An Efficient Volumetric Framework for Shape Tracking
Supplemental Material

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method	mean	stddev.	median	max
BALLET				
Cagniart *et al.* [2]	5.74	1.88	5.48	15.20
Allain *et al.* [1]	5.81	1.70	5.61	13.77
Ours, no vol. fitting	4.62	1.94	**4.28**	17.20
Ours	**4.56**	**1.21**	4.43	**11.00**
GOALKEEPER-13				
Cagniart *et al.* [2]	10.51	5.06	9.62	38.74
Allain *et al.* [1]	12.67	5.38	11.82	35.46
Ours	**7.19**	**2.70**	**6.74**	**20.52**
MARKER				
Cagniart *et al.* [2]	10.31	3.09	9.90	35.10
Allain *et al.* [1]	9.37	2.95	**8.74**	26.09
Ours	**8.95**	**2.09**	**8.75**	**20.77**

Table 1. Mean and statistics of silhouette reprojection error over BALLET and GOALKEEPER-13 and MARKER datasets, expressed in percentage of silhouette area.

Silhouette reprojection error. On the three datasets, quantitative evaluation by silhouette overlap (Table 1) shows a clear advantage for our method for each statistical quantity considered (mean, std. dev., median and maximum error). Temporal evolution of the silhouette reprojection error is shown by Fig. 1, Fig. 2 and Fig. 3.

Concerning GOALKEEPER-13 dataset, the strong numerical advantage of our method is consistent with the failure of both state of the art methods considered.

Concerning BALLET dataset, the error stays smaller with our method along the sequence (Fig. 1). We observe that our method deforms the shape at limb joints (elbows and kness) more accurately (see the video results).

Concerning MARKER dataset, Fig. 3 shows a smaller error for our method between frames 370 and 440. Observation of the video results shows that the tracking is more robust with our method on this section, while the other methods lose track of the arm of an actor.

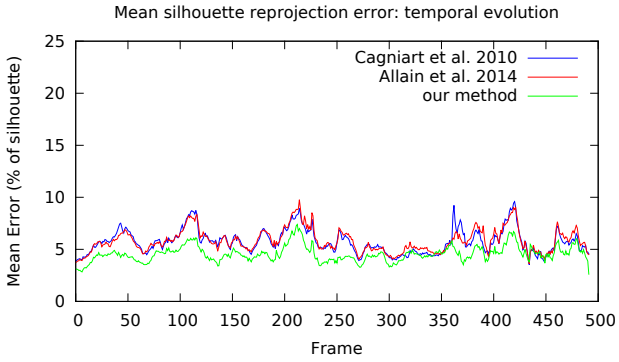

Figure 1. Mean silhouette reprojection error: temporal evolution over BALLET dataset.

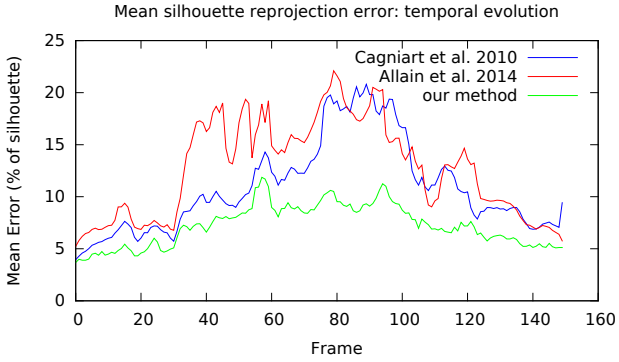

Figure 2. Mean silhouette reprojection error: temporal evolution over GOALKEEPER-13 dataset.

Volume Stability. Table 2 shows our method produces shapes with a more stable volume than the concurrent methods, for the three datasets.

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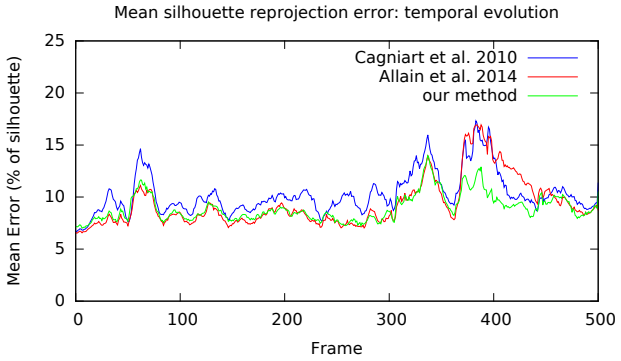

Figure 3. Mean silhouette reprojection error: temporal evolution over MARKER dataset.

method	std. dev. (L)		
	MARKER	BALLET	GOALKEEPER-13
Cagniart *et al.* 2010 [2]	3.85	1.22	4.42
Allain *et al.* 2014 [1]	4.32	1.20	3.54
our method	**2.24**	**0.95**	**2.11**

Table 2. Variation of the estimated volume over the sequence for MARKER, BALLET and GOALKEEPER-13 datasets.

References

[1] B. Allain, J.-S. Franco, E. Boyer, and T. Tung. On mean pose and variability of 3d deformable models. In *ECCV*, 2014. 1, 2

[2] C. Cagniart, E. Boyer, and S. Ilic. Probabilistic deformable surface tracking from multiple videos. In *ECCV*, 2010. 1, 2