# HERMES

Cognitive Care and Guidance
for Active Aging

Project Goals:

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 home-based and mobile devices to support the user's cognitive state and prevent cognitive decline. HERMES targets at the following five core objectives:
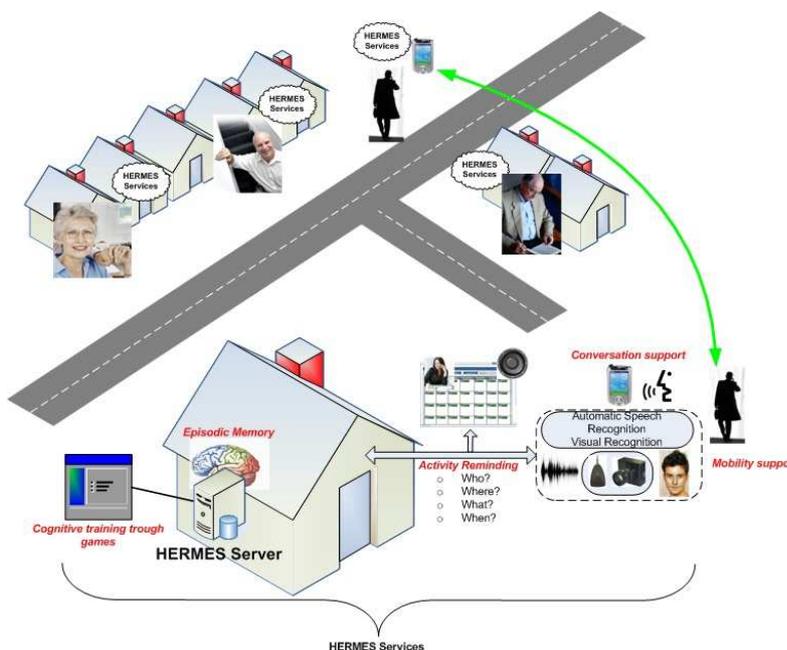
1. Facilitation of episodic memory through the capture of content in audio and image including when, where, who, what and why of a moment, including additional contextual information, such as date and time, but also human emotion, the amount and names of people present, etc..

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.

Expected achievements and impact:
HERMES will be capable of reminding users based on actively set reminders like a typical calendar. At the same time the system facilitates the episodic memory of its users by the provision of important moments. That means that the system "knows" the name of the user's appointment and can e.g. show a photo of him/her and shows the recent topics of their conversation.

The system provides also context based reminding support. If the user e.g. passes certain points of interest the system can remind the user to buy coffee or to buy the pills that the user should take in the evening. In the evening HERMES shows a picture of the pills and reminds the user to take them.

HERMES' core will be the semi-automated reminding system and the search function. HERMES will be capable of detecting those parts of a conversation that should go into the HERMES memory store. These parts might be appointments, prescriptions from the medical doctor, etc. After the detection of such parts HERMES will start an intuitive interaction with the user where he/she can decide on how HERMES shall store the information and on how it shall remind the user.

Furthermore, HERMES will provide a search function which will enable its user to go through past conversations and to search e.g. for emotional parts of a conversation or to search for certain key words. This function will facilitate the users' episodic memory and will enable them to resume past conversations.

Apart from these functions HERMES will provide several cognitive games that will be integrated into the HERMES system and which will enable its users to train their cognitive capabilities.

Technical Approach
HERMES' research challenges require profound research and development in areas such as image and video content processing, including visual pattern recognition, automatic speech recognition, speech analytics, speech data retrieval, emotion detection, text-to-speech synthesis, coding, and noise cancellation.

All the technical work is driven through user-centered design, ensuring that the user is always at the heart of all design decisions. A detailed user analysis provides the geriatric, user-based underpinning of the project.

Project ACRONYM:
HERMES

Project Full Title:
Cognitive Care and Guidance for Active Aging

Project Type:
Small or Medium-Scale Focused Research Action

Project Duration:
36 months

ICT Challenge:
Independent living and inclusion

Contract Number:
216709

Project Priority:
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.

Project Coordinator:
Arjan Geven & Prof. Manfred Tscheligi
Center for Usability Research & Engineering
Hauffgasse 3-5
1110 Vienna
AUSTRIA
Tel: +43/1/743 54 51 – 11
Fax: +43/1/743 54 51 – 30
email: geven@cure.at

Project Participants:
INGEMA Foundation (Spain)
IBM Haifa Research Lab (Israel)
University of Bradford (UK)
AIT (Greece)
TXT E-Solutions (Italy)