TABLE 4

Average PSNR, SSIM values on real-world color image datasets. The average time is calculated based on the PolyU dataset. '-' means the results are not available. 'C: CANON', 'F: FUJIFILM', 'H: HUAWEI', 'I: IPHONE', 'N: NIKON', 'O: OPPO', 'S: SONY', 'X: XIAOMI'. Results marked with $*$ are from the original papers or the official websites.

Methods/Models			DnD	SIDD	CC15	CC60	PolyU	HighISO	IOCI												Time (s)
									C-100D	C-600D	C-5DMark4	F-X100T	H-Honor6X	H-Mate40Pro	I-5S	I-6S	I-13	N-D5300	O-R11s	S-A6500	X-MI8	
Category	Schemes	# Images	1000	1280	15	60	100	100	55	25	83	71	30	126	36	67	174	56	39	36	50	
Traditional denoisers	Matrix	Bitonic [81]	37.85	36.67	35.22	35.98	36.64	37.37	39.38	39.63	40.76	41.05	37.71	37.41	38.98	38.04	39.09	39.22	38.87	43.25	34.92	2.57
			0.936	0.933	0.925	0.931	0.940	0.943	0.959	0.952	0.965	0.964	0.940	0.956	0.947	0.939	0.952	0.954	0.959	0.979	0.941	
		GID [79]	34.32	27.16	37.17	38.41	38.37	39.63	40.86	41.60	44.11	42.31	39.52	38.66	40.12	40.16	41.50	41.09	40.50	44.96	36.11	49.99
			0.817	0.634	0.946	0.963	0.967	0.967	0.974	0.979	0.989	0.975	0.965	0.972	0.964	0.967	0.979	0.973	0.973	0.989	0.960	
		LSCD [75]	-	-	36.20	37.69	37.97	38.64	40.65	41.45	-	-	39.22	-	39.84	39.53	-	40.83	-	44.34	35.86	3.19
			-	-	0.942	0.963	0.964	0.962	0.973	0.979	-	-	0.963	-	0.963	0.963	-	0.973	-	0.987	0.957	
		MCWNNM [71]	37.38*	-	37.02	38.54	38.26	39.89	41.47	42.07	44.22	42.48	39.46	38.78	39.87	40.18	41.33	41.74	40.71	45.38	35.84	237.57
			0.929*	-	0.950	0.967	0.965	0.970	0.977	0.979	0.988	0.976	0.961	0.971	0.957	0.963	0.976	0.975	0.973	0.990	0.952	
		M-SVD	37.45	33.51	37.63	39.36	38.57	40.27	41.81	42.55	44.39	42.68	39.99	38.93	40.78	40.52	41.72	42.18	40.73	45.71	36.37	104.24
			0.924	0.867	0.954	0.971	0.967	0.971	0.979	0.983	0.989	0.976	0.967	0.973	0.969	0.969	0.977	0.977	0.974	0.990	0.961	
		NLHCC [80]	38.85	35.31	38.49	39.86	38.36	40.29	41.77	42.72	43.66	**42.80**	38.84	38.31	40.44	39.94	41.13	**43.25**	-	**46.02**	35.73	40.32
			0.953	0.930	0.965	0.976	0.965	0.971	0.979	0.984	0.986	**0.978**	0.959	0.968	0.964	0.963	0.976	**0.981**	-	**0.991**	0.955	
		TWSC [20]	37.96*	-	37.90	39.66	38.62	40.62	41.65	42.52	44.94	42.26	38.71	38.81	38.77	40.12	41.71	42.23	40.65	45.49	35.40	350.30
			0.942*	-	0.959	0.976	0.967	0.975	0.977	0.982	0.992	0.973	0.945	0.972	0.938	0.962	0.980	0.975	0.972	0.990	0.939	
		WTR1 [94]	-	-	37.80	37.32	38.20	38.19	-	-	-	-	-	-	-	-	-	-	-	-	-	600.33
