

Supplementary material

Improving neural implicit surfaces geometry with patch warping

This document first show a failure case of our method. It then presents the detailed results of the ablation study and additional qualitative results on DTU dataset.

1. Failure case

Figure 1 shows reconstructions from scan 65 of DTU which is a failure case of our method. This scene has large view dependent effects like specularities or saturated pixels. Optimizing consistency from multiple view produces artifacts in the reconstruction since there is no useful signal. This may explain why reconstructions optimized with volumetric rendering only are smoother and more accurate than the reconstruction with our full method.

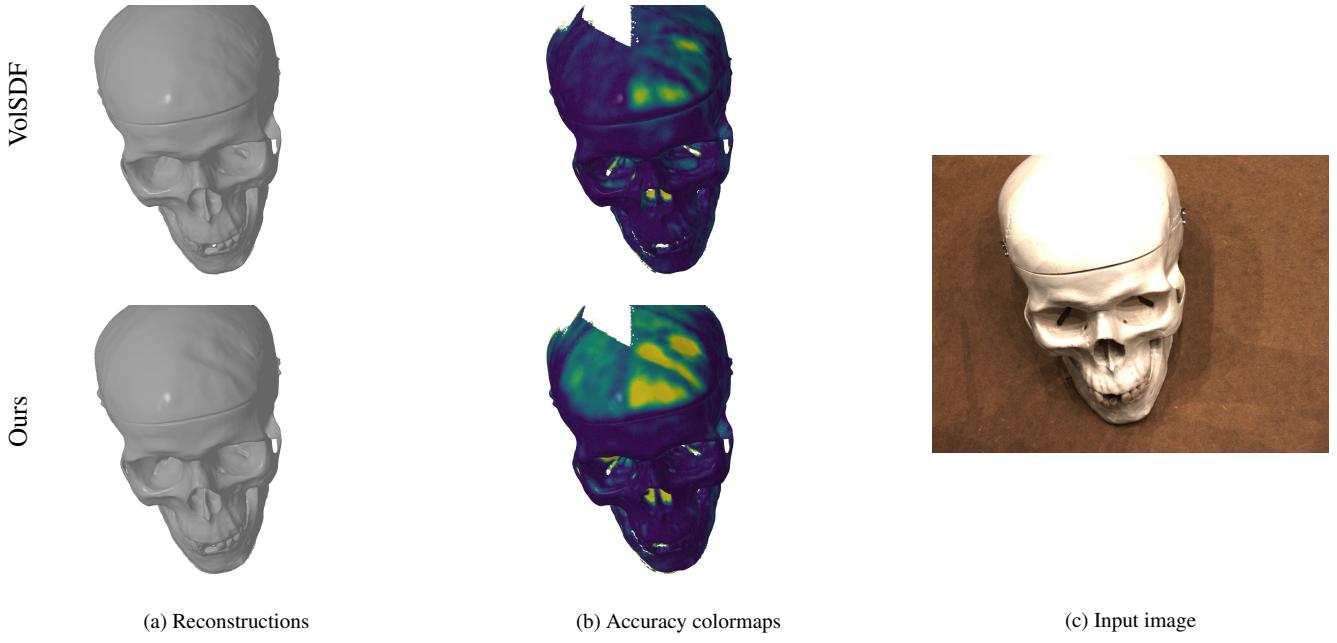


Figure 1. Failure case for a scene with low texture and large view dependent effects.

2. Detailed results ablation study

We show in tables 1, 2 and 3 the three quality metrics (overall, accuracy and completeness) for each scene of the ablation study. Adding volumetric rendering is especially beneficial on scenes with poor texture and large specularities like scans 63, 65, 97 and 110.

