REBUTTAL SUPPLEMENTARY MATERIAL

GENCORRES: CONSISTENT SHAPE MATCHING VIA COUPLED IMPLICIT-EXPLICIT SHAPE GENERATIVE MODELS

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In this rebuttal supplementary material, we provide more experiments to address concerns raised by some reviewers. Specifically, we provide experiments on real 3D body scans in Section 1 and experiments on quadruped shapes in Section 2.

1 EXPERIMENTS ON REAL 3D BODY SCANS

We create a dataset based on the THUman dataset Zheng et al. (2019), which contains human scans with various clothes and hairstyles. Since the dataset is captured using the DoubleFusion system Yu et al. (2018), the meshes are non-watertight and noisy. We subsample 128 human scans from the original THUman dataset and use them to train SALD Atzmon & Lipman (2021) and the implicit generator of GenCorres. We visualize the shape space interpolation in Figure 1.

From the results, we observe that both SALD and our method can effectively reconstruct the wrinkles in clothing and the rough shapes of hair, including the bangs, medium-length straight black hair, and the ponytail, as shown in the last row of Figure 1. However, SALD fails to generate rigid arms or legs during interpolation. By integrating our proposed geometric deformation regularization into SALD, our method significantly improves the interpolations within the shape space.

2 EXPERIMENTS ON QUADRUPED SHAPES

We generate a dataset comprising 64 shapes based on the SMAL model Zuffi et al. (2017), which includes 32 lions and 32 horses. We use them to train SALD Atzmon & Lipman (2021) and the implicit generator of GenCorres. In Figure 2, we visualize the interpolation between a lion and a horse using our method. We also present a comparison with SALD in Figure 3. The results demonstrate that our method achieves smoother interpolation compared to SALD.

REFERENCES

Matan Atzmon and Yaron Lipman. SALD: sign agnostic learning with derivatives. In *9th International Conference on Learning Representations, ICLR 2021*, 2021.

Tao Yu, Zerong Zheng, Kaiwen Guo, Jianhui Zhao, Qionghai Dai, Hao Li, Gerard Pons-Moll, and Yebin Liu. Doublefusion: Real-time capture of human performances with inner body shapes from a single depth sensor. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2018.

Zerong Zheng, Tao Yu, Yixuan Wei, Qionghai Dai, and Yebin Liu. Deephuman: 3d human reconstruction from a single image. In *The IEEE International Conference on Computer Vision (ICCV)*, October 2019.

Silvia Zuffi, Angjoo Kanazawa, David W. Jacobs, and Michael J. Black. 3d menagerie: Modeling the 3d shape and pose of animals. In *CVPR*, pp. 5524–5532, Washington, DC, USA, 2017. IEEE Computer Society.

