SUPR: A Sparse Unified Part-Based Human Representation

Ahmed A. A. Osman[1], Timo Bolkart[1], Dimitrios Tzionas[1,2], Michael J. Black[1]

[1]Max Planck Institute for Intelligent Systems,Tübingen [2]University of Amsterdam

Max Planck Institute for Intelligent Systems

University of Amsterdam

ECCV TEL AVIV 2022

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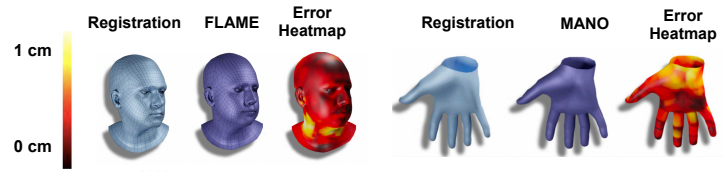
Code, Models and Data

Goal

SUPR is an expressive body model trained on a **federated dataset** of 1,2 million hand, head and body registrations. We can **separate** the model into body parts because of the **sparse pose blend shape** formulation based on STAR [3].

Problems

Body parts that are trained on separated scans do not capture deformations for the full range of head and hand motion.



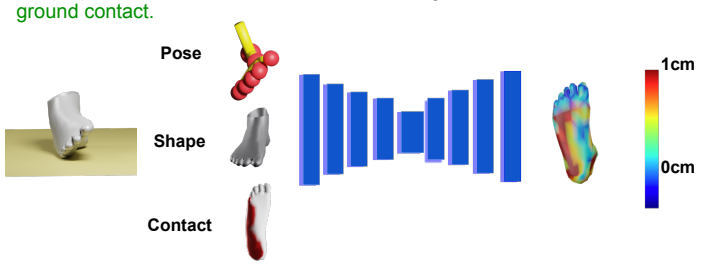
Existing Body Part models for the head and hand fail to capture the body parts' full range of motion

The SMPL foot penetrates the ground platform.

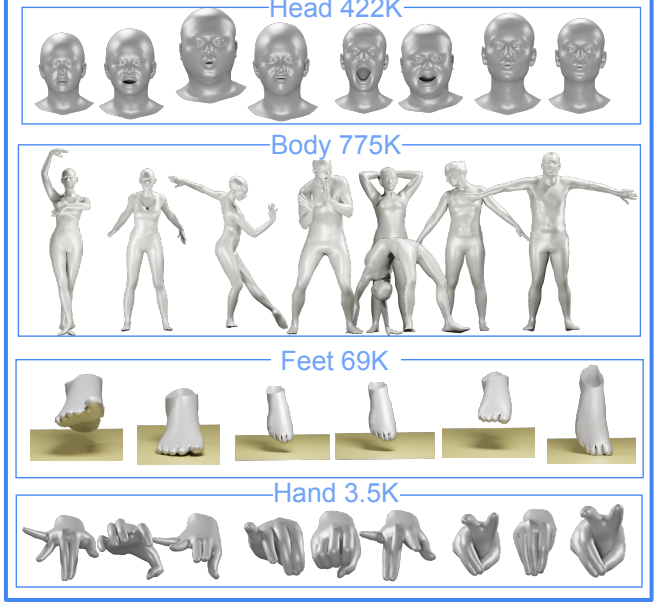
No foot model exists that can capture foot deformation due to ground contact

Foot Deformation Network

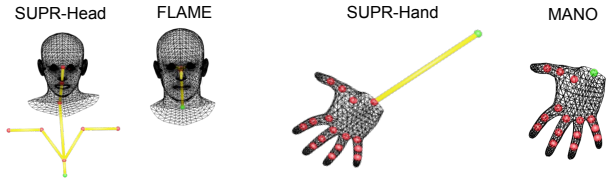
- Existing models only relate the body deformations to the body pose.
- We propose a network architecture for modeling the foot deformation due to ground contact.



