

POSTER SESSION 2

Interactive Doll Training System for Elderly with Dementia.

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Purpose The population with dementia is increasing sharply to 131.5 million by 2050; total cost world-wide of dementia care will imminently turn on 2 trillion US dollar by 2030, which would be equivalent to the world's 18th largest economy (Prince et al., 2015; Patterson, 2018). Doll therapy has been reported effective in promoting healing and motivation in patients with dementia (Tamura et al., 2001). However, most of the dolls used are without proactive interactive functions. Interactive robots for elderly with dementia have increasingly been accepted because of increased embracement of IT technologies in the caring sector, better availability and more specific design for elderly. However, these dolls were designed for non-organized sequences of interactions without any controlled pre-set content and theme for interaction, making it difficult for the therapy to have accurate measurable outcome and customization. **Methods** 20 interactive robotic dolls were developed (Figure 1), which consists of microphone, speaker, single board computer with customized electronics, hall sensors, pressure sensor, accelerometer, and battery. An internal structure of the dolls, where the sensors were mounted, was de-signed to limit the motion range for the mimic human. The interactive dolls were controlled from web-based server apps (Figure 2). A training can be created from series of tasks such as wearing clothes, doing exercise, etc. 10 basic tasks related to toddler caring were created by a series of actions, which were detected and analyzed by the sensors. The action flow and completion criteria can be modified to cope with different needs of the individual. Elderly with dementia in a nursing home were recruited to interact with the dolls. **Results and Discussion** Caregivers conducted the series of training for residents in hostels specified for elderly with dementia. Elderly can interact with the dolls with pre-set tasks organized in a training package with control from the server side to change tasks and measure the completion rate. The care-giver frequently adjusted the sensors' parameters, allowing all tasks to be completed, and measured the time of completion. The elderly were organized into groups to conduct training set at different skill levels regarding their abilities. Voice encouragement and cueing showed helpful to promote the interactions. A customized voice and sound will probably further improve the interactions. An open media structure design allows the caregiver to upload the elderly most favour voice.

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Figure 1. Dolls



Figure 2. Web-apps