Method	\mathcal{L}_{vol}	$\mathcal{L}_{\text{warp}}$	M_s^{occ}	24	37	40	55	63	65	69	83	97	105	106	110	114	118	122	Mean
VolSDF	✓			0.99	0.86	0.82	0.48	1.39	0.69	0.90	1.26	1.24	0.67	0.67	1.12	0.41	0.72	0.54	0.85
Pixel	✓	Pixel	✓	0.66	0.77	0.65	0.46	1.36	0.85	0.83	1.26	1.15	0.69	0.65	1.46	0.46	0.66	0.55	0.83
Patch no occ.	✓	Patch		0.58	0.69	0.41	0.42	0.84	0.92	0.87	1.30	1.24	0.70	0.69	0.81	0.38	0.69	0.52	0.74
Patch no vol.		Patch	✓	0.49	0.78	0.41	0.33	0.92	1.04	0.82	1.25	1.29	0.67	0.62	0.93	0.40	0.67	0.50	0.74
Ours full	✓	Patch	✓	0.49	0.71	0.38	0.38	0.79	0.81	0.82	1.20	1.06	0.68	0.66	0.74	0.41	0.63	0.51	0.68

Table 1. Detailed **overall** metric of ablation study on DTU

Method	\mathcal{L}_{vol}	$\mathcal{L}_{\text{warp}}$	M_s^{occ}	24	37	40	55	63	65	69	83	97	105	106	110	114	118	122	Mean
VolSDF	✓			0.90	0.92	0.77	0.51	1.31	0.70	0.96	0.88	1.00	0.62	0.61	1.24	0.39	0.77	0.60	0.81
Pixel	✓	Pixel	✓	0.65	0.86	0.69	0.49	1.37	0.84	0.89	0.89	0.91	0.61	0.54	1.56	0.44	0.70	0.59	0.80
Patch no occ.	✓	Patch		0.65	0.79	0.41	0.51	1.06	0.91	0.97	0.92	0.99	0.63	0.61	1.04	0.37	0.73	0.54	0.74
Patch no vol.		Patch	✓	0.54	0.93	0.43	0.36	1.24	1.07	0.92	0.91	1.05	0.61	0.56	1.21	0.42	0.80	0.57	0.77
Ours full	✓	Patch	✓	0.52	0.82	0.39	0.40	1.01	0.81	0.92	0.85	0.84	0.59	0.57	0.92	0.41	0.73	0.55	0.69

Table 2. Detailed **accuracy** metric of ablation study on DTU

Method	\mathcal{L}_{vol}	$\mathcal{L}_{\text{warp}}$	M_s^{occ}	24	37	40	55	63	65	69	83	97	105	106	110	114	118	122	Mean
VolSDF	✓			1.09	0.79	0.86	0.44	1.46	0.68	0.84	1.64	1.49	0.73	0.73	1.00	0.43	0.66	0.48	0.89
Pixel	✓	Pixel	✓	0.68	0.69	0.62	0.44	1.36	0.86	0.77	1.63	1.39	0.77	0.76	1.37	0.48	0.61	0.50	0.86
Patch no occ.	✓	Patch		0.52	0.60	0.40	0.32	0.63	0.92	0.76	1.68	1.48	0.77	0.77	0.59	0.39	0.66	0.50	0.73
Patch no vol.		Patch	✓	0.45	0.64	0.39	0.31	0.60	1.01	0.71	1.59	1.52	0.73	0.69	0.66	0.39	0.54	0.43	0.71
Ours full	✓	Patch	✓	0.46	0.61	0.37	0.37	0.58	0.81	0.72	1.55	1.28	0.77	0.74	0.56	0.40	0.54	0.46	0.68

