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# Integration of Olfactory Media and Information in Pervasive Environments

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Doctoral Seminar, Linz, 2006

**Abstract**

The most important requirement to a pervasive environment is to make technology invisible, but also inaudible, inodorous for the user. This means that a pervasive environment must appeal all five senses to hide technology by a real, augmented world. Aromas and Flavours could also transport information like pictures or sounds. But they need a different way to integrate and use them in a pervasive environment.

**Keywords**

Olfactory, Pervasive computing, media, information, perception, information design

**Problem Statement and Research Question**

Nowadays pervasive environments often appeal only two senses, the sense of hearing and the sense of sight. Sometimes the sense of touch is considered, but the sense of smell and taste are omitted. This makes such environments unreal, because information for one sense isn't supported by the information for other senses (e.g. information for the eyes isn't supported by information for the nose). So there is no multimodal communication between the environment and the user.

Smells and Odours are information which is interpreted most individually. The same information content (e.g. smoke) has a different meaning for different users (e.g. a house burns, warming open fire, someone smokes,...). So following research questions need to be answered:

*How do users perceive odours and is there a possibility of an objective perception?*

The psychological research found out that people perceive odours very differently. But there are some smells which are always interpreted in the same way, e.g. stink is bad and perfume is good. Besides odours has a bigger effect on the human mind as pictures or sounds. *So how far could people be influenced by odours?*

*Smell has been an unconscious media so far. But is it possible to use smell conscious?*

A selective use of smells could effect individual or mass reactions. *So could smell be used as mass media?*

*How could the perception of odours be used for a standardized communication between user and user or user and environment? Is this possible?* This depends also on the human perception of odours. Further the current and future technical possibilities plays a big role.

*How could an olfactory communication be integrated in a pervasive environment?*

Considering the rules how technology should be hidden in a pervasive environment olfactory technology could be integrated. But there are also other aspects like proportion or the local and temporal limitation of odours, which must be considered.

## **Approach and Methodology**

The experimental research bases on projects of the department of pervasive computing and polytechnical university of Hagenberg.

The research results will be evaluated by applying these to future installations of the department of pervasive computing and the polytechnical university of Hagenberg.

## **Related Work**

### *Papers*

#### *German Literature*

Jürgen Raab, Soziologie des Geruchs, Uvk, 2001

E. Br. Goldstein, Wahrnehmungspsychologie, Spektrum Akademischer Verlag, 2002

#### *English Literature*

Constance Classen, Antohny Synnott, David Howes, Aroma: The Cultural History of Smell, Rotledge, 1994

Linda Bartoshuk, Carterette, Gary K. Beauchamp, Tasting and Smelling, Academic Press Inc. (London) Ltd, 1997

Catherine Rouby, Benoist Schaal, Andri Holley, Danihle Dubois, Remi Gervais, Olfaction, Taste and Cognition, Cambridge Univ Pr (Sd), 2002

Deborah Roberts, Andrew J. Taylor, Flavour Perception, Blackwell Science (UK), 2004

### **Preliminary Results**

In 2002 the polytechnical university of Hagenberg realized an augmented reality installation (Smellware) with an integrated smell machine (Smellbox). Test shows that a overload of odours causes a physical and mental refusal.

### **Conclusions and Future Steps**

Next step is the theoretical research in the subject areas usability, perception and design to delve how far design rules of these topics could be applied to pervasive installations.

This thesis is written in media theories. Main supervisor is Karin Bruns of the University of Art of Linz. Because of the main research it needs a co-operation with the polytechnical university of Hagenberg and the department of pervasive computing with Alois Ferscha as co-supervisor.