an actuation style in mobile interaction, and it may be perceived as creepy. Wetness, as in the 'kissing mobile', is generally considered inappropriate for electronics, it may be cumbersome and impractical, and it may also be perceived as disgusting. Lastly, airstream, as in the 'whispering mobile', can be perceived as scary and inappropriate.

While exploring new modalities of interaction is certainly a worthwhile undertaking, the means of communication that were proposed in this paper may show the current limits of this endeavor.

### CONCLUSION

We conclude that the proposed designs would benefit from more subtlety. We find ourselves in the dilemma of awkwardness and burdensomeness on the one hand, and potentially rich emotional telepresence on the other – solving this dilemma should be the focus of further research in this area. We encourage studies on the acceptance of such novel styles of interaction, and also studying potential cultural differences in the degrees of acceptance.

Should mobile communication be as real and as intense as possible? The means of communication presented in this paper attempt to provide a hands-on experience of one future vision of the mobile phone. This paper thereby attempts to contribute to a discussion about how we want to telecommunicate in the future.

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