

# Chapter 35

## Virtual Carer: A First Prototype

**Aldo Franco Dragoni**  
*Università Politecnica delle Marche, Italy*

### ABSTRACT

*In view of the rapidly progressive increase in the average population age, “Ambient Assisted Living” (AAL) defines the actions and policies needed to promote the improvement of living conditions within domestic spaces to foster autonomy, safety, and social inclusion for the elderly or disabled. The idea is to design an innovative and comprehensive information system for AAL, an ICT-based “Virtual Caregiver,” which is informed, intelligent and friendly, and which constantly monitors the health warning, informing and advising the elderly while controlling the environment and then asking for help when needed. The system will have the ability to establish interactive communication with the person but also extend it automatically outside the house in times of need. Virtual Caregiver will be able to enable the software protocols that activate the emergency phone calls to the family, medics or even first aid in emergencies.*

### INTRODUCTION

Aging well is one of the most important challenges of the west world. Ambient Assisted Living (AAL) is an initiative from the European Union to address that problem by reducing barriers, through ICT innovation, with the goal to lower social security costs and allow the elderly/disabled to live comfortably in their (nursing) homes (AAL 2009). The main objectives declared by the European AAL are:

- Extend the period in which people can live in their preferred environment by increasing their autonomy, self-sufficiency and mobility.
- Help maintain health and functional capacity of older people.
- Promoting lifestyles and better health for people at risk.
- Increase safety, prevent social exclusion and maintain relational network of people.
- Supporting the players, families and organizations of care.
- Improving the efficiency and productivity of resources in an aging society.

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The themes of “good aging” and AAL activities are the focus of numerous research programs and of the new European perspective of Horizon 2020. But AAL is not just technology: it requires in all its phases, from conception to implementation and use, collaboration and effective communication between researchers, planners, industry, users, administrators, social workers and health care, in a completely new operating paradigm, challenging and stimulating.

The purpose of this article is to shed light on the key technologies involved in the design of an ICT-based innovative and comprehensive AAL-oriented information system. The hazard of being subjected to restrictions on their autonomy and independence grows rapidly over the age of sixty, and the home environment is one of the scenarios where severe limits of autonomy occur, along with independence related diseases and disabilities.

## **BACKGROUND**

Most of the AAL projects provide ICT platforms to create and maintain an easy-to-use web-based social network for the elderly in order to stimulate their social relations. Timely information are transferred to the network on the activities and subjective state of the elderly person (e.g. presence, state of wellness, etc.) allowing for a much better-tailored and timely response, attention and care so as to improve and maintain the well-being and independence of the elderly living in their own homes and reduce healthcare costs. The AAL projects address chronic conditions such as mild cognitive impairment, and develop and test solutions to alleviate and/or prevent them. In such a way, caregivers, friends and family members have greater access to information about the person, and those at a distance are enabled to keep in touch and share activities with their elderly family member or friend, and to know their current condition.

Despite these advances, we believe that it is necessary to find and test new services exploiting the potential of ICT to implement socially advanced and reliable services, “smart” technology-based communication and information processing that must be adapted to the needs of the elders (Weber 2005) (Weiser 1996) so that they derive real benefits in terms of autonomy and security. To illustrate what we are thinking about (at the Laboratory for Artificial Intelligence and Real Time Systems of the “Università Politecnica delle Marche,” in Italy) I need to tell a personal story.

Some time ago, when my father (widow) was still alive, I experienced some difficulties which are very common in the west world, where sons live far from their old parents. My problem was that when I called my father, who lived a hundred miles from my home, he often did not answer the phone. And this happened more than once in succession so that I was forced to take the car for a long trip anxious to go and see what had happened to my father. Systematically the causes of the fact that he did not answer the phone was that, during the first phone call my father was in the garden, while the second was in the bathroom and while the third was sleeping! Paradoxically, my problems disappeared when his worse! In fact, when his health worsened, my father was forced to hire a nanny. The caretaker of my father answered the phone in his place, and kept me well informed about the health and mood of my father. She also called me when he needed something from me.

Unfortunately, in the future, the socioeconomic equilibrium of the western world will probably make it difficult for the next generations of elderly to hire personal caretakers. After this consideration, I immediately realized that almost all the informative tasks performed by the nanny could also be provided by a well designed and skilled software system! Of course it would have been a complex system that

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