

Abstract

The estimation of human body pose and its measurements is an emerging problem that drives attention in many research areas. An automatic and accurate approach to address the tasks is crucial in many fields of computer vision-oriented industry. The thesis targets multiple human body analysis-related tasks, including pose estimation, pose tracking, and anthropometric body measurements estimation. We focus on deep learning methods, as they proved to outperform analytical strategies; while also examining various types of visual input data formats, including three-dimensional data, particularly unstructured and grid-structured point clouds. Since obtaining a large-scale database of real annotated training data is time-consuming and ineffective, we propose to substitute or augment the training process with synthetically generated human body data. Furthermore, a review of the existing state-of-the-art methods within all stated tasks is presented. We describe a large variety of conducted experiments within the field, and provide results and evaluation within each of the stated tasks.

Keywords: human pose estimation, temporal pose estimation, pose tracking, anthropometric body measurements, point clouds, deep learning, computer vision