4D Human Body Correspondences from Panoramic Depth Maps Supplemental Material

Zhong Li[1], Minye Wu[2], Wangyiteng Zhou[2] and Jingyi Yu[1,2]

[1]University of Delaware, Newark, DE, USA. lizhong@udel.edu
[2]ShanghaiTech University, Shanghai, China. {wumy,yujingyi}@shanghaitech.edu.cn
wytzhou@gmail.com

1. bpvf metric

In our animation mesh compresssion autoencoder network, to calculate the bpv per frame, we used the following equation:

$$bpvf = \frac{6V + q(\mathcal{N}(C) \cdot (V + \sum_{\mathcal{G} \in x,y,z} \mathcal{N}(D_1^{\mathcal{G}})) + \sum_{\mathcal{G} \in x,y,z} \sum_{i=1}^{2} \mathcal{N}(D_i^{\mathcal{G}}) \cdot \mathcal{N}(D_{i+1}^{\mathcal{G}}))}{FV} \tag{1}$$

Where $6V$ encodes the connectivity, we use the Edgebreaker [3] method to compress the connectivity information. While $\mathcal{N}()$ define the number of nodes in this layer. We conduct quantization on each nodes to half float by only use $q = 16$ bits to represent a float value.

2. Additional Results

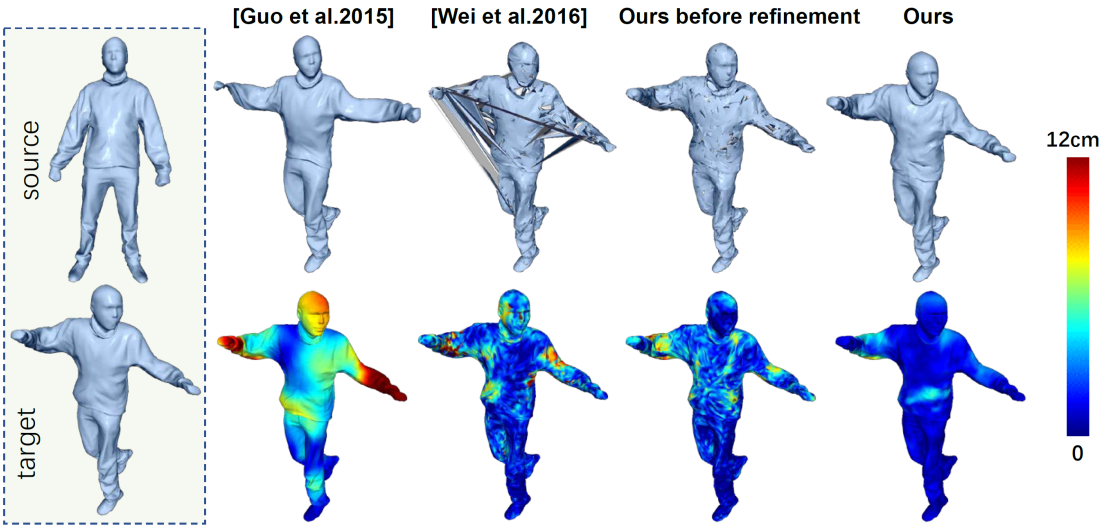

Figure 1: Our technique vs. the state-of-the-art on the Jumping sequence. [2] loses track due to large deformations(see geometry inconsistencies); [5] is able to track most of the vertices but the errors produce topology inconsistencies; Our result before refinement outperforms both in correspondence matching. The results are further improved after refinements.

