Getting out of the lab: A real-world AAL experience

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Purpose Ambient Assisted Living (AAL)[1] is drawing increased attention as a way to support independent living and active aging. Besides standard safety and monitoring features, active recognition and behavioral analyses are the most promising ways to promote independence among the elderly in such a context[2]. It is often lamented, however, that it is difficult to transfer AAL research results to the market due to concerns about users' willingness to use newly developed products, the financial sustainability of these products, and the technology skills amongst potential users. In this work, we report a successful story of AAL-technology utilization in a real-world context. **Method** This case describes a 92 old woman with mild physical and cognitive age-related impairments. She lived alone in her house in Milano, Italy and received care from professional caregivers on a regular basis. AAL tools, based on the CARDEA[3,4] system, were used to provide her and her relatives with more safety and better confidence while staying alone at home. The system includes 3 presence (PIR) sensors located in the bathroom, the hallway and the kitchen; a bed-occupancy sensor; a sofa-occupancy sensor; and a door-sensor on the main door. All sensors were wirelessly connected with ZigBee technology, and network activity was logged in a database. Three levels of interactions were devised: first, a web-based panel allows caregivers and relatives to access a synoptic view, summarizing current sensor status and recent activity (for example, how long the bed is occupied, or how much time passed since she last visited the bathroom). Second, a set of automatic actions were defined by means of rules, such as "IF the user leaves his bed at night time (between 11 PM and 5.30 AM) AND does not get back within 30 minutes, THEN trigger automatic phone call to caregiver". Third, long-term behavioral analysis was carried out. The system aims at helping relatives and caregivers identify changes suggestive of an alteration in health status as early as possible. It will not, however, diagnose these events. **Results & Discussion** After a trial over a period of several months, outcomes were evaluated: the approach was effective in monitoring home safety, was well accepted, and was easily used with very little training necessary. It also helped in assessing disorders of night time behavior, which might have been unnoticed otherwise. A graph illustrating a marked increase in the night time activity is shown in *Figure 1* and is confirmed and interpreted by the density map shown in *Figure 2*, referring to the sofa occupancy events and showing a number of unusual nocturnal events. This suggests a more discontinuous sleep and a state of unease, which was scarcely perceptible on a day-by-day observational basis. By integrating ICT-based monitoring techniques in the caregiving strategy, a more comprehensive view and coverage of users' needs was gained, allowing for better care planning and more effective care service delivery.

References

1. Hong S, De Florio V, Ning G, Blondia C. 2009 6th International Conference on Information Technology New Generations 2009; pp 1201-1207; doi:10.1109/ITNG.2009.169
2. Virone G, Sixsmith A. Activity Prediction for In-Home Activity Monitoring. Seattle. 4th International Conference on Intelligent Environments; 2008; pp 1-4
3. Grossi F, Bianchi V, Matrella G, De Munari I, Ciampolini P. Assisted Technology: from Adapted Equipment to Inclusive Environment. Amsterdam: IOS Press; 2009; pp 309-313
4. Losardo A, Grossi F, Matrella G, De Munari I, Ciampolini P. Assistive Technology: from Research to Practice, Assistive Technology Research Series, AAATE2013. Amsterdam. IOS Press; 2013; pp 1121-1125

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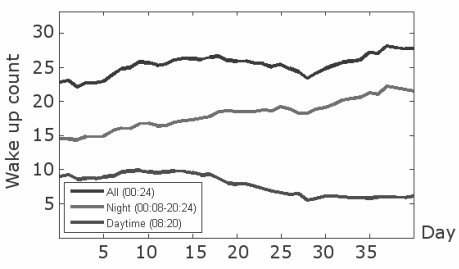

Figure 1. Bed wake-up daily count

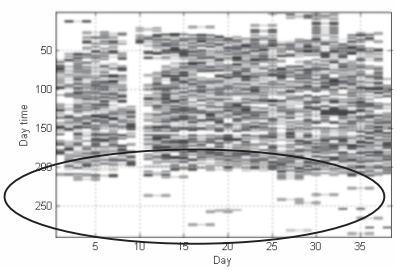

Figure 2. Sofa occupancy 2D density plot, highlighting nocturnal activity increase