POCO: 3D Pose and Shape Estimation with Confidence
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Motivation

Methods are quite accurate
Yet, they are not perfect

As most HPS regressors do not report the confidence, downstream tasks cannot differentiate accurate estimates from inaccurate ones.

Goal

POCO
SOTA
HPS
Framework

Problem

Prior Work
Distribution of body parameters (SMPL)

Accuracy vs Speed

Resources

Project Page
https://poco.is.tue.mpg.de/

POCO: Architecture

SMPL Pose (θ)
SMPL Shape (M(θ,β))

Uncertainty (σ)

Regressor

Camera (C)

(1) Gaussian Baseline

(2) Normalizing Flow Baseline

Results

Evaluation on 3DPW Test Set

POCO Inference

(HPS Self-Improvement)

(Keep) Uncertainty < 0.3

(Discard) Uncertainty > 0.3

POCO-PARE

POCO-PARE

POCO-PARE

POCO-PARE

POCO-CLIFF

Detect implausible pose and discard

GLAMR, CVPR’22

(b) Inpainting Uncertain Frames

CLIFF, ECCV 2022

PARE, ICCV 2021

PARE, ICCV 2021

CLIFF, ECCV 2022

Sengupta et al., Hierarchical Kinematic Probability Distribution for 3D Human Shape and Pose Estimation from Image in the Wild. ECCV 2021

References

HMR: Kanazawa et al., End-to-end Recovery of Human Shape and Pose. CVPR 2018
PARE: Kocabas et al., PARE: Part Attention Regressor for 3D Human Body Estimation. ICCV 2021
CLIFF: Li et al., CLIFF: Carrying Location Information in Full Frames into Human Pose and Shape Estimation. ECCV 2022
3DPW: von Marcard et al., Recovering Accurate 3D Human Pose in The Wild Using IMUs and a Moving Camera, ECCV 2018
ProHMR: Kolotouros et al., Probabilistic Modeling for Human Mesh Recovery. ICCV 2021