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## Editorial - Welcome to this first HERMES Newsletter

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The aim of this newsletter is to inform scientists, industry as well as older people in general about the achievements reached within the HERMES project. The newsletter appears approximately two times per year.

In this newsletter:

- Start of the HERMES project
- Pervasive computing in the context of the older person's home
- Project's first milestone reached

Please do forward this newsletter to people that might be interested in the project! For more information on the project, take a look at the project website at <http://www.fp7-hermes.eu>.

Kind regards and enjoy reading!

Arjan Geven  
*HERMES Project Administrator*

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## HERMES – Cognitive Care and Aging starts successfully

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HERMES provides an integrated approach to cognitive care. This is achieved through an assistive technology that combines the functional skills of the older person to reduce age-related decline of cognitive capabilities and assist the user where necessary. Based on intelligent audio and visual processing and reasoning, the project results in a combination of a home-based and mobile device to support the user's cognitive state and prevent cognitive decline. HERMES assesses the following five core objectives associated:

1. Facilitation of episodic memory through the capture of content in audio and image including when, where, who, what and why of a moment, including additional contextual information, such as date and time, but human emotion, the amount and name of people present and derivatives, and information from other sources.
2. Cognitive training through games with moments that have been captured previously that are related to contextual information.
3. Advanced activity reminding to assist the user's prospective memory in performing everyday tasks and to support

independent living. Modelled after human associative memory, contextual cues remind the user automatically and non-disruptively.

4. Conversation support on the grounds of interactive reminiscence based on the recordings of important moments in everyday life.
5. Mobility support to address the needs of the user outside of the house with cognitive support when and where needed.

HERMES aims specifically at supporting the decline in (declarative and prospective memory) capabilities by using other functional cognitive skills and training these, thereby reducing the need for active care and support and substantially increasing the ability to cope with everyday life and to live independently.

The HERMES project has officially started on the first of January 2008 with a project duration of 36 months, the project will finish in December 2010. The kick-off meeting took place in Vienna on the 16th and 17th of January.

## User requirements analysis provides insight in everyday cognitive issues of the older population

A questionnaire developed in order to collect the needs of elderly has been administered. The objectives of the questionnaire were: (1) To specify the needs of the elderly people that allow them to live in an independently and autonomous way; (2) To know the specific aspects of the user needs in which HERMES can offer help and the way it can do it; (3) To define which information is important for the elderly to be reminded.

It has been administered to 63 people with and without memory complaints, when these people attended at Cognitive Training Sessions organized by INGEMA. Regarding the gender of the sample, 14 people were male and 49 female. The age average was 70.15 years, with a standard deviation of 6.30 years.

Both, qualitative and quantitative approach were taken into account. The qualitative analysis consisted on the frequency of answers given in the open questions. Unfortunately, not everybody answered these questions. The main results were the following:

- Needs in the field of health and prevention: to remember an adequate diet:
  - 42% of people that answered affirmatively to this question.
- Needs in the field of conditions to live by yourself:
  - health preservation: 27% of people that answered affirmatively to this question

- access to emergency telephone: 25% of people that answered affirmatively to this question

The analysis of the quantitative approach, has produced the following results:

- Elderly want a device that reminds them: shopping list (50%); conversations with the doctor (41.0%), or with their families (36%), things they have to do (48.1%); cognitive games (86.66%) and register places (39.47%).
- The situations in which they feel uncomfortable because of not remembering something is: buy or do any task (55%); how to go somewhere (23.3%); forget names (63%), important appointment (41.66%); conversations (30%); having bought something or buy it twice (16.9%).
- In the cognitive training field, they feel that is necessary to practice 34% (9 people)

Finally, an attempt to find significant relations between variables has been done. The most statistical significant relations ( $p < .05$ ) have been found between Range of age and being uncomfortable forgetting names ( $p = .07$ ), and between Range of age and use of remembering strategies ( $p = .11$ ). These relations imply that people with more age feel more uncomfortable when they forget names, and use more strategies in order to remember the things that they have to do.

## HERMES in the Context of Pervasive Computing Systems for Ambient Assisted Living

The vision of pervasive computing is to transform physical spaces into computationally active and intelligent environments, which provide non-obtrusive human-centric services regardless of time and end users location. A

main characteristic of these services is that they are context-aware in the sense that they can automatically sense and perceive the status of their surrounding environment, and accordingly exploit this status in shaping their

application logic. Numerous instances of context-aware services have been developed in research initiatives, but also in the scope of deployments in smart homes, smart conference rooms and systems for ambient assisted living (AAL).