			-	-	0.958	0.944	0.965	0.940	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Tensor	4DHOSVD [18]	37.58	34.49	37.52	39.15	38.54	40.27	41.40	42.19	44.49	42.60	39.82	38.88	40.59	40.37	41.75	41.82	40.71	45.58	36.27	123.06
			0.929	0.911	0.956	0.973	0.968	0.973	0.977	0.982	0.990	0.976	0.966	0.973	0.965	0.967	0.980	0.977	0.974	0.990	0.961	
		CBM3D1 [12]	38.04	35.00	37.58	39.21	38.60	40.11	41.58	42.40	44.43	42.53	39.93	38.84	40.56	40.41	41.93	42.29	40.62	45.58	36.24	1.02
			0.938	0.925	0.955	0.971	0.969	0.972	0.977	0.982	0.990	0.976	0.966	0.973	0.967	**0.970**	0.982	0.979	0.973	0.990	0.959	
		CBM3D2 [12]	37.73	34.74	37.70	39.41	38.69	40.35	41.69	42.54	44.74	42.65	39.97	38.97	40.77	40.55	42.03	42.20	40.75	45.72	36.38	2.94
			0.934	0.922	0.957	0.975	0.970	0.974	0.978	0.984	0.992	0.977	0.967	0.974	0.967	0.969	0.983	0.979	0.974	0.990	0.961	
		CMSt-SVD [92]	38.25	34.38	37.95	39.76	38.85	40.49	41.99	42.75	44.65	42.68	40.08	38.95	**40.84**	40.53	42.06	42.72	**40.88**	45.91	36.40	4.95
			0.940	0.900	0.959	0.976	0.971	0.974	0.979	0.984	0.991	0.977	0.967	0.973	0.967	0.967	0.982	0.980	**0.974**	0.991	0.962	
		LLRT [90]	35.45	30.74	37.77	39.76	38.28	39.59	41.60	42.24	42.68	42.22	37.91	38.80	38.01	39.87	42.02	41.76	38.69	45.17	35.71	285.62
			0.897	0.766	0.957	0.977	0.970	0.972	0.977	0.983	0.992	0.975	0.969	0.973	0.965	0.971	0.984	0.979	0.972	0.989	0.962	
DNN methods	Supervised	AINDNet [138]	39.77	39.08	36.14	37.19	37.33	38.00	38.54	39.33	39.49	38.50	36.53	36.24	36.93	36.83	37.27	38.11	37.44	40.17	34.65	0.33
			0.959	0.953	0.935	0.949	0.954	0.946	0.975	0.976	0.979	0.966	0.954	0.965	0.958	0.953	0.964	0.961	0.968	0.981	0.953	
		BRDNet [210]	33.80	-	37.27	39.16	38.04	39.64	39.85	40.95	43.54	40.27	39.48	38.66	38.19	40.07	41.92	41.34	39.66	42.76	36.08	14.66
			0.897	-	0.953	0.974	0.960	0.969	0.965	0.974	0.989	0.958	0.958	0.973	0.943	0.969	0.981	0.972	0.965	0.979	0.953	
		CBDNet [125]	38.06	33.26	36.20	37.67	37.81	38.18	41.43	42.41	42.55	41.88	38.35	38.17	39.80	39.07	40.63	40.92	39.54	44.38	35.54	0.04
			0.942	0.869	0.919	0.940	0.956	0.942	0.977	0.981	0.980	0.971	0.946	0.964	0.960	0.951	0.968	0.963	0.965	0.981	0.950	
		CycleISP [133]	39.57	39.42	35.40	36.87	37.61	37.70	41.26	41.84	42.64	41.59	38.47	38.01	38.79	38.67	40.61	40.03	39.86	44.75	35.54	0.26
			0.955	0.956	0.916	0.939	0.955	0.936	0.977	0.977	0.978	0.969	0.952	0.966	0.961	0.952	0.970	0.953	0.968	0.987	0.949	