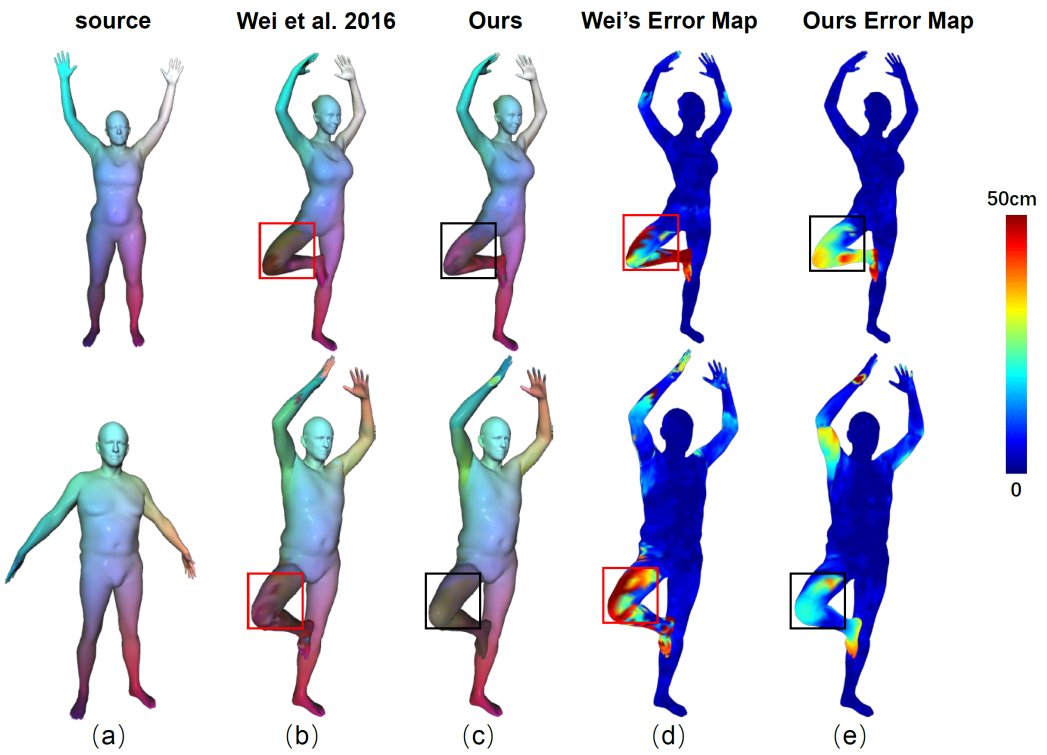

Figure 2: Comparisons on FAUST [1]. (a) shows the reference mesh; (b) and (c) show the results by [5] and ours; (d) and (e) show the corresponding errors maps. Our technique more robustly handles strong deformations (e.g., knee and elbow bending).

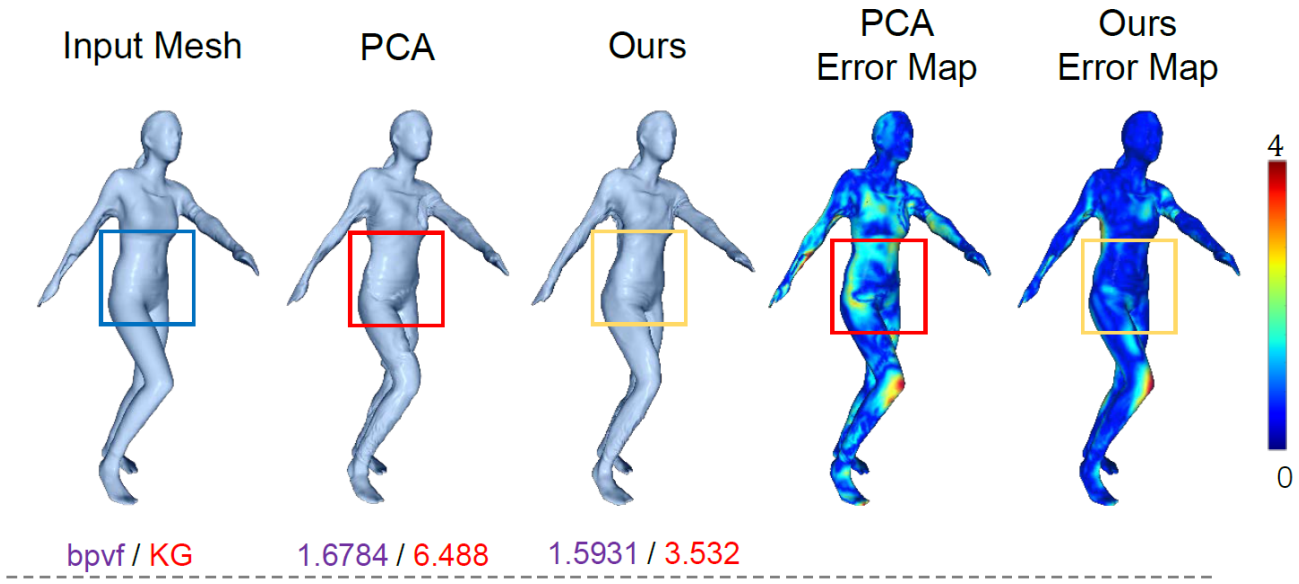

Figure 3: Visual comparisons of ours vs. the PCA technique [4] on mesh compression. Our technique outperforms [4] even with at lower bpvf.

References

[1] F. Bogo, J. Romero, M. Loper, and M. J. Black. Faust: Dataset and evaluation for 3d mesh registration. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 3794–3801, 2014. 2

[2] K. Guo, F. Xu, Y. Wang, Y. Liu, and Q. Dai. Robust non-rigid motion tracking and surface reconstruction using l0 regularization. *2015 IEEE International Conference on Computer Vision (ICCV)*, pages 3083–3091, 2015. 1

[3] J. Rossignac. Edgebreaker: Connectivity compression for triangle meshes. *IEEE Trans. Vis. Comput. Graph.*, 5:47–61, 1999. 1

[4] M. Sattler, R. Sarlette, and R. Klein. Simple and efficient compression of animation sequences. In *Proceedings of the 2005 ACM SIGGRAPH/Eurographics symposium on Computer animation*, pages 209–217. ACM, 2005. 2

[5] L. Wei, Q. Huang, D. Ceylan, E. Vouga, and H. Li. Dense human body correspondences using convolutional networks. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, pages 1544–1553, 2016. 1, 2