Intelligent Environments with Robots: Achievements and Perspectives *

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Extended Abstract

During several years of interest for the applications of Artificial Intelligence techniques to Ambient Assisted Living (AAL) I have worked in projects that aimed at supporting older adults by using either robots (in projects like ROBOCARE, ExCITE, GiraffPlus) or generic ICT-based tools (see EasyReach, SpONSOR, MAESTRO). This talk mostly revisited my work done within the first group of projects but also aimed at synthesizing some lessons learned during the whole work experience in the AAL area as an AI scientist.

ROBOCARE was the project in Europe that anticipated the idea of using a companion robot in a home environment taking advantage of the integration of basic sensors (namely cameras) [2] and several AI tools (e.g., [10]). The project proposed the idea of monitoring older person's activities at home triggering simple verbal interactions through the robot [5] to suggest healthy behaviours to the users. Interesting in the project have been the users studies performed before [11] and after [3] the synthesis of the technical results.

The ExCITE project approached the problem of robotic companion from a quite different perspective because it used a relatively simple telepresence robot, Giraff [1], and was mostly dedicated to the long-term test of such robot in real homes of different countries [6]. Notable results have been a methodology for performing long-term assessment in ecological settings [4] and a detailed report on the robot features that have been synthesized to follow the many new requirements emerged during continuous use in real houses [8].

The GiraffPlus project was grounded of both the previous experiences. We have maintained the idea of using the robot as a front-end for the interaction at home with the older person, but also gathered data from environmental sensors using a state of the art AAL middleware [9], and started designing comprehensive services for better supporting the user over time taking advantage of the integration of different devices and services [1]. Also in this case we have performed long-term experiments in real homes that indeed required quite an amount of effort and spotted several directions for improvements. It is worth noting how current AI progress may play a key role in the future of robotic applications in

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this area. An important requirement is the continuity of support given that technology "lives with the person". Consequently aspects particularly relevant are: personalized interaction, adaptiveness to users (see [7] for a starting example), and integration of autonomy and telepresence – so as to serve a wider spectrum of services along the line "complete autonomy versus human-remote control". In general, the classical AI cycle "data-analysis/reason/act" should be flexibly tailored so as to create services that adapt to the different and dynamic needs of frail population.

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