On Self-Contact and Human Pose
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Mocap. and Scans: No in-the-wild images
Recently: discrete contact annotations (rare & no 3D mesh)
Scans avoid self-contact (Table 1)

Why not studied? -> No suitable datasets

[2] Ahmed et al., A survey on deep learning advances on different 3D data representations, CoRR 2018
[3] Anguelov et al., SCAPE: Shape Completion and Animation of People, TOG 2005
[6] Pavlakos et al., Expressive body capture: 3D hands, face, and body from a single image, CVPR 2019
[7] Kolotouros et al., Learning to Reconstruct 3D Human Pose and Shape via Model-fitting in the Loop, ICCV 2019

Code & Data tuch.is.tue.mpg.de

• SMPLify-DC optimisation for DSC data (SPIN [7] design)
• MTP data treated as ground truth

Table 1. 3D scan datasets with mesh count (total and self-contact).

Common labels (e.g. keypoints): No contact information
Scans avoid self-contact (Table 1)
Morap- and Scans! No in-the-wild images
Recency: discrete contact annotations: Fare & no 3D mesh

Table 2. Quantitative results on 3DPW.

188 scans with self-contact

3D mesh into 24 regions

30K labels for LSP & DeepFashion

Largest improvement

Smallest improvement

3.7K MTP images

30K labels for LSP & DeepFashion

TUCH: the first HPS regressor for self-contact poses trained end-to-end
Why not studied? -> No suitable datasets

Three new datasets: 3DCP, MTP, and DSC
“Mimic The Pose” & SMPLify-XMC (images in-the-wild & 3D reference poses)
TUCH: the first HPS regressor for self-contact poses trained end-to-end
Code and data available

CONTRIBUTION

TUCH highlights:
• SMPLify-DC for DSC data
• Minimise minimum distance between regions in contact, $L_D = \sum_{n=1}^{N} \sum_{i} \min_{n \in R_i} (|v - u|)$
• Contact energy terms
  - $L_C$ encourages self-contact for vertices that are outside and near each other
  - $L_P$ pushes inside vertices to the surface

MTP - images in the wild with 3D reference pose
c) render meshes from 3DCP (presented pose)
d) ask Workers on Mechanical Turk to mimic poses
b) refine near-contact poses select from AMASS [5] (3DCP Mocap)

SMPLify-XMC
• adapts SMPLify-X [6] optimisation
• corrects small differences between presented and mimicked pose
• uses presented pose and contact and subject measurements

DSC - discrete self-contact annotations
e) Presented pose (blue), mimicked image, SMPLify-XMC fit (grey)

3DCP - 3D meshes with self-contact in SMPL-X topology
a) scan six subjects in self-contact poses (3DCP Scan)

MTP & DSC
• SMPLify-DC for DSC data (SPIN [7] design)
• MTP data treated as ground truth

RESULTS

Table 2. Quantitative results on 3DPW.