COMPETITIVENESS AND INNOVATION FRAMEWORK PROGRAMME

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This Deliverable includes a printout of the most important item of project dissemination, the LLM leaflet and the description of the project fact sheet according to the Description of Work annexed to the contract with the EC.

Document History

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[1] Please use a new number for each new version of the deliverable. Add the date when this version was issued and list the items that have been added or changed. The 'what's new' column will help the reader in identifying the relevant changes. Don't forget to update the version number and date on the front page and the header.

[2] A deliverable can be in either of these stages: "draft" or "final". For each stage, several versions of a document can be issued. *Draft:* Work is being done on the contents. *Final*: All chapters have been completed.

Project information sheet

LLM (Long Lasting Memories) - A unified solution for cognitive and physical health and autonomous living for senior citizens.

Long Lasting Memories (LLM) is an EU project aiming at an integrated ICT platform which combines state-of-the-art cognitive exercises with physical activity in the framework of an advanced ambient assisted living environment. By combining cognitive exercises and physical activity LLM delivers an effective countermeasure against age-related cognitive decline, thus actively improving the quality of life of the elderly and significantly prolonging the time they can remain independent at home, while respecting ethical and legal boundaries.

The LLM service can be installed in individual homes, day care centres, or more formal medical settings, enabling the accident-free, personalized and monitored physical and cognitive training of its users. Meanwhile, users are able to take advantage of the features of an independent living solution. This is accomplished by home automations that compensate for the disabilities of people with cognitive problems or mild dementia during their daily activities. Finally, an elaborate distributed sensor network guarantees immediate response in case of an emergency, by calling for help through public telephone lines (in case of home installations), or issuing alerts to onsite caregivers (in case of other installations).

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Milton Keynes Council (Link to http://www.milton-keynes.gov.uk)	UK

Links

LLM website (Link to http:///www.longlastingmemories.eu)

Project ID card

Funded under: ICT Policy Support Programme
Area: CIP-ICT-PSP-2008.1.4 - ICT for ageing well with cognitive problems, combining assistive and independent living technologies
Total cost: €4.720m
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Project reference: 238904
Execution: From 01/06/2009 to 30/11/2011
Project status: Running
Contract type: ICT Policy Support Programme CIP-ICT-PSP-P CIP-Pilot actions

Project activities

During the project, the LLM service will be tested in real life situations in order to consolidate requirements and validate functionality of the solution. To achieve consistency of requirements and specifications across the whole value chain, the consortium contains a multidisciplinary team of partners encompassing a broad spectrum, from technology development to service providers, and including public authorities from each country that have responsibilities in the relevant area of care or supply of services.

Four consecutive rounds of testing will take place in 5 EU Member countries (Austria, France, Greece, Spain, and the UK) for a period of 15 months, thus aiming for a wide impact on the entire Union. Effective cooperation of public authorities and private institutions will be pursued through extensive dissemination activities as an effort to promote a business model based on public-private-partnership.

Testing will be focused upon elderly volunteers who will be screened and monitored throughout the course of the trials to provide high quality data quantifying the results of the LLM solution. In addition, the testing participants will provide feedback to help improve the solution. Testing will be conducted in accordance with relevant regulations for the protection of the participants; all test protocols will utilise good ethical practices and comply with European and national legislation.

Case examples

The LLM service is designed for use by elderly people living at home, visiting day care centres in their community, or in a rehabilitation clinic or hospital, providing simple, user-friendly operation and measurable physical and cognitive benefits. Though these three types of environments differ significantly, they can all utilize the LLM platform. Case examples are described below:

A. Independent Living at Home

Mrs B. is an older woman who has recently widowed and is now living in the same town as her daughter. Nevertheless there is such a distance between them that prevents her daughter from constantly visiting her and seeing if everything is alright. While this distance arrangement has successfully worked while Mr. B was alive, after his death, Mrs B's daughter finds herself worrying more intensely about her mother, afraid that she might fall at any time, without having someone to help her. She is thinking about hiring a personal caretaker, but her mother will not accept full time care. Finally, her mother is already showing some signs of memory loss, a definite sign of cognitive decline.

LLM can be used very effectively in this scenario. First of all, it would be easier for Mrs B. to accept having the LLM service installed, since it would be less intrusive than the presence of a full-time professional caregiver. The LLM's eHome environment would monitor Mrs B.'s movements and notify her daughter at home or on her mobile phone if anything went wrong. LLM would also create a training programme tailored to Mrs B's condition. This training programme would include both cognitive exercises as well as physical training equipment, which in Mrs. B.'s case would be a recumbent bike.

