

Romero et al. - 2017 - Embodied hands modeling and capturing hands and bodies together

1 Important

This paper describes the **MANO parameters** that we get with our training data. They captured a lot of hands and trained a hand model that can represent hands with only few parameters. For that, they performed dimensionality reduction on the captured hands to get the most essential features. For our project, the training data will be annotated with a selection of the MANO parameters.

Parameters: (**S,P,W,J,T**)

- S: Shape Space (the shape space is computed using neutral hand poses)
- P: Pose Space (they use 6 Principal components)
- W: Blend Weights
- J: Joints (15 ball joints with global orientation)
- T: Templates

2 Difficulties they Mention

- (Self-) Occlusion -> Great part of their dataset is hands holding objects to train for occlusion as well.
- Different Hand Colors
- Different Hand Dexterity
- Different Hand Shapes
- Motion Blur
- Hands are small. would need very high resolution captioning
- High-dimensional hand pose space -> They use PCA to reduce it. It's appropriate to reduce it since hand movements are restricted and not every joint can be moved freely from the others. Some research found the dimension of hand joint movement is about 6.5.

3 Additional Info

They **mirror the left hand** so there are only right hands in the dataset (they mirror it back later)

They cropped away the arm and hand stand

Resolution is around **50'000 vertices**, including texture map