

Publication

Automatic selection of a representative trial from multiple measurements using Principle Component Analysis

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Experimental data in human movement science commonly consist of repeated measurements under comparable conditions. One can face the question how to identify a single trial, a set of trials, or erroneous trials from the entire data set. This study presents and evaluates a Selection Method for a Representative Trial (SMaRT) based on the Principal Component Analysis. SMaRT was tested on 1841 data sets containing 11 joint angle curves of gait analysis. The automatically detected characteristic trials were compared with the choice of three independent experts. SMaRT required 1.4s to analyse 100 data sets consisting of 863 trials each. The robustness against outliers reached 98.8% (standard visual control). We conclude that SMaRT is a powerful tool to determine a representative, uncontaminated trial in movement analysis data sets with multiple parameters.

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