Ambient Assisted Living and Care in The Netherlands: The Voice of the User

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ABSTRACT

Technology can assist older adults to remain living in the community. Within the realm of information and communication technologies, smart homes are drifting toward the concept of ambient assisted living (AAL). AAL-systems are more responsive to user needs and patterns of living, fostering physical activity for a healthier lifestyle, and capturing behaviours for prevention and future assistance. This study provides an overview of the design-requirements and expectations towards AAL-technologies that are formulated by the end-users, their relatives and health care workers, with a primary focus on health care in The Netherlands. The results concern the motivation for use of technology, requirements to the design, implementation, privacy and ethics. More research is required in terms of the actual needs of older users without dementia and their carers, and on AAL in general as some of the work included concerns less sophisticated smart home technology.

Keywords: Ambient Intelligence, Assistive Technology, Needs, Older Adults, Smart Homes, User Perspectives

1. INTRODUCTION

With an ageing population, an ever growing group of older adults wish to remain living in the community; the so-called ageing-in-place. Apart from receiving family and professional care at home, there are architectural and technological solutions to facilitate this desire. Within the domain of technological solutions, home automation, telehealth services, and ‘ambient intelligence’ are increasingly becoming tools to support and monitor older adults, both with or without cognitive impairments (Schuurman et al., 2007). In addition, such technologies form a welcome support for family carers, clinicians and care professionals.

Information and communication technology (ICT) forms a substantial part of everyday technology, and thus, becomes an omnipresent part of the living environment. At the same
time, such ICT collects and disperses a high volume of personal data, and gets increasingly intelligent and autonomous (van Hoof et al., 2007). Poland et al. (2009) outlined that smart homes are environments facilitated with technology that act in a protective and proactive function to assist in managing one’s daily life. A typical smart home implementation would include sensors and actuators to detect changes in status and to initiate beneficial interventions.

According to Virone (2009), smart homes are drifting toward the concept of ambient assisted living (AAL) and are more responsive to users’ needs and patterns of living, fostering physical activity for a healthier lifestyle, and capturing behaviours for prevention and future assistance. The philosophy guiding smart home technology or AAL, which offer a wide variety of options (Table 1), is that the monitored environment should be transparent and minimally intrusive to the person being monitored (Kang et al., 2010).

The wide range of (networked) technological possibilities in the home environment of older people is shown by the model of a health smart home by Stefanov et al. (2004) and van Hoof et al. (2007) (Figure 1). For the purposes of this investigation, we distinguish between two kinds of technologies: (i) assistive technologies and devices that are not connected to a network, and (ii) state-of-the-art ICT-solutions, connected to a (single) home network. In Figure 1, the home network is connected to a call centre that includes clinicians, carers, security, and maintenance services. In practice, governments, family and unidentified parties could be connected via the network enabling data access.

Recently, there has been a growing interest in the automatic recognition of human actions and activities, for instance, in the care for older persons with dementia (for instance, van Hoof et al., 2011; Tapia & Corchado, 2009). The general idea of using computers to automatically recognise (patterns in) human activities has been applied to several different research domains and applications. One important subfield of action and activity recognition is the automatic recognition of activities in the home setting and more specifically to monitor the activities of daily living (ADL) of older persons living at home. In relation to smart homes, Frisardia and Imbimbob (2011) state that ADL abilities are the main predictors of informal care hours, and both ADL and neuropsychiatric symptoms are important predictors of perceived burden on carers. ADL monitoring by human observers may be viewed as being inefficient in terms of both time and cost, it is stressful to both parties, and in some instances is deemed to be too invasive, whereas an automatic activity monitoring systems may be more acceptable (Hong & Nugent, 2011).

Atallah et al. (2009, p. 1031) stipulated ideally, “physiological parameters would be observed continuously rather than providing a snap-shot recording of a person’s health that is available

<table>
<thead>
<tr>
<th>Technology</th>
<th>Risk Monitoring Systems</th>
<th>Intervenional, Alert System</th>
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<tbody>
<tr>
<td>Portable</td>
<td>Heart rate and blood pressure monitors, Activity monitor, Oximetry, Glucose monitor, Sociometer, Portable telephone</td>
<td>Mobility monitoring in people with Parkinson’s disease, Warning systems for unsafe behaviours in people with dementia, Cueing of gait for rehabilitation</td>
</tr>
<tr>
<td>Environmental</td>
<td>Motion sensor, Instrumented carpet, Refrigerator door sensor, Toilet flush sensor</td>
<td>Video, Acute fall detection, Electronic pillbox</td>
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</tbody>
</table>

Table 1. Examples of in situ monitoring technologies for older people (Kang et al., 2010)
A Multi-Linear Statistical Method for Discriminant Analysis of 2D Frontal Face Images
www.igi-global.com/chapter/multi-linear-statistical-method-discriminant/62682?camid=4v1a

Privacy-Friendly Wi-Fi-Based Occupancy Estimation with Minimal Resources
www.igi-global.com/article/privacy-friendly-wi-fi-based-occupancy-estimation-with-minimal-resources/211171?camid=4v1a