Dementia Ambient Care: Multi-sensor support to enable independent home-based living for people with dementia

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X	Oral Presentation

ABSTRACT

The quality of life of the person with dementia is often impacted by the loss of autonomy and independence that can arise during dementia progression. Ambient assistive technologies represent a way of enabling independence and facilitating "ageing in place", by supporting the health, lifestyle, and safety of the person with dementia in an unobtrusive manner. Dem@Care is a European FP7 funded project, which is using ambient and wearable sensors to maintain independent home-based living for as long as possible. We have identified five frequently problematic areas for the person with dementia that can be supported by technology: Sleep, Activities of Daily Living, Physical Activity, Social Interaction, and Mood. In Dem@Care, a clinical assessment is carried out with the person with dementia and their family to identify their unique needs in each of the 5 areas. An individualised sensor "toolbox" is tailored and discussed with the individual and their family, and an acceptable and useful system is configured and deployed. Over time, information gathered by sensors is used to provide feedback to identify changes in patterns of behaviour that may indicate deterioration, improvement, stasis, or the risk of future deterioration, and to increase awareness of behaviours that are detrimental to health and well-being. We report relevant guiding principles from the literature, and findings from the first Dem@Care pilot evaluation, regarding user-centred design, individualization, ethics, and the acceptability and usability of current Dem@Care sensors. We present results from the monitoring of sleep, physical activity, and daily-living activities and following promising initial results, we are expanding data collection to incorporate additional sensors and new participants with the expectation that we can demonstrate the ability of the Dem@Care system to enable persons with dementia to remain independent and living in their own homes for longer.