Abstract:
In this paper we present our work on markerless model-based 3D human motion capture using multiple cameras. We use an industry proven anthropometric human model that was modeled taking ergonomic considerations into account. The outer surface consists of a precise yet compact 3D surface mesh that is mostly rigid on body part level apart from some small but important torsion deformations. Benefits are the ability to capture a great amount of possible human appearances with high accuracy while still having a simple to use and computationally efficient model. We have introduced special optimizations such as caching into the model to improve its performance in tracking applications. Available force and comfort measures within the model provide further opportunities for future research. 3D articulated pose estimation is performed in a Bayesian framework, using a set of hierarchically coupled local particle filters for tracking. This makes it possible to sample efficiently from the high dimensional space of articulated human poses without constraining the allowed movements. Sequences of tracked upper-body as well as full-body motions captured by three cameras show promising results. Despite the high dimensionality of our model (51 DOF) we succeed at tracking using only silhouette overlap as weighting function due to the precise outer appearance of our model and the hierarchical decomposition.