Typical usage of the service might be similar to the following scenario: Mrs B. wakes up. After finishing her breakfast, she sits on her armchair and uses the touch screen to initiate the cognitive training procedure. A number of exercises appear and Mrs B. clicks on the correct answer by putting her finger on the corresponding button-image on the screen. At any time she can stop the procedure by clicking on the corresponding button; otherwise the procedure will eventually finish for this day, asking her to return tomorrow. During the afternoon the system suggests to her that she should sit on the recumbent bike and follow the training programme according to the displays on the screen. Since Mrs B. has improved during the last two weeks the programme will set a slightly more challenging physical programme and monitor her performance. If she can keep up with the pace then after two weeks, a more intense workout will be proposed. Otherwise, the system will return to the previous pace and will display related messages accordingly.

The effects on the lives of Mrs B. and her daughter are various: Mrs B. herself feels more self-reliant and independent, not only because she can move freely around the house with fewer worries, but also because she is feeling physically and mentally fit. Furthermore, her daughter is not fearful about her mother being helpless, since she knows that in the case of an emergency the system will immediately notify her. Finally, on a less important -but still quite relevant- level, her family has avoided high financial costs associated with engaging a 24 hour caregiver. They have also avoided the costs, both financial and emotional, associated with any intensive care or hospitalization needs of Mrs. B, by prolonging her cognitive and physical well-being.

B. Elderly Day Care Centres

The day care centre for the elderly in a small town is a nice and clean place where aged people can talk to each other, play games and generally entertain themselves. However, the number of elderly people in the centre, including people with mild dementia or more serious cognitive disabilities, has risen over the years. Consequently, the care centre's staff does not have adequate time to spend with each person. Relatives are contacted and are

asked to provide care to their elders, while the manager of the centre believes that more staff is needed but cannot be afforded.

LLM could be used in medium and large size elderly care centres to ameliorate such problems, as it provides a positive activity in which the elderly can be engaged while improving their cognitive and physical condition. We envision that a day care centre using LLM has both an eHome installation and a specific purpose room with a touch screen and all physical training equipment. Different types of physical training equipment can be used, in order to provide different levels of exertion according to the user's abilities. The elders can also use one or more touch screens to access the cognitive training software. Meanwhile, they can work out on the physical training equipment of their choosing watching their performance on the screens. Finally, if any accident were to occur inside the eHome framework, the centre's staff would be immediately notified to direct them to the location of the accident to provide assistance or medical care.

This advanced installation offers an added value to the day care centre, by prolonging, through the training process, the time that elders remain in a cognitive and physical condition that allows them to interact and engage with other people, without the need for more intensive personalized care. Elderly are able to extend the period of their enrolment at the day care centre, improving their own quality of life through social interaction, and ultimately providing more revenue for the care centre. Moreover, the centre's staff can work more efficiently since the monitoring system would identify emergencies and direct staff accordingly.

C. Clinics for the Elderly

An elderly person enters a medical institution (such as a hospital or an assisted living facility) when he or she needs intensive care. Once hospitalised, this person might be allowed to move freely around the facilities, depending upon specific medical conditions. Much as at the day care centres, constant monitoring of the movement of the patients within the facility is not possible. And though most institutions provide physiotherapy sessions, they lack any methods for cognitive training.

LLM can be used in elderly clinics, providing a sensor network throughout the facility, with special rooms equipped for cognitive training exercises. The physical training equipment can be used in a fashion that is complementary to the normal physiotherapy sessions of the patients. The LLM service can also assist the hospital's staff to know whether any of their patients has had an accident, enabling a quick response. For maximum effect, the clinic can have a specially trained neuropsychologist to evaluate each patient's progress using the LLM service and provide further feedback in the form of personal interviews. Finally, patients can be encouraged by the hospital's staff to use the physical training equipment, above and beyond their normal physiotherapy work, if their medical condition allows. Such complementary training can further increase the mobility skills and improve the physical well-being of the patients.

Taking into account that hospitalized persons suffer either from a cognitive and/or a physical problem, LLM can have a significant effect. Its cognitive training component can be used by every patient, excepting those with severe cognitive issues. The physical training equipment can be used by all physically able patients, thus improving their physical condition and sense of well-being. All patients can enjoy increased freedom of movement within the institution's premises due to the presence of the monitoring system.