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Implementation of machine learning algorithms for automated human gait activity recognition using sEMG signals

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Abstract

The exoskeleton or prosthesis can be controlled by recognising distinct gait activities based on the sEMG signal. These robotic assistive devices are used for enhancing the physical performance of an injured or disabled person. In this paper, a comparative assessment of various computational classifiers is presented for the recognition of different gait activities from the sEMG signal. Analysis of sEMG signal is complicated because of a multiple muscle contribute to a single activity and the effect of other muscles produces noise. So, first, we have applied the discrete wavelet transform to the sEMG signal based on the Daubechies wavelet and then extracted 16 features. Thereafter, features are standardised and fed to eight different computational classifiers. The performance indices of classifiers are calculated for ten runs. The results suggest that the MLP classifier gives the highest accuracy (97.72%) in identifying different gait activities from sEMG signals.

Keywords

gait activity recognition, discrete wavelet transform, DWT, computational classifier, surface electromyography, sEMG signal

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