

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 [2] but also to drive our attention towards the most important tasks to perform and to manage our lives [1]. 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 [8][11], 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 [1][10].

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 [9] or when it is rehearsed often which can be facilitated by having physical objects related to memories, such as souvenirs or photographs [4]. Therefore tangible interaction systems seem to have potential for supporting everyday human memory (e.g. [3][5][12]). Furthermore, it appears that humans easily access and retrieve information when it is linked to other related information or objects [7][13], either information or sounds, smells, images, etc. which supports the idea of cross-modal indexing [6].

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 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	13-14	Lunch/brainstorming in groups
9-11	Position papers	14-16	Brainstorm. in groups
-	15 min. break	16-17	Group presentations
11-13	Position papers	17-17.30	Wrap up & future

5. FUTURE WORK

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.

6. REFERENCES

- [1] Baddeley, A. (1997). *Human Memory: Theory and Practice*, Psychology Press (UK).
- [2] Cohen, G. (1996). *Memory in the real world*, Hove, UK: Psychology Press.
- [3] Glos, J.W. and Cassell, J. (1997b). *Rosebud: A Place for Interaction Between Memory, Story, and Self*, Proceedings of the 2nd International Conference on Cognitive Technology (CT'97), 88.
- [4] Hoven, E.A.W.H. van den (2004). *Graspable Cues for Everyday Recollecting*, Ph.D.-thesis at the Department of Industrial Design, Eindhoven University of Technology, The Netherlands.
- [5] Hoven, E. van den, and Eggen, B. (2004). *Tangible Computing in Everyday Life: Extending Current Frameworks for Tangible User Interfaces with Personal Objects*, Markopoulos et al. (Eds), proceedings of EUSAI 2004, LNCS 3295, Nov 8-10, Eindhoven, The Netherlands, pp. 230-242.
- [6] Lalanne, D. and Ingold, R. (2005). "Structuring Multimedia Archives With Static Documents." In *ERCIM News: "Multimedia Informatics"*, vol. 62, n° 62, July 2005, pp. 19-20.
- [7] Lamming, M. and Flynn, M. *Forget-me-not: intimate computing in support of human memory*. In: *FRIEND21: International symposium on next generation human interface*, Meguro Gajoen, Japan, 1994, 125–128.
- [8] Morris, M.E. (2005). *Early Detection of Cognitive Decline with Embedded Assessment*. *Alzheimer's and Dementia*, Volume 1, Issue 1, Supplement 1, July 2005, p. 107.
- [9] Ochsner, K.N. and Schacter, D.L. (2003). *Remembering emotional events: A social cognitive neuroscience approach*. In: *Handbook of Affective Sciences*, R. J. Davidson et al. eds., Oxford University Press, pp 643-660.
- [10] Rigamonti, M., Lalanne, D., Evéquo, F. and Ingold, R. (2005). "Browsing Multimedia Archives Through Intra- and Multimodal Cross-Documents Links." In *Renals S. & Bengio S., eds., Machine Learning for Multimodal Interaction II*, LNCS 3869, Springer, pp. 114-125.
- [11] Rusted, J.M. and Sheppard, L.M. (2002). *Action-based memory in people with dementia: A longitudinal look at tea-making*. *Neurocase*, 8, 111-126.
- [12] Ullmer, B., Ishii, H. (2000). *Emerging frameworks for tangible user interfaces*, *IBM Systems Journal*, 39, 915-931.
- [13] Whittaker, S. Bellotti, V. and Gwizdka, J. (2006). *Email in Personal Information Management*. In *Communications of the ACM*, 49(1), 68-73.