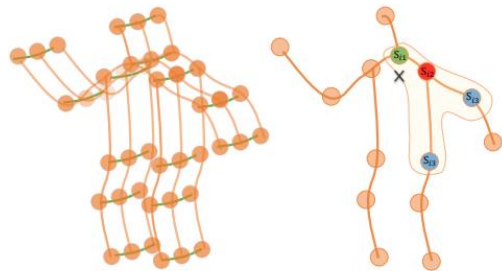


Title: Learning an Embedding for Skeleton-Based Action Recognition

Description: The collaboration between humans and robots is an increasingly important field of research. The multi-variant assembly process is a specific application scenario in the project "Engineering for Smart Manufacturing" (E4SM). Here, a robot should support humans by recognizing situations and predicting subsequent steps. Action recognition is necessary for this. Since there are many different possible actions that can potentially be performed in the multi-variant assembly, not all of them can be recorded in a training dataset. Therefore there is a need for an embedding. This embedding should map a skeleton sequence that describes the action directly to a meaningful feature vector.



Source: [3]

There have been many new developments [1, 2] in the field of skeleton-based action recognition in recent years, with the most promising methods using graph neural networks [3, 4]. The aim of the master thesis is to research, evaluate and implement suitable methods for skeleton-based person action recognition. These methods are to be modified in such a way that an embedding can be learned and evaluated on suitable datasets [5].

Tasks:

- Review of the state of the art in skeleton-based person action recognition with graph neural networks
- Evaluation of the researched methods based on the application scenario and the suitability for an embedding
- Implementation and evaluation of selected methods
- Preparing of an introductory and a final presentation
- Writing the master thesis according to the specifications of the FG NI&KR

Literature:

- [1] <https://paperswithcode.com/sota/skeleton-based-action-recognition-on-ntu-rgb-d>
- [2] Zhang et al.: A Comprehensive Survey of Vision-Based Human Action Recognition Methods, Sensors 2019
- [3] Shi et al.: Skeleton-Based Action Recognition with Multi-Stream Adaptive Graph Convolutional Networks, arXiv 2019
- [4] Liu et al.: Disentangling and Unifying Graph Convolutions for Skeleton-Based Action Recognition, arXiv 2020
- [5] Liu et al.: NTU RGB+D 120: A Large-Scale Benchmark for 3D Human Activity Understanding, arXiv 2019
- IEEE Recherchesystem www.ieeexplore.ieee.org
- Google Scholar scholar.google.com
- Proceedings of the relevant conferences (CVPR, ICCV, ECCV, BMVC, AVSS, ICPR, ICIP, IROS, ICRA, ...)

Supervisor: Dustin Aganian, M.Sc. (dustin.aganian@tu-ilmeneau.de)
Supervising Prof.: Prof. Dr. H.M. Groß
Student: Najam Saleem