Ambient Life: Permanent Tactile Life-like Actuation as a Status Display in Mobile Phones

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ABSTRACT

In this paper we describe Ambient Life, a status display system for mobile phones based on permanent tactile life-like signals. The system is based on the hypothesis that humans are inherently well-trained in the interpretation of life-like signals.

The proposed system has two distinct states: calm and excited. 'Calm' (a slow, relaxed pulse) means that e.g. no calls have been missed, the battery is fine and the network reception is good. 'Excited', on the other hand, means that the phone needs the user's attention.

As the system involves permanent tactile stimulation, the question arises about what is preferable: Permanent checking, or permanent noise.
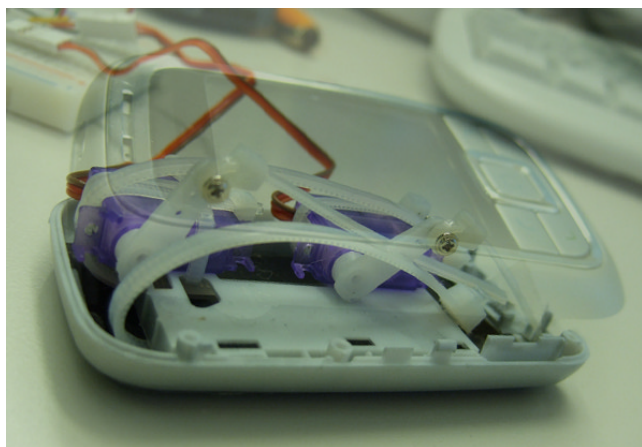
Fig. 1: Initial prototype, two servo motors used to simulate breathing of mobile phone.

ACM Classification: H5.2 [Information interfaces and presentation]: User Interfaces: Haptic I/O.

General terms: Design, Human Factors

Keywords: Mobile phones, life-like signals, heartbeat, pulse, interaction design, ambient display

INTRODUCTION

One of the major issues of the information age is informa-

tion overload [2]. Especially in mobile interaction design, the creators of novel interaction schemes face a problematic overusing of most sensory channels [12, 13]. This project is inspired by previous findings by psychologists, who found out that children are, even in early stages of their development, well able to distinguish between living and non-living objects [11, 3]. This might suggest that humans inherently well-trained in the perception of life-like signals. Given life-like expression, a phone would be able to display its status in a natural, and yet ambient way, allowing the user to develop a 'feeling' for the device.
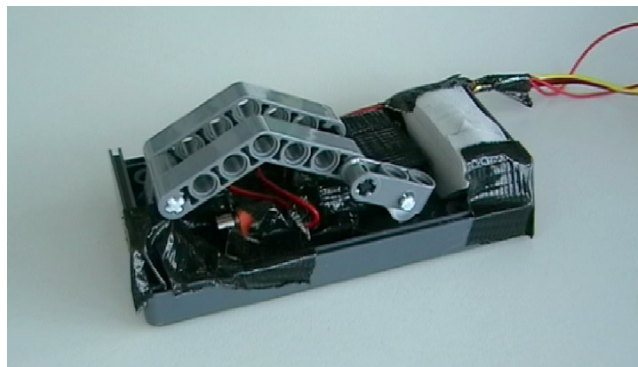

**Fig. 2: Prototype, made of LEGO,
a servo motor and a vibration motor.**

RELATED WORK

Considering mobile tactile information design, special interest came to the area of Tactons [1, 4, 9] giving the user a feeling for who is calling, through encoded vibration patterns. Further, rather 'encoded' or iconic systems have been proposed by NEC [10], Horev [8] and others. These offer a rich bandwidth of communicable data, but at the cost of the need to decode it. More natural systems have, on the other hand, been proposed as well: These make use of shape change [7] and excitatory feedback [14] – while these are limited in the data they convey, they facilitate a more intuitive interpretation.

PROPOSED SYSTEM

We propose a status display system for mobile phones based on life-like signals, like breath and pulse. Several prototypes (Fig. 1-3) are currently in development, including models with breath and heartbeat. The breathing mobile phone depicted in Fig. 1, for example, has been implemented by inserting two servo motors into an empty mobile

phone case, while the pulsation-based system is a Java software controlling the phone's built-in vibration motor.

PILOT STUDY RESULTS

The latter system has been tested in two short-term pilot studies [5, 6], which yielded mixed results: Some users liked the functionality, while others got annoyed by it soon after the beginning of the test. The acceptance of the system also varied with the intensity of the pulse and the situation it was used in (e.g. it was annoying in a library, and useful in a loud environment). Some users were able to ignore the system, and focus on it when they wanted to check the phone for missed calls. Interestingly, some users reported feeling a 'gap' when they took the phone out of the pocket in the evening.

Fig. 3: Prototype, made of textile, a servo motor and a vibration motor.

CONCLUSION

We think that permanent tactile information systems should be discussed. Not only they might be suitable solutions for certain user groups (which, for example, have to make sure that they have enough battery power, network reception, and that they do not lose physical contact to their phone), they also raise the question of how penetrating the mobile phone should be. The proposed system exaggerates current mobile phone usage: While some users permanently check their phones, Ambient Life permanently communicates actively 'I'm here, and everything is okay.'. While some users might eventually anthropomorphize their phones, Ambient Life is based on anthropomorphization. If it would be possible to base human-computer interfaces on the perception of life, which humans might be inherently good at, this could be very beneficial.

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