

Workshop Title:

Supporting Human Memory with Interactive Systems

Organizers:

Denis Lalanne and Elise van den Hoven

Contact:

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Summary (30 words):

The major goal of this workshop is to explore how interactive systems can support human memory, using novel technologies and innovative human/machine interaction paradigms, such as tangible user interaction.

Procedure:

This full-day workshop will consist of a morning program including an introduction and position paper presentations (of approximately 10 minutes each). We want to divide the participants in the afternoon session according to the themes defined in the workshop description. These themes and the related questions raised in the workshop will be used to start discussions and brainstorms in small discussion groups. Later these groups will present their results to the other workshop participants. We would like to end the workshop with a group discussion on possible future directions.

Goals and timeliness of the theme:

The aim of the workshop is to bring people together to discuss ongoing research into human memory, both user centered and technology driven, and to address some of the following topics: findings in human memory and related diseases, technologies that support human memory, the relationship between tangible objects and human memory, emotion-oriented user interfaces, and personal information management and visualization.

Human memory is indeed central in our daily life activities, not only to build relationships with friends, create our identity or reminisce about the past but also to drive our attention towards the most important tasks to perform and to manage our lives. Information overload, memory and attention lacks are crucial challenges to solve, not only for elderly people but also for the rest of the society. Numerous elderly have memory and attention problems, without speaking about Alzheimer disease, which hinder their daily lives. Younger people also face memory problems, especially with the constant increase of information a person owns and handles.

This workshop proposes to explore how technologies and interactive systems can help support human memory and to improve the wellness of people suffering from memory or attention lacks or just everyday people in everyday situations.

### Participants:

We aim at a mix of researchers and practitioners working on (including but not limited to) tangible user interfaces, multimodal interfaces, system designers, sensing technologies, cognitive sciences, personal information management or information visualization. These participants could be originating from diverse fields, including HCI, computer science, (interaction) design, psychology, sociology and ethnography.

### About the organizers:

Denis Lalanne is a senior researcher in the DIVA group of the University of Fribourg, Switzerland, where he gives a course on multimodal interfaces ([diuf.unifr.ch/courses/05-06/mmi/](http://diuf.unifr.ch/courses/05-06/mmi/)). Previously, he was usability officer in Iconomic systems, a Swiss startup, assistant professor in the University of Avignon, and researcher in the USER group of IBM Almaden, USA. In 1998, he obtained a PhD from the Swiss Federal Institute of Technology in the domains of AI and HCI. Denis is currently coordinating scientifically several HCI projects among which: MeModules ([www.memodules.ch](http://www.memodules.ch)) which aims at building and evaluating tangible reminders, supporting memory and facilitating the control of devices in everyday life and information access; and Total Recall aiming at supporting humans' memory in their professional life, and more specifically to support humans in remembering information or documents exchanged during meetings, tasks to do, or for preparing their presentations for a following meeting.

Elise van den Hoven is an assistant professor in the User-Centered Engineering group at the department of Industrial Design of the Eindhoven University of Technology, the Netherlands, currently working on tangible interaction in different application areas, including gaming and well-being. She has a background in user-system interaction. Her PhD-project took place at the Philips Research Eindhoven Laboratories and centered around two major themes: recollecting memories and tangible interaction. Her work focuses on designing, building and evaluating Tangible Interaction systems, which is user-centered and it is inspired by Dourish's Embodied Interaction (2001).

# Supporting Human Memory with Interactive Systems

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## ABSTRACT

The major goal of this workshop is to explore how interactive systems can support human memory, using novel technologies and innovative human/machine interaction paradigms, such as tangible interaction. We believe this is important since memory and attention are becoming critical resources for our wellness, e.g. with regard to a continuously increasing information overload. The goal of this workshop is not only to support personal information management but also daily life activities, e.g. adapted to user preferences and specific contexts. Where current multimedia search engines are designed for large user communities and their applications, this workshop targets the support of individual's personal memory in everyday life.

## 1. MOTIVATION

Human memory is central in our daily life activities, not only to build relationships with friends, create our identity or reminisce about the past (Cohen, 1996) but also to drive our attention towards the most important tasks to perform and to manage our lives (Baddeley, 1997). Information overload, memory and attention lacks are crucial challenges to solve, not only for elderly people but also for the rest of the society.

Numerous elderly have memory and attention problems, without speaking about Alzheimer disease (Morris, 2005, Rusted, 2002), which hinder their daily lives. Not only do they have difficulties remembering appointments and tasks that need to be done, such as buying bread or milk twice the same day, they might lose their glasses, they have trouble remembering people and places, which can result in insecurity, unsafe situations and melancholic feelings.