Table 3. Detailed **completeness** metric of ablation study on DTU

3. Additional DTU visualizations

We show additional DTU results in figures 2, 3 and 4

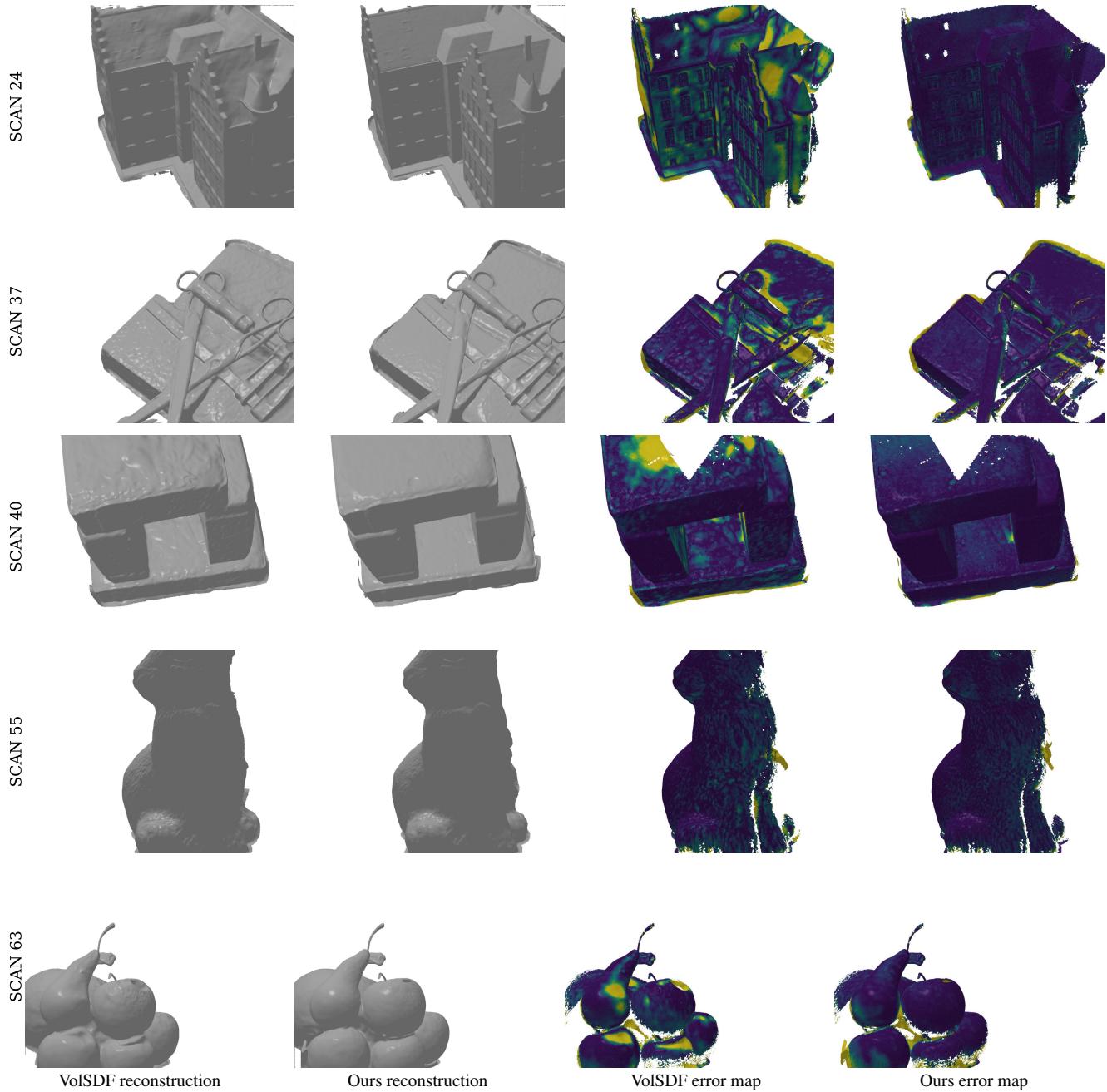


Figure 2. Qualitative comparison of VolSDF and our method (1/3)

