

P. PANEK, P. MAYER. **Monitoring system for day-to-day activities of older persons living at home alone.** *Gerontechnology* 2012;11(2):302; doi:10.4017/gt.2012.11.02.491.00 **Purpose** Many older persons living alone are afraid of falling or facing another emergency situation while not being able to call for help. Providing means to recognise such situations by monitoring with wireless sensors that can automatically trigger an alert (which is sent to friends/relatives and/or to service centres for follow up) are main objectives of the eHome research prototype^{1,2}. This abstract outlines the monitoring capability and its evaluation in the field. Additionally, eHome is able to recognise falls directly by floor vibrations³ and provides (video)phone and reminder functionality to support day-to-day life. **Method** Human activities in daily life usually follow social and biological rhythms⁴. This fact is exploited by systems like eHome or e.g. Quietcare⁵. The acquired knowledge of the typical activity level for each of the daily time slots is compared with the current level. In case of significant deviations some supportive or emergency actions can be triggered⁶. Specific focus of eHome was on the implementation of a low-cost embedded system with a sparse set of sensors arguing that a small number of sensors and consequently a coarse set of sensor data should be sufficient to recognise relevant events and situations. This is in contrast to other approaches⁷ using a higher number of sensors. Typically in eHome, only one motion sensor is used per door of a room. Reed contacts and vibration sensors are used to cover special areas of interest (e.g. entrance door, bed, and kitchen). The implemented event-triggered expert system^{8,9} of eHome can raise alerts on the following observations in the data: Time of activities (e.g. rising from bed), duration of selected activities (e.g. nightly leaving of bed) and frequency of activities⁸ (e.g. reduction in cooking, hygiene). **Results & Discussion** Over an 18-month period annotated data were gathered from 11 homes of older persons of. There was a good correlation with the logbooks kept by older persons. Despite the fact that the number of sensors deployed was minimal and the field of view of motion sensors did not cover the whole room the data collected are sufficient to recognise the prime activity of the user¹. The developed rules set was shown to be robust, e.g. cooking could be recognised over 3 installations with an average sensitivity of 81% and a specificity of 90%. The system was able to correctly classify “usual behaviour” over time. This can be used to bring value to older users and home care by triggering an alarm in case of unusual sudden changes indicating a possible emergency case; mid- and long-term trends can be used to steer traditional care interventions.

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