		DANet [135]	39.55	39.43	37.17	38.63	**41.49**	38.92	41.59	42.59	42.83	41.70	37.91	38.17	39.23	38.74	41.58	41.54	39.58	44.03	36.21	0.02
			0.953	0.956	0.953	0.969	**0.977**	0.960	0.979	0.985	0.979	0.977	0.963	0.970	0.964	0.962	0.980	0.976	0.972	0.989	0.961	
		DBF [123]	-	-	38.48	40.59	38.87	40.09	41.56	42.87	44.85	42.36	39.98	38.86	40.17	40.26	42.12	43.17	40.67	44.75	36.45	0.34
			-	-	0.960	0.981	0.970	0.970	0.979	0.984	0.992	0.975	0.967	0.972	0.966	0.966	0.982	0.982	0.973	0.987	0.963	
		DCDicL [146]	35.86	-	36.61	-	37.45	38.12	37.77	38.24	38.39	38.62	35.87	36.07	35.83	36.25	39.84	39.38	37.04	40.24	34.72	1.24
			0.918	-	0.945	-	0.972	0.965	0.970	0.977	0.990	0.968	0.968	0.975	0.956	0.971	0.984	0.976	0.969	0.980	0.955	
		DeamNet [148]	39.63	39.35	36.63	-	37.70	36.93	40.90	40.86	41.22	39.72	33.67	36.40	37.87	35.07	40.25	38.92	39.56	40.52	34.61	0.18
			0.953	0.955	0.936	-	0.958	0.944	0.977	0.978	0.979	0.967	0.953	0.964	0.961	0.948	0.966	0.957	0.969	0.980	0.952	
		DIDN [124]	39.64	39.78	36.06	-	37.36	38.24	40.74	41.68	42.35	41.17	38.15	37.87	38.27	38.58	40.03	40.32	39.73	44.07	35.28	7.25
			0.953	0.958	0.946	-	0.953	0.950	0.975	0.977	0.975	0.966	0.951	0.965	0.954	0.950	0.963	0.959	0.966	0.985	0.949	
		DnCNN [24]	37.90*	37.73*	37.47	39.32	38.51	40.01	40.81	41.91	44.16	41.57	39.92	38.72	39.34	40.22	42.03	42.12	40.26	43.97	36.30	3.23
			0.943*	0.941*	0.954	0.974	0.966	0.971	0.972	0.979	0.991	0.969	0.962	0.973	0.964	0.969	0.983	0.977	0.970	0.984	0.960	
		DRUNet [41]	-	-	38.30	40.33	38.93	40.77	41.94	42.62	**45.36**	42.78	**40.35**	**39.17**	40.80	**40.80**	**42.86**	42.86	**40.88**	45.76	36.61	0.17
			-	-	0.961	0.979	0.970	0.974	0.978	0.982	**0.993**	0.977	**0.969**	**0.975**	0.966	**0.970**	**0.985**	0.980	**0.974**	0.990	0.961	
		DudeNet [144]	33.18	27.55	36.03	37.44	39.92	38.18	39.94	41.13	42.97	41.06	38.63	37.83	39.09	38.58	40.73	40.63	39.71	43.34	35.44	0.18
			0.810	0.645	0.933	0.953	0.973	0.955	0.972	0.977	0.988	0.971	0.962	0.969	0.962	0.961	0.976	0.969	0.972	0.985	0.955	
		FCCF [40]	36.30	23.32	**39.02**	**40.89**	38.87	**41.20**	**42.03**	43.07	45.15	**42.80**	40.14	39.04	40.61	40.66	42.31	43.05	**40.88**	45.47	**36.72**	11.20
			0.885	0.461	**0.968**	**0.982**	0.971	**0.978**	**0.980**	**0.985**	0.993	**0.978**	0.966	0.974	0.967	0.969	0.984	0.982	**0.974**	0.989	**0.964**	
		FFDNet [119]	37.61*	38.27*	37.67	39.73	38.76	40.28	41.67	42.55	44.77	42.44	40.05	38.96	40.60	40.50	42.43	42.44	40.75	45.71	36.47	0.02
