Intimate Mobiles: Near-Body Telepresence through Tightness, Wetness and Airflow in Mobile Phones

Fabian Hemmert, Ulrike Gollner, Matthias Löwe, Anne Wohlauf, Gesche Joost
Deutsche Telekom Laboratories
Ernst-Reuter-Platz 7
10587 Berlin, Germany
{fabian.hemmert, ulrike.gollner, matthias.loewe, anne.wohlauf, gesche.joost}@telekom.de

ABSTRACT
In this paper, we propose three principles for near-body telepresence in mobile phones: *Tightness*, *Wetness* and *Airflow*. We present three prototypes that allow for hands-on experience of the proposed means of telecommunicated near-being.

An overview over the relevant literature in intimate telepresence is given, with regard to the proposed styles of interaction. The proposed prototypes are described in their conceptual groundwork, and in their current implementation.

We conclude by projecting the findings in our designs onto future work in this field.

Author Keywords
Tightness, airflow, airstream, fluids, body fluids, wetness, grasp, haptics, mobile phone, erotic, sex, telepresence.

ACM Classification Keywords
H5.m. Information interfaces and presentation: Miscellaneous.

INTRODUCTION
Mobile phones are increasingly present in our everyday communication habits, and thereby also becoming a valuable means of erotic telecommunication. However, the current style of interacting with a mobile phone, through touch screens, audio transmission and simple vibration, does not live up to the full experience one could imagine or wish for.

Fig. 1: Tightness prototype, hand contraction on backside.

BACKGROUND
Recently, Paulos et al. have published work on personal tele-embodiment [14], which can, alongside and Tollmar and Persson's analysis of remote presence [16] and Vetere et al.'s proposals of mediated intimacy [17] serve as the theoretical foundation for explorations in the field of near-body telepresence. With regards to the relationship between the users, Hassenzahl et al.'s work on technology for people in love [8] should be considered as well. Dourish's notion of Embodied Interaction [4], combining the social and the physical, could be considered as a potential overarching theoretical framework for the recent developments in the way we interact with computers.

As for practice, numerous projects are concerned with means of mediated near-being in telecommunication. An overview over the relevant literature will be given in the following.

Earlier explorations of this field have included mostly vibration-based interaction, such as the ComTouch [1] and the ComSlipper [2]. Later, visual approaches, as in the Lover's Cups [3], have been proposed, but simulated human nearness through cutaneous actuation has proven to be increasingly popular. An interesting approach to simulate human touch has been presented in Li et al.'s Tapping and Rubbing project [11], emphasizing the potential of subtlety in touch. Differently from that, Wang

et al.'s work Touch & Talk, based on shape-memory alloys [18], proposes a contracting element worn around the arm. Werner's United-Pulse ring [19] and Eichhorn's stroking device [5] also show the spectrum of nearness in telecommunication communication, often with romantic elements, like shared moments, or taking care of each other. Breathing, in particular, has been utilized as a status display [9], in architecture [20], and as a shared experience means [15]. Ultimately, holding hands [6, 13] and hugging, e.g. in the 'Hug' [7], 'Hug over a distance' [12] and the 'Huggy Pajama' [10] projects, have been largely investigated by the research community.

It has become obvious that physical nearness in telepresence is an active research field that is still to be explored in depth. Given their strong integration into our everyday lives, the integration of intimacy-enabling technology into mobile phones is of particular interest.

Fig. 2: Wetness prototype, sweatiness actuation and liquid outlets.

PROTOTYPES

We propose three means of intimacy communication in mobile phones – tightness, wetness and airflow. We have developed mobile phone-shaped boxes that make it possible for users to play and experiment with the new styles of actuation.

Tightness

Firstly, we propose tightness actuation as a means of telecommunicated nearness. Our prototype is equipped with a motor on its inside that allows for a widening loop to be extended and contracted on the mobile phone's outside (Fig. 1). This loop can, for instance, be placed around the user's hand to make it possible, through a force sensor on the caller's phone, to telecommunicate through hand grasp while talking.

Wetness

Secondly, we propose wetness as a means of intimate telepresence. Through a moisture sensor on the caller's phone, the level of sweatiness of their hands could be transmitted to the prototoype, which features a moisturizable membrane. A sponge is affixed to a tube on the phone's inside, which is connected to a nearby water pump. Once the sponge is moisturized by the pump, it is pushed against the phone's casing (which consists of a semi-permeable membrane). This makes the casing wet on the backside. Furthermore, the prototoype features two outlets for liquids on its front side.

Fig. 3: Airstream prototype, air jets on front side.

Airflow

The third principle we propose is airflow. We present a mobile-phone shaped prototype that is equipped with three airjets, each allowing for a different type of airstream output. The three jets could allow for the reproduction of the caller's nostril airstreams, for the air involved in speech (including guttural and plosive sounds), and for the transmission of atmospheric winds.

CONCLUSION

Innovation in machine-mediated human communication is a tough challenge, as it often leads to awkwardness and uncanny feelings for users.

The presented prototypes allow for experimenting with future visions of such novel types of communication hands-on. We believe it is a beneficial undertaking to make such visions a tangible experience, as to provide a basis for discussion, whether or not such communication is desirable.

Especially in times of omnipresent connectedness, it is a fruitful field of research to investigate how the basic human need for nearness can be fulfilled. We encourage activities that make interacting with computers – and through them, with each other – richer and more enjoyable.

