

MoCapDeform: Monocular 3D Human Motion Capture in Deformable Scenes

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Overview

We propose the first algorithm that models non-rigid scene deformations and finds the accurate global 3D poses of the subject by human-deformable scene interaction constraints

- Given the scene mesh, camera parameters and RGB sequence, we recover 3D global human pose along with the non-rigid deformation of the scene geometry.
- We propose a learning-free raycast algorithm to find the contact region on the human body mesh and scene geometry for improved localisation accuracy.
- We release a new dataset for the experimental evaluation with human-scene interactions and observable scene deformations.





- Multiview markerless 3D reconstruction of human mesh deformable geometry
- 4 different subjects, 16K frames (30fps) in total
- Allows testing the performance of estimated geometry deformation



Estimated deformations

3D Error comparison on PROX dataset

	PJE	V2V	p.PJE	p.V2V	non-col
SMPLify-X [38]	214.64	219.20	64.04	61.88	92.42%
PROX [19]	167.16	171.35	63.54	63.06	95.63%
POSA [20]	157.11	159.52	63.70	63.23	95.89%
MoCapDeform (s1+s2)	144.15	145.23	62.86	61.19	95.90%
MoCapDeform (full)	139.78	140.60	62.29	60.67	97.60%

3D Error comparison on our dataset

	PJE	V2V	p.PJE	p.V2V	non-col
SMPLify-X [38]	441.86	451.87	89.73	101.53	97.14%
PROX [19]	375.01	403.22	97.09	107.57	97.99%
POSA [20]	365.91	398.15	97.26	108.67	98.41%
MoCapDeform (s1+s2) MoCapDeform (full)	266.18 264.68	283.46 282.01	91.18 91.91	101.71 102.43	98.57% 99.04%

Related works: SMPLify-X [CVPR 2019], PROX [ICCV 2019], POSA [CVPR 2021], HULC [ECCV 2022]

Acknowledgement: This work was supported by the ERC consolidator grant 4DReply (770784).