Living Interfaces: The Impatient Toaster

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ABSTRACT
This paper introduces the *Impatient Toaster*, a kitchen appliance designed to motivate its owners to eat more often and in regular intervals: After not using it for a while, it signalizes hunger through nervous movements. This project sought to explore life-like behaviour as a means of increasing user's sympathy for everyday objects. We present a prototype that was informally tested with six participants in a situated user test. The results indicate that sympathy and perceived cuteness can arise from life-like movements that, as we propose, represent an object's will of its own. This work is part of a larger series of experiments in the *Living Interfaces* project, exploring ways in which reduced life-like movements can be beneficial for Human-Machine Interaction.

Categories and Subject Descriptors
H.5.2 [**User Interfaces**]: Haptic I/O, Prototyping

General Terms
Design, Human Factors

Keywords
Interface Design, Living Interfaces, Emotional Interaction, Kitchen Appliance

Figure 1. The Impatient Toaster, waggling excitedly to alert its user

INTRODUCTION
The *Impatient Toaster* has been created as a trial to provide a lively impression to an everyday life object by using vital and unpredictable manners. Utilizing the Impatient Toaster, it was sought to explore the acceptance of domestic appliances with character of their own. Computers play a predominant role in our lives. Especially students spend a great portion of their time sitting at the PC. One may tend to forget one's environment (especially when in a state of Flow) [1], and sometimes even the intake of food [2]. As research indicates, humans tend to like what is similar to themselves [3] – this is especially true for anything that appeals as cute, which may ultimately be reasoned in a protective instinct: Pets, often cats and dogs, are appointed in therapy for old and disabled people [4], and also pets in the household have a positive symbiotic influence. According to a recent study, owners of pets have to see a doctor more rarely [5]. This project seeks a novel way of motivating the user to eat regularly: Through cuteness and sympathy. It was also of our interest how such could be used as a basis of interaction in other areas, as well.

RELATED WORK
Donald Norman [6] pointed out that sooner or later machines will be equipped with emotions – for better interaction, cooperation and learning:

> *How shall my toaster ever learn in which way I like my toast if he isn't able to be proud of his work?*

In the recent years, different projects have followed this vision. For instance, the (In)Security Camera [7] is a shy surveillance camera that avoids eye contact, and was designed as a statement of social criticism (rather than a exploration of affective HCI). Nabaztag [8] gives information about weather, stock market, air quality, road traffic, email, etc. in various ways, including (ear) posture, light and sound – as opposed to the appliance proposed in this paper that relies only on non-verbal communication and reduced functionality. Furthermore, Luxalive [9] should be mentioned, a reading lamp that moves in relation to the users personality and mood.

DESIGN
The *Impatient Toaster* has no handles or buttons, all interaction with it is strictly based on verbal and gesture-based

negotiation. According to the use-case of a computer user that forgets to eat, the *Impatient Toaster* gets restless after a time of inactivity and begins to shake nervously. Once fed, it calms down and the toast is transported downwards; the toaster is then satisfied. Subtle movements during the toasting period signalize activity. Once the toasting has ended, the retaining jig moves up and the toaster becomes excited again. As soon as the user takes the bread out of the slot, the appliance calms down satisfied. It is also possible to calm down the toaster by patting it for a while. We customized a toaster according to our needs by augmenting it with an Arduino microcontroller board [10] and two servo motors on both sides under the encasement. The hand gear and all buttons were removed and the holes were closed. The retaining jig was motorized. As of safety concerns, the heat mechanism was removed and only simulated with red LEDs. This prototype was remote-controlled by potentiometers and buttons in a Wizard-of-Oz-style setup.

USER TEST

In this initial evaluation, we focused on observing the interaction between user and toaster as for the impatient behaviour, actual toasting and automatic 'slot-in' were not implemented. In a normal kitchen, the device was placed beside other kitchen appliances. An opened bag with bread was placed nearby. The test subjects were asked to enter the kitchen and answer a questionnaire. They were left alone to anwer the questions with the indication that the test about the toaster would be started later. As the subjects filled out the questionnaire, the toaster was activated, while the subjects were secretly filmed. After interacting with the appliance for a couple of minutes, an interview was conducted.

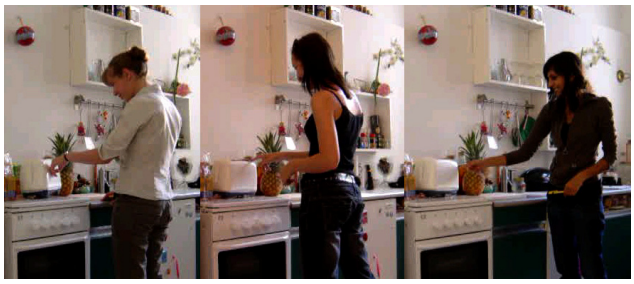

Figure 2. User Test: Participants touching the appliance to calm it down.

RESULTS

The prototype was informally tested by six persons aged between 25 and 40 (4f, 2m). Four of them knew the concept before, but nobody was informed that the test would already start while they answered the questionnaire; all of them were obviously surprised as the toaster began to move. Their reactions were similar: First they were alarmed, then they began to laugh. Every participant stopped writing and came closer to the toaster, touched it and began talking to it ('What's up?', 'What's the matter?', 'What do you want?'). A short while after feeding the toaster (which most of the subjects did intuitively right away), it started to waggle again excitedly. Interestingly, all test subjects turned towards it and started to talk to it and touched it again, and also verbally tried to calm it down. After the simulated toasting, one subject actually said 'Thank you!' to the toaster. One person tried to put more and more bread into the slot. Another subject reportedly felt a bit scary in the first instance, having to build up trust first. Most participants found the toaster 'very cute', stating he was 'proud' of his work. They enjoyed interacting with it.

CONCLUSION

By building the prototype and arranging a user-test in a real life scenario we found out that it is possible to give a kitchen appliance a character of its own by simulating life-like behaviour. The user test has shown that human-like attitudes foster emotional engagement between the object and its user. Judging from the toaster's movements, all users understood that the toaster 'wanted' something.

FUTURE WORK

In terms of functionality, it is important to add a working 'slot in/out' mechanism and enable the device to actually toast bread. It needs to be determined how the *Impatient Toaster* can be appropriately calmed down, as, for instance, to deny a proposed meal. Also, effects of long-term usage are still unexplored. Additional emotional states of the device could be explored, such as greed, satisfaction and happiness; we encourage more research in the field of emotionally augmented household devices.

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