

Body Shape Estimation from Silhouettes Based on Body Parts Using Multi-Output Deep Regression Network.

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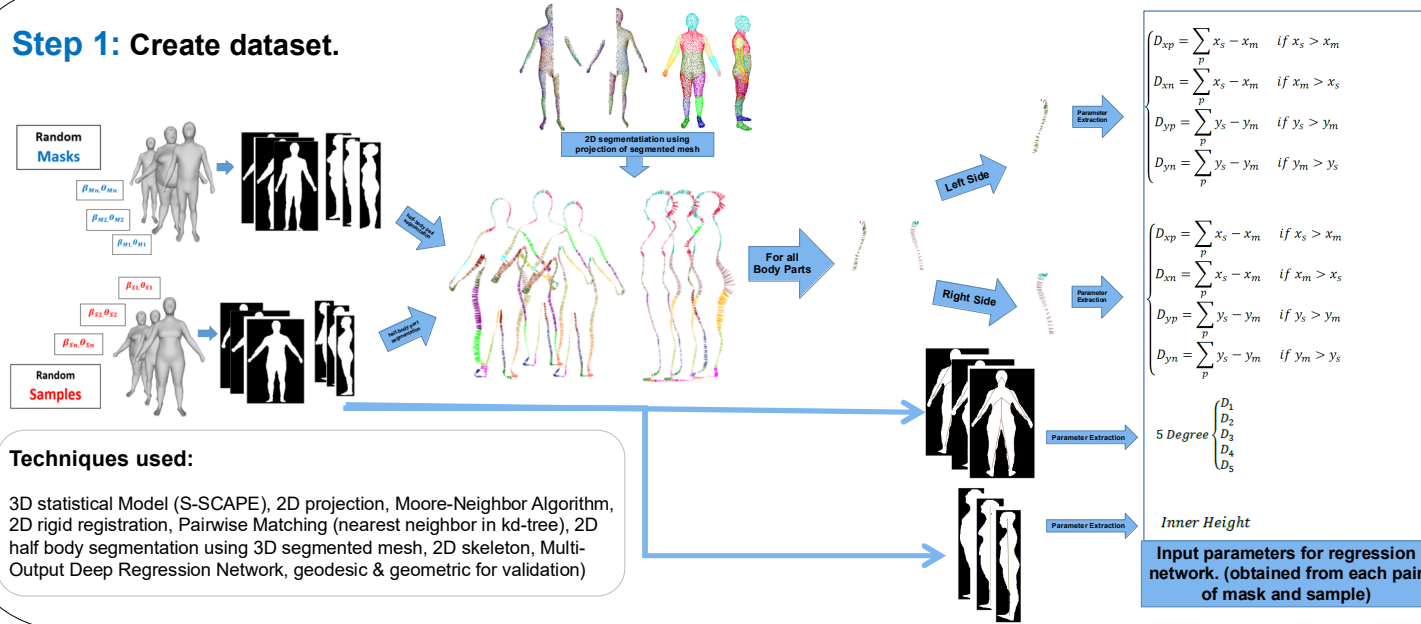
Motivation:

- Improving the running time of the previously proposed algorithm [1].
- Improving the accuracy of visually important body parts in body shape estimation.

Contribution:

- Train a regression network by matching errors extracted from the 2D projection of random samples and random masks.
- 2D half-body part segmentation using projection of segmented 3D body meshes.

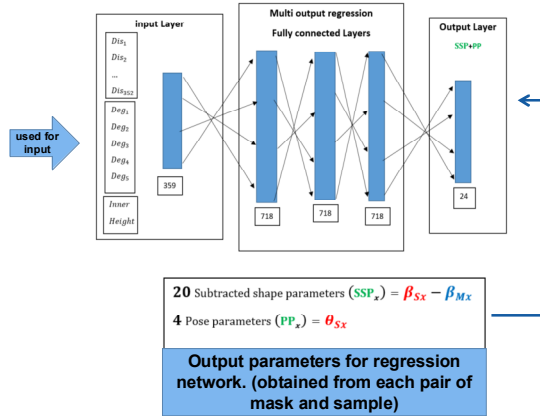
Step 1: Create dataset.



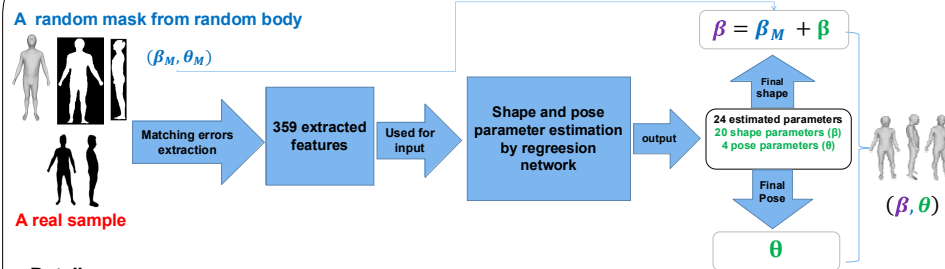
Techniques used:

3D statistical Model (S-SCAPE), 2D projection, Moore-Neighbor Algorithm, 2D rigid registration, Pairwise Matching (nearest neighbor in kd-tree), 2D half body segmentation using 3D segmented mesh, 2D skeleton, Multi-Output Deep Regression Network, geodesic & geometric for validation)

Step 2: Train a regression network using created dataset.



Step 3: Reconstruction process.



Details:

- For a real sample, a random mask is used to generate 359 parameters as input features for the regression network.
- 24 parameters, including 20 shape parameters and four pose parameters, are estimated using the network.
- 20 estimated shape parameters should be added to 20 mask shape parameters to obtain shape parameters.
- Four estimated pose parameters are used for pose parameters.

Experimental Results:



Selected References:

- [1] Hemati, A., & Bastanfard, A. (2022). Adjustable Method Based on Body Parts for Improving the Accuracy of 3D Reconstruction in Visually Important Body Parts from Silhouettes. submitted to Multimedia Tools and Applications. arXiv: <https://doi.org/10.48550/arXiv.2211.14822>.
- [2] B. M. Smith, V. Chari, A. Agrawal, J. M. Rehg, and R. Sever, "Towards accurate 3D human body reconstruction from silhouettes," in Proc. Int. Conf. 3D Vis. (3DV), Sep. 2019, pp. 279–288.
- [3] E. Dibra, H. Jain, C. Öztireli, R. Ziegler, and M. Gross, "HS-Nets: Estimating Human Body Shape from Silhouettes with Convolutional Neural Networks," in 3D Vision (3DV), 2016 Fourth International Conference on, 2016, pp. 108–117.