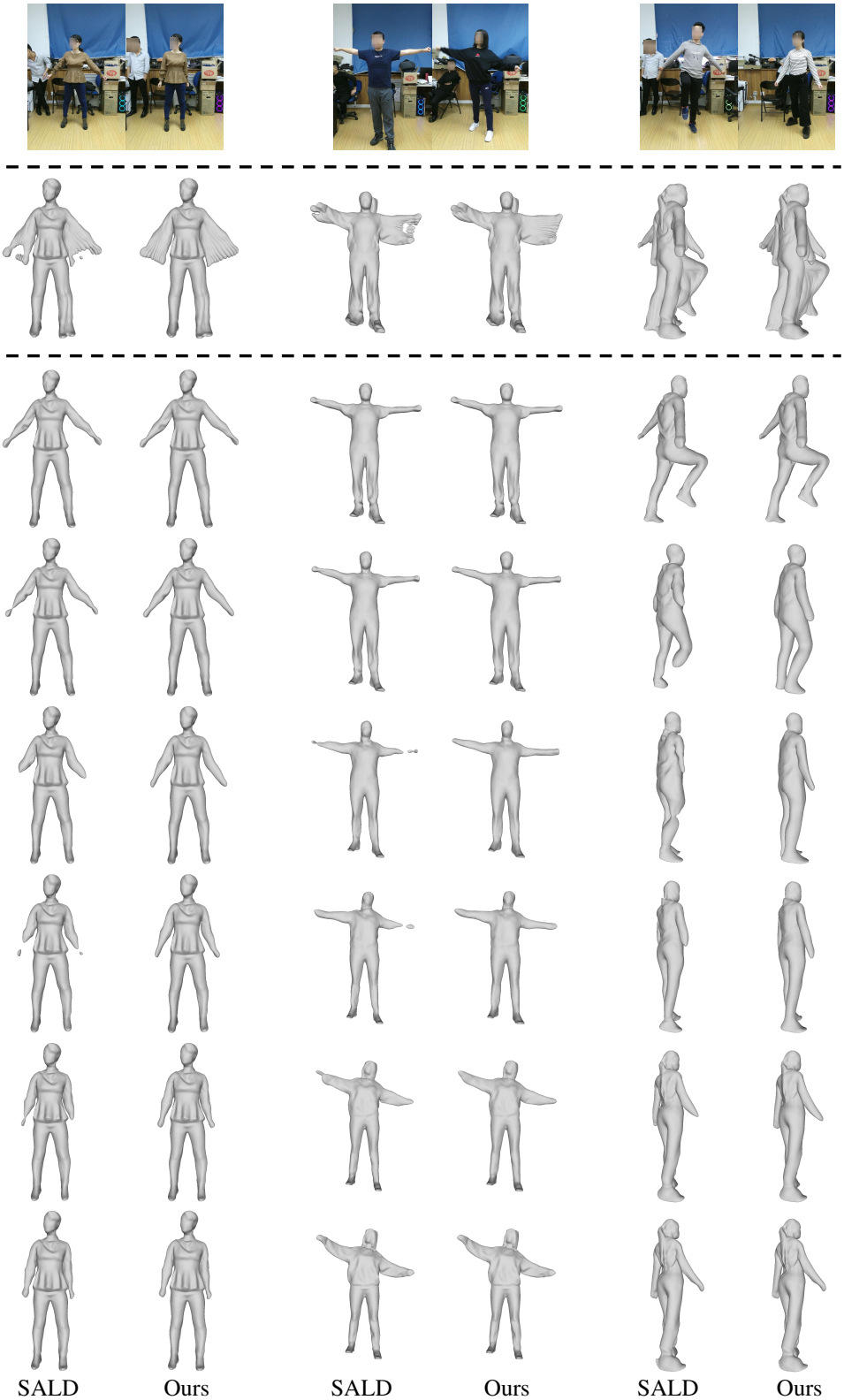

Figure 1: Comparison of shape interpolation between SALD and our method on the subsampled THUman dataset. The first row shows the corresponding RGB images of the source shape and the target shape, which are not used in training and are only visualized for reference. The second row shows 11 interpolated shapes, which are aligned in the same coordinate system for better comparison. Starting from the third row, we show some of the interpolated shapes individually in each column.

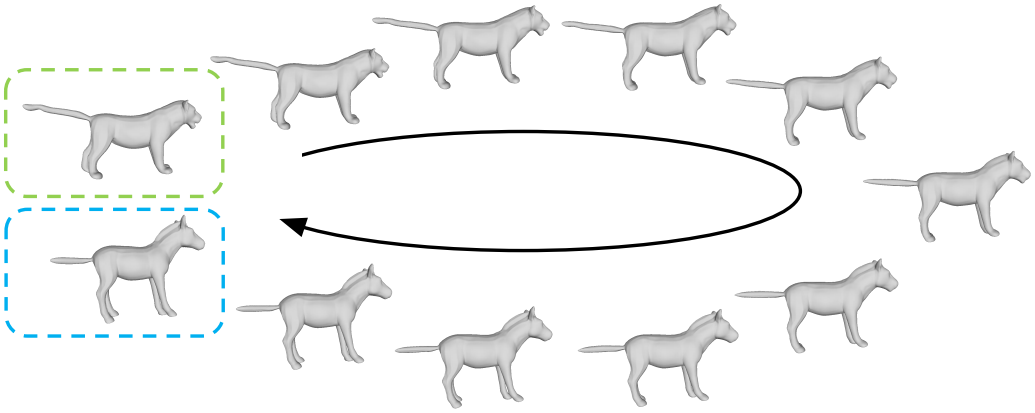

Figure 2: Interpolation between a lion (enclosed in the green box) and a horse (enclosed in the blue box) using our method. 9 interpolated shapes are visualized.

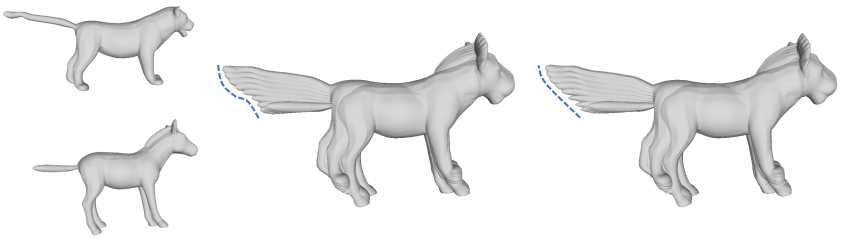

Figure 3: Comparison of shape interpolation between SALD and our method for quadruped shapes. (Left) The source shape, a lion, and the target shape, a horse. (Middle) Interpolation results using SALD. (Right) Interpolation results using our method.