			0.942*	0.948*	0.956	0.977	0.970	0.973	0.977	0.982	0.992	0.976	0.967	0.974	0.964	0.971	0.984	0.979	0.973	0.990	0.961	
		InvDN [145]	39.57	39.28	34.55	36.33	35.94	38.01	38.95	40.09	42.03	40.02	33.32	37.00	36.64	37.66	40.06	40.98	39.10	40.74	34.15	0.74
			0.952	0.955	0.937	0.953	0.947	0.952	0.965	0.973	0.978	0.960	0.930	0.965	0.939	0.955	0.966	0.971	0.964	0.969	0.935	
		IRCNN [211]	34.78	33.50	37.26	37.25	37.49	39.66	41.24	41.85	43.89	41.78	39.91	38.63	40.14	40.12	41.87	41.86	40.26	44.38	36.22	2.15
			0.907	0.887	0.954	0.956	0.956	0.970	0.978	0.981	0.991	0.973	0.969	0.972	0.965	0.969	0.983	0.977	0.972	0.988	0.961	
		MIRNet [139]	39.88	39.55	36.06	37.25	37.49	38.10	40.72	41.68	42.76	41.05	38.28	37.80	38.60	38.55	40.28	40.46	39.73	43.66	35.42	0.71
			0.956	0.957	0.942	0.956	0.956	0.952	0.975	0.978	0.980	0.968	0.954	0.967	0.959	0.952	0.966	0.964	0.967	0.983	0.953	
		MPRNet [142]	39.82	39.57	35.94	-	37.50	38.04	40.59	41.30	42.59	41.23	38.35	37.92	38.95	38.62	40.21	40.20	39.77	44.05	35.49	35.97
			0.954	0.958	0.935	-	0.954	0.946	0.974	0.974	0.978	0.969	0.952	0.966	0.960	0.949	0.965	0.960	0.967	0.986	0.951	
		NAFNet [150]	38.36	**40.15**	34.39	-	36.38	37.88	40.12	40.23	40.66	40.01	36.13	35.87	36.66	36.79	36.53	39.93	39.32	40.45	34.82	0.35
			0.943	**0.960**	0.923	-	0.947	0.954	0.973	0.943	0.936	0.962	0.919	0.927	0.948	0.927	0.884	0.951	0.966	0.924	0.948	
		NBNet [147]	39.89	39.64	35.89	-	37.37	38.32	40.95	41.91	42.92	41.17	38.02	37.87	37.79	38.45	40.51	40.45	39.73	43.96	35.37	0.12
			0.955	0.958	0.935	-	0.957	0.955	0.977	0.980	0.982	0.971	0.955	0.967	0.956	0.955	0.972	0.967	0.969	0.984	0.953	
		NLNet [30]	-	-	37.56	39.32	38.58	40.17	41.43	42.18	44.53	42.19	39.96	38.89	40.06	40.61	42.14	42.16	40.63	44.87	36.34	39.06
			-	-	0.955	0.974	0.968	0.973	0.976	0.981	0.991	0.974	**0.969**	0.973	0.964	**0.971**	0.983	0.978	0.973	0.988	0.962	
		PD-Denoising [140]	38.40	33.99	35.85	37.13	37.13	37.12	40.85	41.38	41.13	41.05	37.72	37.57	39.03	38.01	39.18	39.64	38.80	43.73	35.05	0.61
			0.943	0.896	0.924	0.944	0.944	0.921	0.974	0.974	0.966	0.959	0.935	0.956	0.948	0.929	0.948	0.946	0.955	0.981	0.940	
		PNGAN [42]	39.38	39.81	38.44	-	39.57	40.51	41.79	**43.13**	44.73	42.55	39.84	38.78	40.63	40.20	41.85	43.15	**40.88**	45.32	36.40	1.53
			0.953	0.959	0.963	-	0.974	0.974	0.979	**0.985**	0.992	0.977	0.964	0.970	**0.969**	0.962	0.981	0.982	**0.974**	0.988	0.962	
		Restormer [212]	**40.03**	40.02	36.33	-	37.66	38.29	41.10	41.84	42.49	41.47	38.42	38.08	39.05	38.77	40.13	40.53	39.56	44.19	35.65	0.77