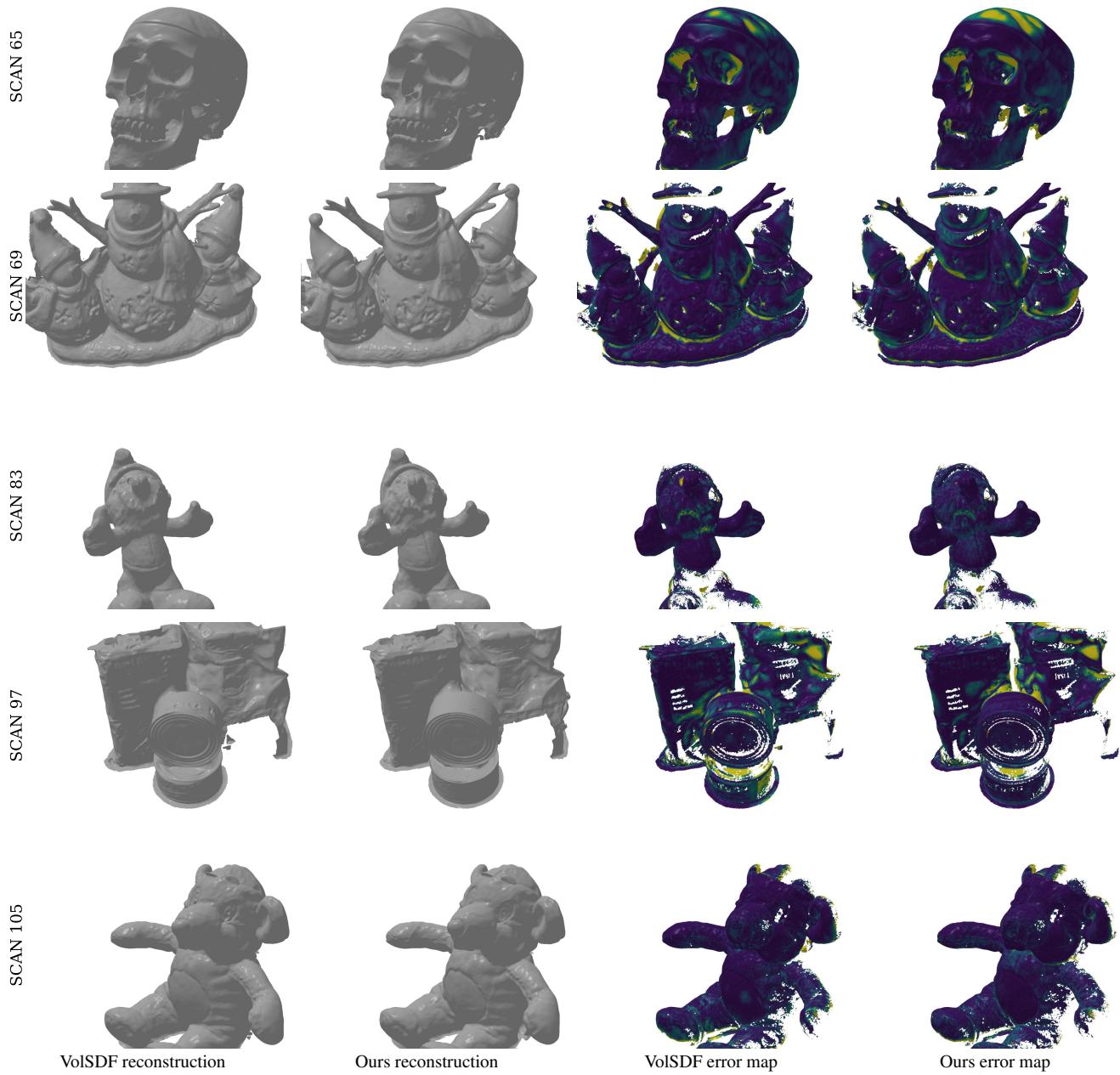


Figure 3. Qualitative comparison of VolSDF and our method (2/3)

