Supplementary material for ReconNet: Non-Iterative Reconstruction of Images from Compressively Sensed Measurements

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Figure 1: The figure shows qualitative results on tracking for 8 videos. The red bounding box is the location for ReconNet+KCF at 0.01 measurement rate, and the blue bounding box is the location for original videos + KCF.

1. More results

Reconstruction from noiseless CS measurements: In table 1 of the main paper, we presented the peak signal-to-noise ratio values for 4 of the 11 test images. Here, the PSNR values (in dB) for the remaining 7 test images for various measurement rates are presented in Table 1.

Real-time high level vision from CS imagers: In the section 6 of the main paper, we showed the variation of average precision for 15 publicly available videos [5] (BlurBody, BlurCar1, BlurCar2, BlurCar4, BlurFace, BlurOwl,

Image Name	Algorithm	MR = 0.25		MR = 0.10		MR = 0.04		MR = 0.01	
		w/o BM3D	w/ BM3D	w/o BM3D	w/ BM3D	w/o BM3D	w/ BM3D	w/o BM3D	w/ BM3D
Monarch	TVAL3 [2]	**27.77**	**27.77**	**21.16**	21.16	16.73	16.73	11.09	11.11
	NLR-CS [1]	25.91	26.06	14.59	14.67	11.62	11.97	6.38	6.71
	D-AMP [3]	26.39	26.55	19.00	19.00	14.57	14.57	6.20	6.20
	SDA [4]	23.54	23.32	20.95	21.04	18.09	18.19	15.31	15.38
	ReconNet (Ours)	24.31	25.06	21.10	**21.51**	**18.19**	**18.32**	**15.39**	**15.49**
Parrot	TVAL3	**27.17**	**27.24**	23.13	**23.16**	18.88	18.90	11.44	11.46
	NLR-CS	26.53	26.72	14.14	14.16	10.59	10.92	5.11	5.44
	D-AMP	26.86	26.99	21.64	21.64	15.78	15.78	5.09	5.09
	SDA	24.48	24.36	22.13	22.35	**20.37**	20.67	**17.70**	17.88
	ReconNet (Ours)	25.59	26.22	22.63	**23.23**	20.27	**21.06**	17.63	**18.30**
Boats	TVAL3	28.81	28.81	23.86	23.86	19.20	19.20	11.86	11.88
	NLR-CS	29.11	**29.27**	14.82	14.86	10.76	11.21	5.38	5.72
	D-AMP	**29.26**	29.26	21.95	21.95	16.01	16.01	5.34	5.34
	SDA	26.56	26.25	24.03	**24.18**	21.29	21.54	**18.54**	18.68
	ReconNet (Ours)	27.30	27.35	**24.15**	24.10	**21.36**	**21.62**	18.49	**18.83**
Cameraman	TVAL3	**25.69**	**25.70**	**21.91**	**21.92**	18.30	18.33	11.97	12.00
	NLR-CS	24.88	24.96	14.18	14.22	11.04	11.43	5.98	6.31
	D-AMP	24.41	24.54	20.35	20.35	15.11	15.11	5.64	5.64
	SDA	22.77	22.64	21.15	21.30	**19.32**	19.55	17.06	17.19
	ReconNet (Ours)	23.15	23.59	21.28	21.66	19.26	**19.72**	**17.11**	**17.49**
Foreman	TVAL3	35.42	35.54	**28.69**	**28.74**	20.63	20.65	10.97	11.01
	NLR-CS	**35.73**	**35.90**	13.54	13.56	9.06	9.44	3.91	4.25
	D-AMP	35.45	34.04	25.51	25.58	16.27	16.78	3.84	3.83
	SDA	28.39	28.89	26.43	27.16	23.62	24.09	**20.07**	20.23
	ReconNet (Ours)	29.47	30.78	27.09	28.59	**23.72**	**24.60**	20.04	**20.33**
House	TVAL3	32.08	32.13	26.29	26.32	20.94	20.96	11.86	11.90
	NLR-CS	**34.19**	**34.19**	14.77	14.80	10.66	11.09	4.96	5.29
	D-AMP	33.64	32.68	24.84	24.71	16.91	17.37	5.00	5.02
	SDA	27.65	27.86	25.40	26.07	22.51	22.94	**19.45**	**19.59**
	ReconNet (Ours)	28.46	29.19	**26.69**	**26.66**	**22.58**	**23.18**	19.31	19.52
Peppers	TVAL3	29.62	29.65	**22.64**	22.65	18.21	18.22	11.35	11.36
	NLR-CS	28.89	29.25	14.93	14.99	11.39	11.80	5.77	6.10
	D-AMP	**29.84**	**28.58**	21.39	21.37	16.13	16.46	5.79	5.85
	SDA	24.30	24.22	22.09	22.34	**19.63**	19.89	**16.93**	**17.02**
	ReconNet (Ours)	24.77	25.16	22.15	**22.67**	19.56	**20.00**	16.82	16.96

Table 1: PSNR values in dB for 7 of the test images using different algorithms at different measurement rates (the PSNR for the other 4 test images and the mean PSNR are given in table 1 of the main paper).

Car2, CarDark, Dancer, Dancer2, Dudek, FaceOcc1, FaceOcc2, FleetFace, Girl2) as a function of location error threshold for both ReconNet+KCF at measurement rate of 0.01 and original videos + KCF. Here, in figure 1 we present qualitative results for 8 of those videos by overlaying on the original frames, the bounding boxes predicted for ReconNet+KCF (in red) and original videos+KCF (in blue). It can be seen that for the videos where the target object is of reasonably large size, ReconNet+KCF performs nearly as well as original videos + KCF. This indicates that the reconstruction output by ReconNet retain enough semantic information to reliably track medium to large sized targets. However, for very small sized targets, ReconNet+KCF performs poorly indicating that at measurement rate of 0.01, the reconstructed frames do not retain fine-grained information in the images.

References

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