Non-intrusive, visual-less wearable haptic stimuli navigational assistance for elderly with dementia

ABSTRACT

Age is typically affiliated with the decline of cognitive function and the probability to be diagnosed with neurodegenerative disease, namely dementia. Of all dementia-related deficits, the paper highlights on the decline of wayfinding ability, since it is interrelated with mobility, autonomy, caregiving burden and eventually institutionalization. The sense of directions in elderly is also affected by the sensory changes, while the most obvious sensory declines are both vision and hearing. Hence navigation systems that support mainly on visual and auditory may not be the best option for them. A concept of wearable navigational assistance that is non-intrusive and uses haptic stimuli instead of visual and/or audio signals is presented in this paper. A Usability Test (UT) was performed towards the elderly with dementia at a selected nursing home to investigate how they perceive haptic-feedback as a modality of navigation. The assessments involved three phases: (1) orientation or training, (2) navigation test and (3) further navigation test. Results indicate the potential efficacy of haptic modality as a navigation signal. Improvement on subjects' navigational performance was shown especially during the further navigation test, signifying the familiarization of the intervention. Employing the haptic modality could be a beneficial substitute for navigational purpose when vision and audio are less appropriate. Nevertheless, as much as the encouraging outcomes from the results and analysis of the assessments are valuable, the constructive reviews attained are indeed important for the future development of the device system.

Keyword: Elderly with dementia; Spatial disorientation; Navigational assistance; Haptic stimuli; Wearable device