

Development of a Responsive Emotive Sensing System (DRESS)

D.F. MAHONEY, W. BURLISON, C. LOZANO, V. RAVISHANKAR, E. MAHONEY. **Development of a Responsive Emotive Sensing System (DRESS) to aid persons with dementia dress independently.** *Gerontechnology* 2014;13(2):259; doi:10.4017/igt.2014.13.02.020.00 **Purpose** The goal of this study is to develop a 'smart dresser' for in-home use by people with moderate memory loss. This device is designed to provide individualized audio and visual task prompting and enables people with moderate memory loss to dress while giving a respite to their caregivers. Prior research indicates that there has been insufficient attention to the stressors associated with dementia-related dressing issues¹, which include stigmatizing clothing² and wearable technology challenges³. Other researchers have suggested the need for innovative gerontechnology initiatives⁴. The DRESS system uniquely combines interactive context-aware/skeletal movement-, wrist-affective emotion sensing and fiducial fabric tag components to assess and respond to users in real time. **Method** Mixed methods approach. To critique DRESS design and provide usability recommendations, qualitative inductive focus group research was done with 25 family caregivers of persons who displayed dressing difficulties. System development followed an iterative path incorporating caregivers' feedback. Quantitative technical feasibility testing occurred in a controlled lab with ten actors portraying nine different standardized dressing scenarios. **Results & Discussion** Caregivers validated the need for tangible dressing assistance to reduce frustration from time spent in repetitive cueing and from struggles over dressing⁵. They contributed six changes that influenced the smart dresser's conceptual stage prototype development, most notably adding a dresser top iPad to mimic a familiar 'TV screen' for the audio and visual cueing (Figure 1). DRESS demonstrated reliable operations, but the accuracy of clothing identification ranged from 16% for the most difficult inside out pants layout to 100% for shirts. Adjustments were made to Kinect and fiducial threshold values, which increased the pants orientation accuracy rate to 81%. The findings demonstrate proof of feasibility and validation of the conceptual development phase. Beta stage development will follow this initial work.

References

1. Twigg J. *Journal of Aging Studies* 2010;24(4):223-230; doi:10.1177/1533317510376944
2. Iltanen-Tajkavuori S, Wikberg M, Topo P. *Dementia* 2012;11(1):49-59; doi:10.1177/1471301211416614
3. Mahoney E, Mahoney DF. *American Journal of Alzheimer's Disease & Other Dementias* 2010;25(6):527-531; doi:10.1177/1533317510376944
4. Fozard JL, Kearns WD. *Per-suasive Technology* 2006;3962:199-202; doi:10.1007/11755494_30
5. Mahoney DF, LaRose S, Mahoney E. *Dementia* 2013;13(2):1-19; doi:10.1177/1471301213501821

Keywords: housing & daily activities, smart dresser, context aware and affective computing
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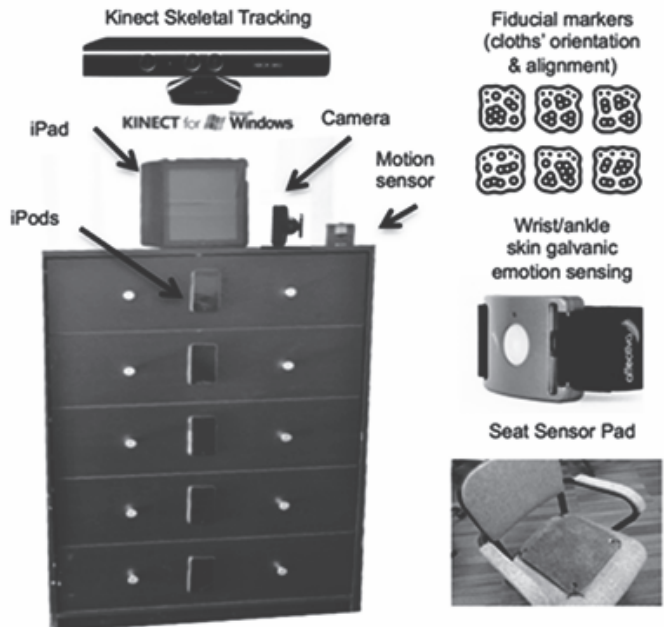


Figure 1. DRESS system components