ABSTRACT

With the population ageing effect, the technological developments, and pressure to reduce the cost with healthcare, are reunited the conditions for the development of Ambient Assisted Living (AAL) solutions. This work is a revision of the current state of the art. Its aim is the characterization of the AAL solutions, within the AAL4ALL scope. Therefore, it is presented features, scenarios and projects, referring the limitations and the opportunities for the future developments of prototypes using high level information and technology in AAL environments. Moreover, it is presented guidelines of operation, exposing the conceptual approach, and the discussion and conclusion, which present recommendations and current AAL4ALL project positions in terms of concepts and technologies.

Keywords: Ambient Assisted Living, Ambient Assisted Living (AAL) Personas, Ambient Assisted Living (AAL) Scenarios, Communication Technology, Elder People, Information Technology
INTRODUCTION

The evolution of the population demography is usually associated with a change in the population configuration. There are differences between rates of evolution, and between countries, meaning that each country has a different perspective about the evolution of their own population. Economic, political and social happenings delimit and structure the way the population evolution progresses. Although there are differences in terms of overall population, the main progression lines are very similar, demonstrating that the elderly population is rising, the adults are maintaining and the young population is decreasing. This shows a notorious shift in terms of the population structure, representing a change in the birth/death rate, meaning that the adult persons have fewer children and reach older ages, benefiting of a larger life span, where the middle-class economic group is dominant and there is sensing of quality of living.

Statistically, life expectancy in the World, and particularly in European Union, is rising exponentially over the last decades due to improvements in life conditions and healthcare. It is estimated that in 2030 there will be a ratio of 40 elder people (age over 65) per 100 active people (age 15 to 64), which will be the double of the actually. The future population needs, in terms of social and healthcare, and other ageing issues such as lack of mobility and cognitive ability, will be more demanding. The current elder care services cannot cope with these needs for such a large population. Alternatives are needed to these systems. A study conducted in the Netherlands and another in the UK indicated that elder people would prefer to live independently in their own houses as long as possible. Moreover, there is a higher incidence of chronic age-related conditions and consequent dependency problems associated with deteriorating capabilities to sense and interact with the environment (Giráldez & Casal, 2005; Sun, Florio, Gui, & Blondia, 2009; Vastenburg, Visser, Vermaas, & Keyson, 2008).

The technological advances lead to the development of assistive technologies. Accordingly, the population that the statistics refer to may be helped with the use of said technology. The Ambient Assisted Living (AAL) concept aims to the production of products that monitor the health and facilitate the life of individuals. Being adjusted to handicapped and elder people, increasing their independence, mobility, safety and social contact through increased communication, inclusion and participation using the available technologies (Magjarevic, 2007). There are several projects that attend to the AAL concept, but only few of them have a broad spectrum, hence the current development of the AAL4ALL project.

Motivation

The AAL4ALL project is a Portuguese consortium effort (“AAL4ALL | Ambient Assisted Living For All,” 2013). The theme is the AAL, following a vertical and linear structure. This means that the project intends to be structured by users for users. Services, protocols, standards, architectures, and products are being developed by all the project partners in a joint effort to present a straightforward application to the user. At this moment it is necessary to respond to the user needs, in a humanitarian and monetary point of view.

The projects available have their development targeted to a single aim. And, while they comply with this aim very proficiently, they become very mono-tasked, i.e., they only one thing very well. This means that the projects are sparse, thus they cannot communicate or collaborate with other projects. In other words, the user has to acquire a full range of different services and/or devices that do not communicate with each other. Therefore, any possibility of an integrated ecosystem whereas the user needed only to interact with one service is almost impossible. Moreover, the information that could be generated from sensor and data fusion is lost, and the capacity of crossing data to achieve new findings.

This article presents the AAL technologies and concepts. From them naturally arise questions such as “to whom?” and “how to
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