

Development of fall detection and activity recognition using threshold based method and neural network

ABSTRACT

Falls are dangerous and contribute to over 80% of injury-related hospitalization especially amongst the elderly. Hence, fall detection is important for preventing severe injuries and accidental deaths. Meanwhile, recognizing human activity is important for monitoring health status and quality of life as it can be applied in geriatric care and healthcare in general. This research presents the development of a fall detection and human activity recognition system using Threshold Based Method (TBM) and Neural Network (NN). Intentional forward fall and six other activities of daily living (ADLs), which include running, jumping, walking, sitting, lying, and standing are performed by 15 healthy volunteers in a series of experiments. There are four important stages involved in fall detection and ADL recognition, which are signal filtering, segmentation, features extraction and classification. For classification, TBM achieved an accuracy of 98.41% and 95.40% for fall detection and activity recognition respectively whereas NN achieved an accuracy of 97.78% and 96.77% for fall detection and activity recognition respectively.

Keyword: Activity recognition; Classification; Fall detection; Neural network; Threshold based method