Younger people also face memory problems, especially with the constant increase of information a person owns and handles. Not only the information amount is growing fast, it is dematerializing and thus, people are often experiencing the "lost-in-infospace" effect. Our documents are multiplying in very large file hierarchies, our pictures are no longer stored in photo-albums, our music CDs are taking the form of mp3 files, movies are stored on hard-drives. Google and Microsoft recently tried to solve the "lost-in-infospace" issue by providing, respectively, a desktop search engine and a powerful email search engine, in attempt to minimize the effort needed by people to organize their documents and access them later by

browsing. However, in order to find a file, one still has to remember a set of keywords or at least remember its "virtual" existence. If one does not remember having a certain document, browsing could be helpful, since it can reveal related keywords and documents. Those, in turn, can help you remember by association, like our human memory does (Baddeley, 1997, Rigamonti et al., 2005).

The process of "remembering" usually starts with a sensory cue which gives you access to an associated memory. For example, we may see a picture of a place visited in our childhood and the image cues recollections associated to the content of the picture and trigger an emotional reaction simultaneously. This information is generally easier to retrieve if it is associated to a strong emotional experience (Ochsner & Schacter, 2003) or when it is rehearsed often which can be facilitated by having physical objects related to memories, such as souvenirs or photographs (Hoven, 2004). Therefore tangible interaction systems seem to have potential for supporting everyday human memory (e.g. Glos & Cassell, 1997, Hoven & Eggen, 2004, Ullmer & Ishii, 2000). Furthermore, it appears that humans easily access and retrieve information when it is linked to other related information or objects (Lamming & Flynn, 1994, Whittaker et al., 2006), either information or sounds, smells, images, etc. which supports the idea of cross-modal indexing (Lalanne et al. 2005).

This workshop proposes to explore possible ways to support memory, by means of interactive systems, to improve the wellness of people suffering from memory or attention lacks or just everyday people in everyday situations.

## 2. AIM OF THE WORKSHOP

The aim of the workshop is to bring people together to discuss ongoing studies on human memory, both user centred and technology driven, and to address some of the following questions:

**Human Memory:** What human memory knowledge is needed to create optimal memory support? What are the known drawbacks of our memory?

**Target group:** Which groups of people could benefit most from human memory support? Can we support people suffering from Alzheimer and dementia? How can potential users be involved in the analysis, design, implementation and evaluation process?

**Evaluation:** How do we evaluate memory support from the perspective of the target group, interaction or interface design and supporting technologies? What has been done in terms of evaluation thus far and what did the results teach us?

**Supporting Technologies:** Which kind of technologies can be used to support human memory? Which multimodal technology

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can help best supporting memory? For which tasks and target group? And what is the context of use?

Tangible Interaction: Why is tangibility important? How can we assess tangibility? What kinds of tangible objects are suitable for supporting remembering, i.e. how does tangible object design relate to human memory? Are personal tangibles more suitable than generic tangible objects for the memory field?

Emotion-oriented interfaces: How can emotion-oriented computing help supporting memory? How can a machine detect emotions and link it with related information? How can a machine generate emotions and recall memories? Can we use the knowledge that memories and emotions are closely linked?

Personal Information Management and Visualization: Which novel information mining and retrieval strategies are necessary to index and retrieve memories? How to adapt and extend multimedia search engines to handle personal memories? How to deal with the cross-modal nature of personal memories and information?

### 3. PARTICIPANTS

We aim at a mix of researchers and practitioners working on (including but not limited to) tangible user interfaces, multimodal interfaces, system designers, sensing technologies, cognitive sciences, personal information management or information visualization. These participants could be originating from diverse fields, including HCI, computer science, (interaction) design, psychology, sociology and ethnography.

### 4. WORKSHOP PROCEDURE

In case you are interested in participating in this workshop you should submit a 4-page position paper on any of the above-mentioned or related topics using the ACM-template (<http://www.acm.org/sigs/pubs/proceed/template.html>). Papers will be selected based on the quality, the relevance and on the diversity, since we are aiming at discussing work from different backgrounds, such as HCI, computer science, cognitive science. We will have to limit the number of presentations to no more than 15, due to time limitations. The total number of participants is limited to 25 to keep the workshop interactive.

The full-day workshop will consist of a morning program including an introduction and position paper presentations (of approximately 10 minutes each). We want to divide the participants in the afternoon session according to the themes mentioned in the previous section. These themes and the related questions raised in the workshop will be used to start discussions and brainstorms in small discussion groups. Later these groups will present their results to the other workshop participants. We would like to end the workshop with a group discussion on possible future directions. This is a rough first schedule of the day:

9	Welcome & Intro	14-14.30	Brainstorming intro
9-12	Position papers	14.30-16	Brainstorming in groups
12-13	Lunch break	16-17	Group presentations
13-14	Position papers	17-17.30	Wrap up & future

### 5. FUTURE PLANS

Plans for publishing the workshop proceedings with Springer-Verlag or electronically on ACM Digital Library will be studied in advance. However, we also want to discuss the follow-up possibilities during the workshop: a forum, a wiki, a mailing list, a book or a special issue in an international journal. In addition we are confident that this workshop will facilitate future collaboration and continuing discussions.

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