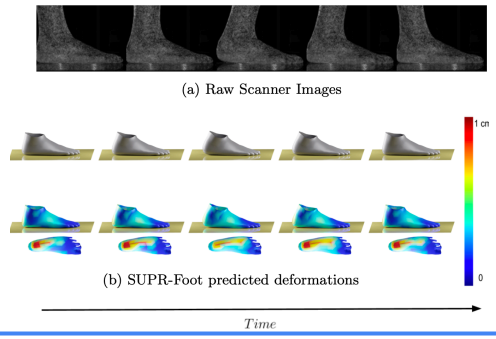
1.2M Federated Registrations



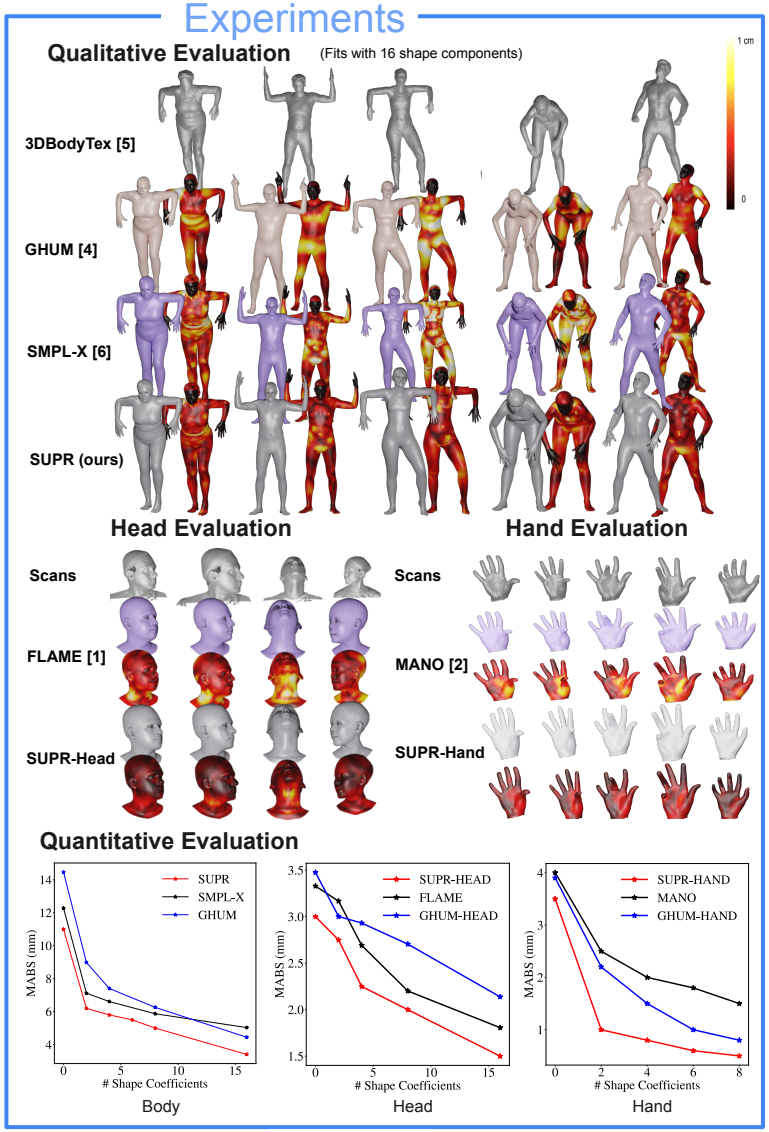
Head & Hand Need More Joints



Foot Deformation



Experiments



References

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2. Romero et al. "Embodied hands: Modeling and capturing hands and bodies together."
3. Osman et al. "STAR: Sparse trained articulated human body regressor."
4. Xu et al. "Generative 3D human shape and articulated pose models."
5. Saint et al. "3DBodyTex: Textured 3D body dataset."
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