Separating 3D Shape and Pose of Hands

Master’s Thesis / Master Project

Description:
Hand pose estimation is an important part of many HCI systems, and plays a key role in future AR and VR applications. Most of recent approaches use depth cameras (e.g. MS Kinect) to capture the users’ hand and apply the hand pose estimation algorithm on these depth images. However, large annotated datasets of different users are required to train state-of-the-art hand pose estimation methods. This work should explore techniques that require as little annotated data as possible. The project should start with depth images of hands from different persons (which are provided by us). Given this data, a method should be learned that separates the hand pose from its 3D shape. The 3D shape of the hand is different for each user, and the hand pose is different for each frame. Using this information, one can train a Neural Network, as shown above, that separates these two parts into two codes. Once these codes are learned, one can evaluate how well they are suited for pose and shape estimation for hands of different users.

The start and end of the project can be chosen by arrangement.

Objective:
- Review literature
- Design and train a Neural Network that separates shape and pose
- Evaluate different training approaches
- Perform experiments with learned shape and pose codes

Qualifications:
- Experience in Python
- Interest in Deep Learning
- Interest in GPU programming

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