ACKNOWLEDGEMENTS

The authors would like to thank Franziska Becker and Susanna Hertrich for their support with the literature review and the development of the presented concepts.

REFERENCES

1. Chang, A., O'Modhrain, S., Jacob, R., Gunther, E. and Ishii, H., ComTouch: design of a vibrotactile communication device. in *DIS '02: Proceedings of the conference on Designing interactive systems*, (2002), ACM Press, 312-320.
2. Chen, C., Forlizzi, J. and Jennings, P., ComSlipper: an expressive design to support awareness and availability. in *CHI '06: CHI '06 extended abstracts on Human factors in computing systems*, (Montréal, Québec, Canada, 2006), ACM, 369-374.
3. Chung, H., Chia Hsun Jackie, L. and Selker, T., Lover's cups: drinking interfaces as new communication channels. in *CHI '06: CHI '06 extended abstracts on Human factors in computing systems*, (Montréal, Québec, Canada, 2006), ACM, 375-380.
4. Dourish, P. *Where the Action Is: The Foundations of Embodied Interaction*. {The MIT Press}, 2001.
5. Eichhorn, E., Wettach, R. and Hornecker, E., A stroking device for spatially separated couples. in *MobileHCI '08: Proceedings of the 10th international conference on Human computer interaction with mobile devices and services*, (Amsterdam, The Netherlands, 2008), ACM, 303-306.
6. Fogg, B.J., Cutler, L., Arnold, P. and Eisbach, C., HandJive: a device for interpersonal haptic entertainment. in *CHI '98: Proceedings of the SIGCHI conference on Human factors in computing systems*, (Los Angeles, California, United States, 1998), ACM Press/Addison-Wesley Publishing Co., 57-64.
7. Gemperle, F., DiSalvo, C., Forlizzi, J. and Yonkers, W., The Hug: a new form for communication. in *DUX '03: Proceedings of the 2003 conference on Designing for user experiences*, (San Francisco, California, 2003), ACM, 1-4.
8. Hassenzahl, M., Diefenbach, S., Eckoldt, K., Heidecker, S., Hillmann, U. and Laschke, M., Technologie, die verbindet? Die bedürfniszentrierte Gestaltung von Kommunikationstechnologien für liebende (und andere, die sich mögen). in *Usability Professionals 10*, (Stuttgart).
9. Hemmert, F., Ambient Life: Permanent Tactile Life-like Actuation as a Status Display in Mobile Phones. in *UIST '08: Adjunct Proceedings of the 21st annual ACM symposium on User Interface Software and Technology (Monterey, California, USA, October 20 - 22, 2008)*, (2008).
10. James Keng Soon, T., Cheok, A., Peiris, R., Choi, Y., Thuong, V. and Lai, S., Huggy Pajama: a mobile parent and child hugging communication system. in *IDC '08: Proceedings of the 7th international conference on Interaction design and children*, (Chicago, Illinois, 2008), ACM, 250-257.
11. Li, K.A., Baudisch, P., Griswold, W.G. and Hollan, J.D. Tapping and rubbing: exploring new dimensions of tactile feedback with voice coil motors *Proceedings of the 21st annual ACM symposium on User interface software and technology*, ACM, Monterey, CA, USA, 2008.
12. Mueller, F., Vetere, F., Gibbs, M., Kjeldskov, J., Pedell, S. and Howard, S., Hug over a distance. in *CHI '05: CHI '05 extended abstracts on Human factors in computing systems*, (Portland, OR, USA, 2005), ACM, 1673-1676.
13. O'Brien, S. and Mueller, F., Holding hands over a distance: technology probes in an intimate, mobile context. in *OZCHI '06: Proceedings of the 18th Australia conference on Computer-Human Interaction*, (Sydney, Australia, 2006), ACM, 293-296.
14. Paulos, E. and Canny, J. Personal tele-embodiment. 155-167.
15. Schiphorst, T., exhale: (breath between bodies). in *SIGGRAPH '05: ACM SIGGRAPH 2005 Emerging technologies*, (Los Angeles, California, 2005), ACM, 6.
16. Tollmar, K. and Persson, J., Understanding remote presence. in *NordiCHI '02: Proceedings of the second Nordic conference on Human-computer interaction*, (Aarhus, Denmark, 2002), ACM, 41-50.
17. Vetere, F., Gibbs, M., Kjeldskov, J., Howard, S., Mueller, F., Pedell, S., Mecoles, K. and Bunyan, M., Mediating intimacy: designing technologies to support strong-tie relationships. in *CHI '05: Proceedings of the SIGCHI conference on Human factors in computing systems*, (Portland, Oregon, USA, 2005), ACM, 471-480.
18. Wang, R. and Quek, F., Touch & talk: contextualizing remote touch for affective interaction. in *TEI '10: Proceedings of the fourth international conference on Tangible, embedded, and embodied interaction*, (Cambridge, Massachusetts, USA), ACM, 13-20.
19. Werner, J., Wettach, R. and Hornecker, E. United-pulse: feeling your partner's pulse *Proceedings of the 10th international conference on Human computer interaction with mobile devices and services*, ACM, Amsterdam, The Netherlands, 2008.
20. Zingerle, A., Wagner, T. and Heidecker, C. AtemRaum, 2006.