

N. ZOUBA, F. BREMOND, A. ANFOSSO, M. THONNAT, E. PASCUAL, O. GUERIN. *Monitoring elderly activities at home. Gerontechnology 2010;9(2):263*; doi:10.4017/gt.2010.09.02.285.00 **Purpose**

The elderly population is expected to grow dramatically over the next 20 years. As people grow older, they need more healthcare assistance. Without sufficient care, the elderly are at risk of losing their autonomy. Thus, a system permitting the elderly to live safely at home is more than needed. Medical professionals believe that one of the best ways to detect emerging, physical and mental health problems (before it becomes critical – particularly for the elderly) is to look for changes in their activities of daily living (ADLs). It is for this purpose, that we propose a monitoring system which aims at detecting activities of daily living (ADLs) at home. In particular, the goal is to collect and combine multisensor information to detect activities and assess behavioral trends to provide user services at different levels so that the elderly will feel safer at home, and the care provider will be able to provide better support via the monitoring of health trends. To reach this goal, we have designed a video understanding platform including an event recognition algorithm<sup>1</sup>. Related work includes developing and employing a variety of sensors for monitoring activities at home, including video cameras to assist a person with dementia during handwashing<sup>2</sup>, and embedded sensors<sup>3</sup> for activity recognition. **Method** We propose to combine video cameras with a few sensors embedded in the home infrastructure, in order to recognize activities of interest at home. We propose also, to describe activities within formal models, by using a dedicated description language<sup>1</sup>. The proposed system includes detecting people, tracking people as they move, recognizing events of interest and identifying a behavioral profile of a person. The potential benefit to the elderly is that they could enjoy an increased quality of life by remaining within their own homes. The laboratory GERHOME (Figure 1) has been equipped with sensors and is composed of two rooms. It has been built to validate the monitoring system and to explore the ADLs that can be recognized automatically. While living in the laboratory, 14 elderly volunteers (60-85 years old) were observed for 4 hours and were asked to perform a set of household activities such as preparing a meal, taking a meal (Figure 2), and washing dishes. **Results & Discussion** The comparison of 2 volunteers (male, 64 years; female, 85 years), show the greater ADLs ability of the 64 year old as compared to those of the 85 year old (Figure 3): (i) the younger person was 'bending' twice as often than the older one (NDI=33%), and in a quicker way (NDA=60%); (ii) the younger person (64 years) was using more of the 'upper cupboard' than the one of 85 years (NDI=42%), and in a quicker way (NDA=65%).

## References

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Figure 1. the GERHOME laboratory



Figure 2. Recognition of 'taking meal' activity

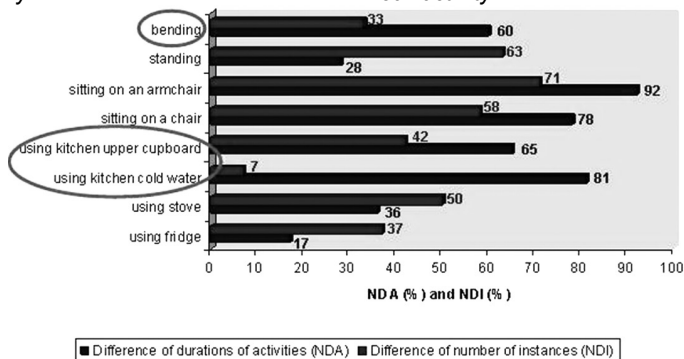


Figure 3. Results of the recognition comparing 2 elderly volunteers