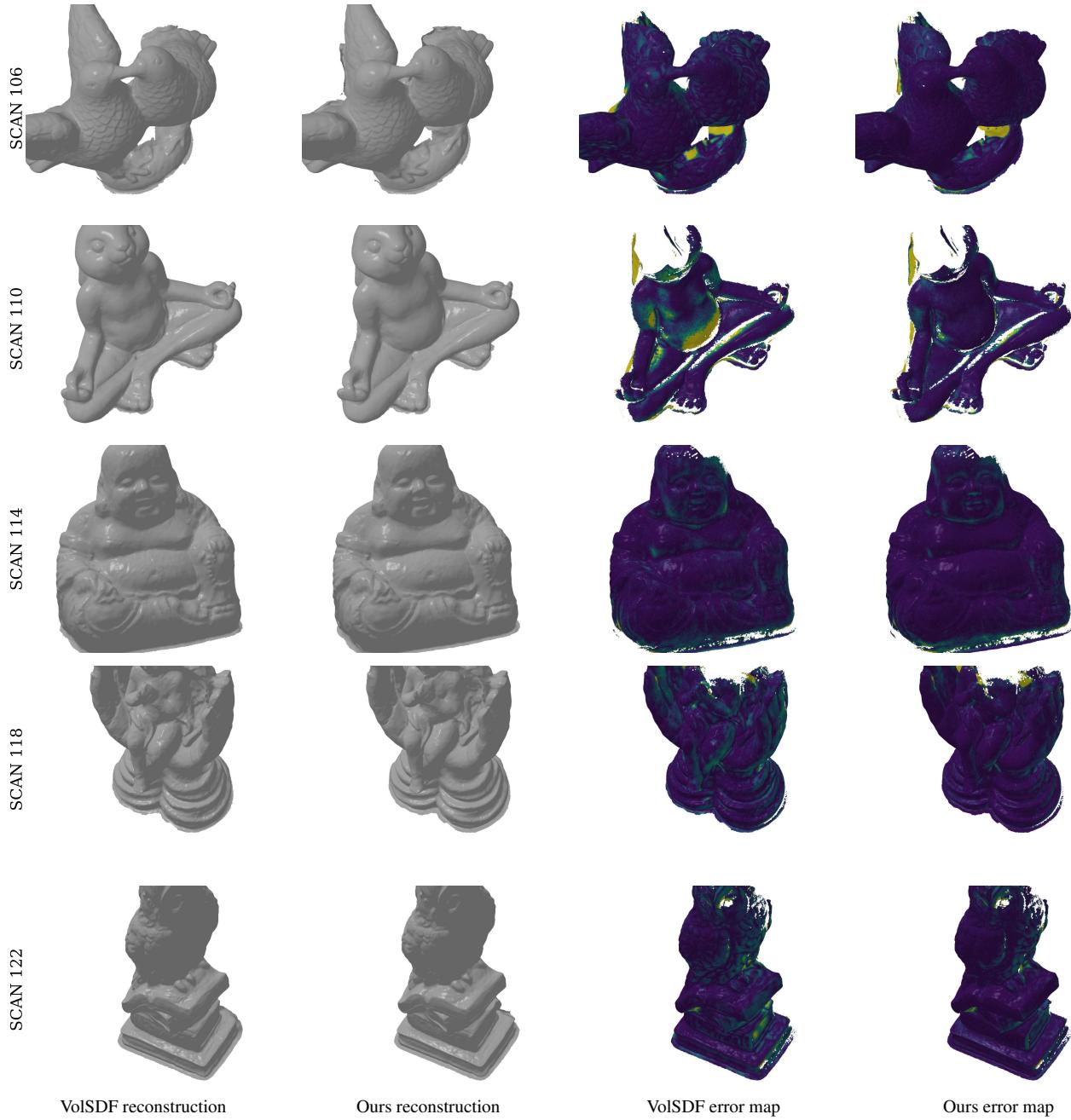


Figure 4. Qualitative comparison of VolSDF and our method (3/3)