In the area of ambient assisted living we are recently witnessing a growing interest for pervasive context aware products and services which target elderly users. This is largely due to falling fertility and rising longevity phenomena, as well as due to the proliferation of the ageing population all over the world. Ambient assisted living solutions for the elderly target a variety of assistive functionalities such as social integration and decentralized communication support (e.g., supporting interaction with friends and relatives), as well as e-health and e-care (e.g., facilitating caretakers and minimizing the need for hospitalization). Most pervasive systems and services for the elderly employ usually one of the following prominent approaches to ubiquitous computing and context-aware systems:

- Tag based systems, which read tags (e.g., Radio Frequency Identification, Active Badges) to track objects, humans and infer context.
- Wearable computing, which is based on sensors that are attached to humans and employ custom I/O mechanisms to derive and disseminate context.
- Smart spaces, which are ordinary physical environments equipped with pervasive sensors and devices that perceive and react to people in a natural and non-intrusive manner

Smart spaces provide the less obtrusive approach to implementing human centric services for aged users. The latter are not likely to be familiar with ICT technologies and devices, which makes the natural interactivity provided by smart spaces preferable. Nevertheless, application development in smart spaces is still a complex task, since it involves

a wide range of highly distributed and heterogeneous hardware and software elements. An integral element of smart space applications are perceptual components, which provide information about the identity, location, activities and sometimes the goals of human actors through person trackers, person identification components and other situation identification elements. In addition to these development challenges, smart space applications for elderly users must extend their outreach outside the domestic environment given that user activities are not confined to the home environment. On the contrary, a variety of elderly user activities (e.g., shopping, doctor visits) takes place in outdoor environments. Hence, application development is made more difficult since developers have to deal with mobility, CPU-constrained devices, as well as their interaction with in-home systems.

The HERMES project leverages leading edge audio and video based perceptual processing components, which can be used to implement a wide range of ambient assisted living functionalities. HERMES relies also on state of the art application architectures which define structuring principles for integrating these perceptual technologies into added value applications for senior citizens. HERMES targets three families of such added value applications spanning the areas of memory aids, ambient calendar and cognitive training games. These applications can contribute to minimizing the cognitive decline for elderly users.

However, HERMES has to deal with some stringent requirements and constraints associated with building context-aware applications for elderly users. Specifically, speech processing applications and speech based emotion detection require customization to the peculiarities of elderly speech. Also, a number of usability issues are raised, given that elderly people are not accustomed to using devices and context-aware applications. A systematic and complete resolution of these important issues asks for a thorough and

consistent understanding of end-user requirements, which is in progress in the scope of the first eight months of the HERMES project. Nevertheless, the availability of robust perceptual components and application architectures open up new opportunities in the area of the ambient assisted living applications

for senior citizens. We envisage that the unique partnership between leading edge technology providers with usability and gerontology experts (realized in the scope of the HERMES project) will capitalize on these opportunities towards novel added value services.

## Project reaches first milestone: user requirements analysis complete

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The first project milestone, the analysis of user requirements was finished at the end of August! Through user interviews, focus groups, questionnaires, memory assessments and other methods such as cultural probes in three different countries (Austria, Greece and Spain), the project partners gained more insight in the way older people interact with technology and particularly with technology that deals with forgetfulness. The requirements have been summarized into scenarios which in

turn have followed into concrete use cases of the future HERMES system. In various deliverables this process has been documented, which can partly be accessed directly through the HERMES website!

In the next phase of the project, first interface prototypes will be developed that are evaluated with users throughout Europe to validate the user requirements and to iterate on the scenarios that define the technology.

## About the HERMES Project

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“HERMES – Cognitive Care and Active Aging” is an international collaboration between six organizations in six countries, aimed at providing cognitive care to combat general cognitive decline induced by aging. The project is supported by the EU under Framework Programme 7 (Ref: 216709).

The project is conducted by the following six organizations:

1. CURE – Center for Usability Research and Engineering, Austria (Coordinator)
2. INGEMA Foundation, Spain
3. IBM Haifa Research Lab, Israel
4. University of Bradford, UK
5. Athens Information Technology, Greece
6. TXT e-Solutions, Italy

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