

Statistical modelling of human gait

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Typically, quantification of human gait involves representation of the angular rotations of different joints over time, occasionally supported by force plate data. This results in high dimensional and temporal dependent data. Often this technical challenge is dealt with by extracting summary statistics from the data, such as the mean value or peak angle during the gait cycle, followed by standard statistical methods. However, potential important patterns of the data might be lost using such crude measures.

Therefore we propose a model, based on functional data analysis, which integrates the essential dimension reduction. The model is based on a finite fourier representation and functional principal component analysis and is further formalised in a mixed model setup. As an added benefit the principal component analysis demonstrates gait as a applicable biometric characteristic.