A nod is as good as a wink to a blind horse
How rich behavioural interaction opens up the experiential

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INTRODUCTION

Novel approaches to human-computer and human-product interaction, like the emergence of affective and experiential aspects in intelligent products, impose new requirements to systems (Picard, 1997). One way of opening up the experiential is to allow people to use their natural expressive powers by allowing them to use their perceptual-motor skills. Most current products do not tap into these skills because their functionality is accessible in just one way, and often a very poor way indeed. To put it bluntly, to set an alarm clock, you have to push a tiny button several times, while holding another tiny button. The user is not able to express her feelings to the product, and the product therefore cannot read these feeling and consider them when reacting to the user.

We believe that this problem should be tackled in two ways. First, the product should elicit rich interaction behaviour, for instance, by allowing for a myriad of ways to handle it. And, second, the system in the product should track the dynamic aspects of this behaviour, for instance, by continuously tracking the handling, calculate the "meaning" of this behaviour, and let the user know it understood by means of inherent feedback. Inherent feedback is information that is a natural consequence of the user's behaviour.

The consequence of our design engineering stance is that research starts with the design of product interaction. We believe in doing our research through design. In this demo we use an alarm clock as our research vehicle. An alarm clock is a perfect example of a product that should adapt to the diversity of emotional experiences. It is also a product with a simple functionality yet it has all the features of the current interface malaise (Cooper, 1999).

KEYWORDS:
Tangible interaction, behaviour, experience

SYSTEM DESCRIPTION

The prototype of the clock (Figure 1) consists of two displays and twelve sliders. The front display shows the current time, whereas the central display shows the alarm time. When the sliders are slid from the starting situation towards the central display, the alarm time changes. With the first displacement of a slider, time is added to the current time to make up the alarm time. With each successive displacement, towards the centre, more time is added to or, towards the edge, subtracted from the alarm time. Each slider ranges from 0 to 60 minutes. Upon reaching the preferred wake up time the central display is pressed and the alarm is set.

Figure 1: The prototype of the alarm clock

The clock's internal system interacts as follows with the user. Each displacement of the sliders is electronically tracked and fed into a computer. In the evening, the wake-up time is set (factual information). This is done differently when in a different mood (mood information). Based on this information the alarm clock makes a decision for an alarm sound. The next morning the person wakes up to this sound and silences it by touching or hitting the snooze button. This behaviour expresses the person's emotions about the appropriateness of the decision. From this behaviour, the system gets feedback on its decisions and can learn and adapt accordingly. The

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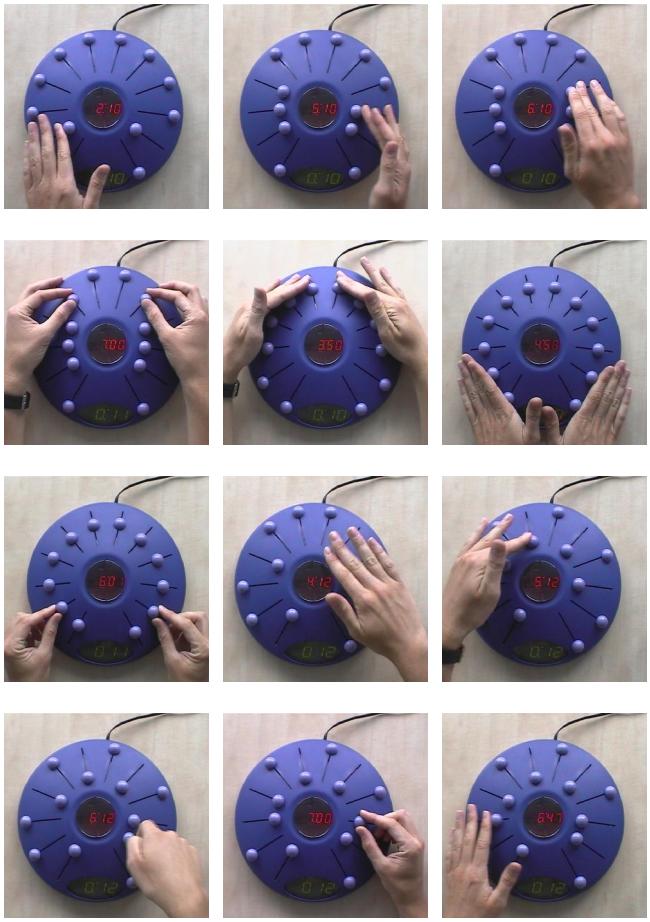

Figure 2: Different ways of setting the alarm clock

person turns the alarm off by sliding all the sliders to the outer edge.

For the user, setting the time in a different mood leaves a different trace on the alarm clock. Whereas the central display shows the wake up time, the in between and end patterns of the sliders reflect the influence the mood had on the behaviour leading to this wake up time. We call this trace inherent feedback. It is information provided as a natural consequence of setting the time. It arises from the movement itself. This trace is essentially dynamic.

For the system to calculate the "meaning" from the displacements, we define two groups of parameters: "action' and "pattern". The action parameters describe how the participants actually move the sliders. The pattern parameters describe the result of the action. So, over the actions (i.e., an uninterrupted displacement of one slider) we build up a history of the interaction that is reflected in the successive patterns.

TO CONCLUDE

This demo illustrates the importance of a tight coupling between action and appearance in interaction design. It distinguishes itself from current electronic products through traces and inherent feedback. In current electronic products, only the final setting of the time is taken into account. In the alarm clock the intermediate stages are also considered, that is, the history of the final setting is also used to determine the user's needs. With inherent feedback, we mean that the visual feedback through the appearance of the product is a natural consequence of the user's actions. Because of the inherent feedback, the traces become visible, are made explicit for the user and guide his behaviour. For example, when using both hands on the sliders in an even and balanced way the resulting pattern is symmetrical and smooth. The way this pattern looks will push the user to either heighten the symmetry and smoothness or disrupt them depending on how she feels. Traces and inherent feedback thus work in synergy. Without inherent feedback, using traces is meaningless, as the product cannot guide the user's behaviour: the trace is invisible and cannot invite the user to act in a emotionally rich manner. The user and the product are blind horses.

From our product design perspective, the appearance of interactive products can no longer be considered as arbitrary. Appearance and interaction need to be designed concurrently.

REFERENCES

1. Cooper, A. (1999) The inmates are running the asylum. Indianapolis, SAMS McMillan.
2. Picard, R.W. (1997). Affective computing. Cambridge: MIT Press.

FURTHER READING

3. Wensveen, S.A.G., Overbeeke, C.J., & Djajadiningrat, J.P. (2000) Touch me, hit me and I know how you feel. A design approach to emotionally rich interaction. In: D. Boyarski and W. Kellogg (Eds.) Proceedings DIS2000, New York, pp. 48-53
4. Wensveen, S.A.G., Overbeeke, C.J., & Djajadiningrat, P.J. (2002) Push me, shove me and I know how you feel. Recognising mood from emotionally rich interaction. In: N. Macdonald (Ed.), Proceedings of DIS2002, London, 25-28 June 2002, pp. 335-340.