



Feb. 10, 2018

F O R S C H U N G S P R A X I S
for
Berkol Görür
Student ID 03681015, Degree EI

Hand Pose Evaluation with Deep Metric Learning

Problem description:

Hand pose tracking plays an important role in many human-robot interaction tasks, such as gesture recognition and learning grasping capability by human demonstration. Since emergence of consumer level depth sensing device, a lot of depth image based hand pose estimation methods appeared. In case of continuous hand tracking, model-based optimization method can be used [2]. Model-based optimization methods require an objective function to measure the discrepancy between the observation and pose hypothesis. Usually, this objective function requires many manual design and parameter tuning steps to obtain good performance. With the advance of deep learning algorithms, this manual design step can be substituted with a learning task. In this thesis, the student will investigate on deep metric learning problem [1]. Relying on a large annotated dataset [3], a deep metric based objective function should be trained and evaluated for hand pose.

Work schedule:

- Literature research and background knowledge study.
- Deep metric learning for hand pose and analysis for the learned objective function.
- Evaluation on a tracking dataset [3].

Bibliography:

- [1] Fangxiang Feng, Xiaojie Wang, and Ruifan Li. Cross-modal retrieval with correspondence autoencoder. In *Proceedings of the 22nd ACM international conference on Multimedia*, pages 7–16. ACM, 2014.
- [2] Alexandros Makris, Nikolaos Kyriazis, and Antonis A Argyros. Hierarchical particle filtering for 3d hand tracking. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*, pages 8–17, 2015.
- [3] Shanxin Yuan, Qi Ye, Bjorn Stenger, Siddhand Jain, and Tae-Kyun Kim. Bighand2. 2m benchmark: Hand pose dataset and state of the art analysis. *arXiv preprint arXiv:1704.02612*, 2017.

Supervisor: M. Sc. Shile Li
Start: 03.04.2018
Delivery: xx.06.2018

(D. Lee)
Univ.-Professor