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.

INTRODUCTION
One of the major issues of the information age is information 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.

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

Fig. 1: Initial prototype, two servo motors used to simulate breathing of mobile phone.

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

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
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.

**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 ac-
tively ‘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 pos-
tible 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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