3 Publishable summary

LLM Publishable Summary

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, while respecting ethical and legal boundaries. 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.

The LLM service can be installed in individual homes, day care centres, or formal medical settings, enabling personalized and monitored physical and cognitive training of its users. Meanwhile, users are able to take advantage of features of an independent living solution.

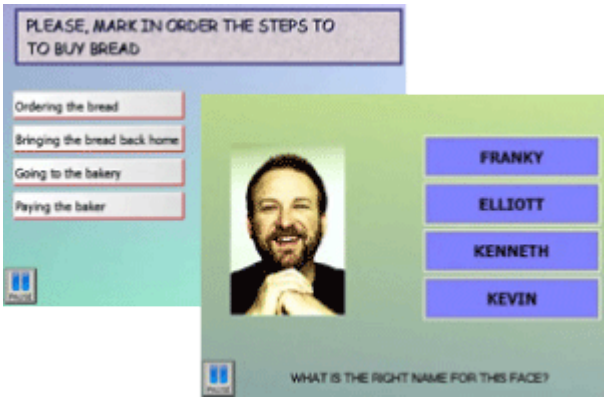
Figure 1: LLM service

The LLM service is designed to comprise of three existing interoperable components which perform complementary and interactive tasks to provide the system's services:

- The **Physical Training Component (PTC)** is based on the **Fit For All** system developed by the Lab of Medical Informatics of the Aristotle University of Thessaloniki (LLM partner No.1). Fit For All is a game platform that can help elderly people to exercise and maintain their physical status and well being through an innovative, low-cost ICT platform, such as Wii Balance Board.

- The **Cognitive Training Component (CTC)** is designed to support cognitive exercises provided by specialised software. Two CTC components have been selected:
  - **BrainFitness** (by PositScience) is considered as a state-of-the-art product in the United States. It speeds up and sharpens auditory processing - the listening system of the brain. By improving the quantity and quality of what your brain takes in through sound, it drives an overall improvement in thinking, focus, and memory.

  - **Gradior** (by Intrals LLM partner No.7) is a program which offers a structured evaluation and neuropsychological rehabilitation system. This system permits cognitive training and the recovery of higher cognitive functions in people who show cognitive deficit / deterioration with few technical requirements for the therapist or the professional that supervises the performance of the elderly individual.



- The **Independent Living Component (ILC)** is based on the **eHome** system, which is a network of distributed, wirelessly-operating sensors connected to an embedded system (the e-Home central unit). It includes features such as intelligent learning of normal and exceptional patterns of behaviour (dangerous situations or indicators for emerging health problems), and relevant alarms. eHome is a project funded by the Austrian Research Promotion Agency (FFG).

LLM runs from June 2009 to November 2011. As of beginning of May 2011 the project has achieved the following:

1. The integrated LLM solution has been tested and validated to fulfil the requirements gathered during task 3.1: Requirements and Configuration. Testing ensured the correct operation of the service in terms of:
    a. user movement identification by eHome
    b. emergency detection by eHome
    c. user interaction with the system such as navigation between the LLM system components through a centralized window environment, namely the LLM Local User Interface Framework (LLF)
    d. administration panel and training (both physical and cognitive) performance monitoring using a Remote User Interface (RUI) for therapists and relatives
    e. digitisation of the whole physical training procedure using FitForAll (FFA) (further investigation of integration issues and user interaction scenarios with automated setup procedure)
    f. cognitive training procedure (both integration and localization issues)
    g. personalized training program development
    h. localization of the LLM service.

2. The overall LLM service was localised with special efforts given on audio and visual sections of the LLM platform. LLM is localized for use in Greece, Cyprus, France, Spain, Austria / Germany and additionally in English speaking countries.

3. The project pilot sites have installed the necessary equipment according to the technical specifications of the LLM platform.

4. Recruitment by all pilot partners of the final users that will participate in the pilot. Pilot partners started training sessions both to the elderly and carer center personnel on how to use the LLM system.

5. A monitoring procedure in pilot sites to support final users was established. This procedure is recording any problems arising through the use of the LLM system. It also includes interviews to gather final users feedback.

6. Three consecutive rounds of testing are now taking place in 5 EU Member countries (Austria, France, Greece, Spain, and Cyprus). All pilot sites are operating, with most sites having now completed the first two rounds. Testing is focused upon elderly volunteers who provide feedback to help improve the solution to meet user expectations. Testing is conducted in accordance with relevant regulations for the protection of the participants; all test protocols utilise good ethical practices and comply with European and national legislation.

7. A first wave of pilots took place to evaluate the LLM service, gathering results for further analysis. A coherent user questionnaire was developed to measure qualitative aspects of the service and its benefit to the elders.

8. A workshop was held in Athens on the 20th of May 2010 to present the LLM service.. The introductory workshop familiarised a selected audience, encompassing medical and health-care providers, investors, government bodies, insurance companies as well as industry and technology providers with preliminary results of the development, integration, and pilot planning efforts. The workshop consisted of three main sessions with intermittent coffee and lunch breaks allowing room for face-to-face discussions with interested parties. The first sessions concerned the presentation of the LLM service. The second session described in detail the pilot trials and presented arising legal and ethical issues. The third session completed the workshop by a hands-on demonstration of the service.

9. LLM participated on the 18th and 19th of October 2010 in two different workshops held in Paris during Semaine Bleue 2010 (national week dedicated to the retirees and the elderly in France).
10. LLM had a major presence in the Annual Alzheimer's Conference in Greece, as well as, numerous other scientific events and meetings.
11. Finally, LLM has started clustering with other EU projects (recent activities involve the T-seniority, the ISISEMD and the MORMED EC funded projects)

In summary, the main results achieved over the first year of the project are:

1. The integrated LLM solution has been tested and was validated to fulfil the requirements gathered during the first project period.
2. LLM has been localized for use in Greece, Cyprus, France, Spain, Austria / Germany and additionally in English speaking countries.
3. The project pilot sites have installed the necessary equipment.
4. Recruitment by all pilot partners of the final users that will participate in the pilot.
5. A monitoring procedure in pilot sites to support final users was established.
6. Three consecutive rounds of testing are now taking place in 5 EU Member countries (Austria, France, Greece, Spain, and Cyprus).
7. A coherent user questionnaire was developed that will measure qualitative aspects of the service and its benefit to the elders.
8. A workshop was held in Athens on the 20th of May 2010 to present the LLM service.
9. LLM participated in two different workshops held in Paris during Semaine Bleue 2010 and organised a few related workshops and presentation in the Alzheimer's annual conference in Greece. It was also clustered with other EC funded projects.

The strategic impact of the LLM project lies on its ambition to proposing an innovative ICT solution towards the benefit of older people and especially those suffering from age-related cognitive decline. The initial feedback of this period showed a great interest of public authorities and private institutions that will be continuously pursued through extensive dissemination activities, as an effort to promote a business model based on public-private partnerships.

Current project progress shows that the LLM service has the capacity to improve the quality of life of older people and their families:

- by allowing older people to remain at their homes, which is their most convenient and frequent request
- by providing a safe and cosy environment for living with the eHome AAL solution
- by supporting them in remaining mentally, physically and socially active for a longer period of time through the cognitive training process
- by ameliorating the effects of cognitive decline through the training process
- by a monitoring system effectively addressing the fears and anxiety that seniors' relatives feel when they leave their parents alone.

Citizens wishing to receive further information or to participate in the project trials may visit the LLM web site and contact the LLM partner in their country. They are also welcome to visit our **Linked in group**, our **Facebook group**, our **Youtube channel** and our **Slideshare channel**.

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