Learning joint reconstructions of hands and manipulated objects
Motivation
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• Learn human rules of object manipulation

• A first step: hand-object reconstruction from a single rgb frame
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• Learn human rules of object manipulation
• A first step: hand-object reconstruction from a single rgb frame
Our approach

• Reconstruct hand and object meshes in an end-to-end learning framework
Hand reconstruction

- Integrate the MANO parametric hand model as a differentiable layer
Hand reconstruction

- Integrate the MANO parametric hand model as a differentiable layer
Object reconstruction

- Deform a sphere into the target shape
- Baseline from AtlasNet
Object reconstruction

• Predict scale and translation relative to hand
Full architecture
Interaction terms

Repulsion loss

Attraction loss

Penalization function

Contact zones
Qualitative results
First Hand Action Benchmark dataset
Object model collection

Selected "Graspable" objects from ShapeNet

- 8 object categories (bowls, bottles, ...)
- 2.7K object instances
Robotic grasps

Transformed MANO to a fixed articulated model
Use Grasplt software to automatically generate grasp
Rendering

Random object textures from ShapeNet and image backgrounds
Random lighting, body pose, global orientation
Qualitative results

CORe50 dataset and custom sequences
Failure cases
Model robustness

Background variation

Object textures

Unseen categories
Future work…