

FALL DETECTION – A MULTI-LAYER PERCEPTRON SOLUTION

Due to the rapid aging of the European population, an effort needs to be made to ensure that the elderly can live longer independently with minimal support of the working-age population. This paper proposes to design an optimal neural network that processes generated input data for classifying events in two classes: fall and not fall. The network can recognize the falling action by use of multi-sensor information in intelligent space. The network uses the speed of the subject, the aspect ratio (height and width of the subject), the angle between the subject and the ground floor and the heartbeat as parameters to extract features that recognition falling needs. By simulating the input data and by controlling the parameters of the neural network, we can achieve the best accuracy for detecting a fall, and reduce unnecessary alarms. The highest classification accuracy of over 95% is achieved with the Levenberg_Marquardt training function with one hidden layer of 4 neurons, using a multi_layer perceptron.

The ability to record and classify the movements of an individual is essential when attempting to determine his or her degree of functional ability and general level of activity. Another important factor that needs to be taken into consideration is the costs associated with the falling cases. Falls represent 38% of all home accidents and cause 70% of death in the 75+ age group. It is important to have a good algorithm that provides good accuracy in order to avoid false alarms and unnecessary costs. Experimental results show that this neural network is practicable for the elderly falling detection.

Authors:

Negoitã George Alexandru – Warsaw University of Technology, Warsaw, Poland

Nguyen Thi Anh Ngoc - Warsaw University of Technology, Warsaw, Poland

Bassam Daya - Lebanese University · IUT Saida - Department of Telecommunications and Networking, Lebanon

