



February 18

F O R S C H U N G S P R A X I S

Human Hand Pose Tracking using Particle Swarm Optimization

Problem description:

Hand pose estimation plays an important role in 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. One of the hand pose estimation approach relies on the kinematic model of human hand. Relying on an efficient sphere-based likelihood function [1], hand pose can be tracked in real-time using Particle Swarm Optimization method.

In this Forschungspraxis, the student should use the sphere based likelihood function from [1], and implement the hybrid PSO-ICP method [1] from using a public dataset [2].

Work schedule:

- Literature study
- Implementation of the hybrid PSO-ICP method [1]
- Evaluation of the implementation on a public dataset [2].

Bibliography:

- [1] Chen Qian, Xiao Sun, Yichen Wei, Xiaou Tang, and Jian Sun. Realtime and robust hand tracking from depth. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 1106–1113, 2014.
- [2] Jonathan Tompson, Murphy Stein, Yann Lecun, and Ken Perlin. Real-time continuous pose recovery of human hands using convolutional networks. *ACM Transactions on Graphics*, 33, August 2014.

Supervisor: M. Sc. Shile Li
Start: xx.xx.xxxx
Delivery: xx.xx.xxxx

(D. Lee)
Univ.-Professor