			0.956	0.960	0.941	-	0.956	0.948	0.977	0.979	0.976	0.968	0.952	0.966	0.960	0.949	0.963	0.962	0.963	0.986	0.953	
		RIDNet [127]	39.26	38.70	36.84	38.11	38.57	38.60	41.09	42.15	42.39	41.59	38.88	38.21	38.67	39.02	40.91	41.01	40.07	44.40	35.76	0.11
			0.953	0.950	0.941	0.961	0.970	0.956	0.977	0.980	0.989	0.975	0.962	0.970	0.963	0.959	0.978	0.977	0.972	0.987	0.957	
		SADNet [137]	39.59*	-	37.76	38.11	39.22	38.90	40.82	42.02	44.25	41.85	39.53	38.33	39.83	39.69	39.81	41.64	40.70	44.61	36.36	0.04
			0.952*	-	0.952	0.961	0.972	0.965	0.976	0.980	0.992	0.975	0.965	0.970	0.965	0.963	0.965	0.979	**0.974**	0.988	0.962	
		SCUNet [213]	-	-	37.44	39.29	38.08	39.47	40.96	42.24	44.02	41.93	40.74	38.75	39.97	40.37	41.79	42.61	40.64	44.24	36.13	0.62
			-	-	0.958	0.972	0.962	0.971	0.972	0.980	0.991	0.966	0.974	0.971	0.967	0.975	0.970	0.978	0.973	0.981	0.956	
		Uformer [214]	40.05	39.74	35.97	-	37.44	38.12	40.83	41.37	42.45	41.35	38.36	37.83	38.95	38.69	40.30	40.36	39.69	43.93	35.50	1.46
			0.956	0.958	0.941	-	0.956	0.950	0.976	0.977	0.978	0.968	0.954	0.966	0.960	0.953	0.966	0.964	0.967	0.985	0.953	
		UDNet [215]	-	-	36.95	38.96	38.05	39.62	40.40	41.36	43.58	41.12	39.35	38.25	38.94	39.95	41.32	41.70	39.51	43.17	36.09	3.68
			-	-	0.943	0.971	0.962	0.967	0.968	0.977	0.989	0.968	0.963	0.971	0.959	0.968	0.979	0.974	0.966	0.981	0.958	
		VDIR [216]	39.63	39.26	34.90	36.51	37.01	36.84	40.84	41.40	41.29	40.81	37.65	37.84	39.09	38.17	39.20	39.41	38.98	44.40	35.04	2.03
			0.953	0.955	0.894	0.925	0.940	0.911	0.973	0.970	0.965	0.953	0.936	0.960	0.951	0.931	0.946	0.938	0.956	0.985	0.939	
		VDNet [217]	-	-	35.86	-	37.58	38.43	40.97	42.37	43.08	41.19	38.23	37.95	37.88	38.60	40.81	41.21	39.93	44.27	35.49	0.05
			-	-	0.945	-	0.957	0.955	0.976	0.983	0.983	0.970	0.956	0.968	0.956	0.956	0.973	0.970	0.970	0.984	0.953	
	Self-supervised	AP-BSN [165]	37.29	35.97	35.44	36.76	36.99	38.26	40.23	41.29	42.72	41.40	37.87	37.62	37.47	38.29	40.83	40.86	39.55	43.73	34.37	3.56
			0.932	0.925	0.936	0.956	0.956	0.965	0.973	0.979	0.986	0.970	0.949	0.966	0.939	0.960	0.977	0.973	0.969	0.983	0.937	
		Blind2Unblind [164]	-	-	36.51	38.18	38.25	39.03	40.71	41.72	43.11	41.17	39.35	38.27	39.39	39.04	40.88	40.90	39.76	43.78	35.75	0.74
			-	-	0.935	0.958	0.968	0.962	0.974	0.981	0.990	0.970	0.967	0.971	0.962	0.958	0.976	0.970	0.971	0.986	0.956	
		C2N [158]	37.28	-	37.02	-	37.69	38.86	41.12	41.95	42.61	41.33	38.73	38.15	38.95	38.67	40.50	40.78	40.05	44.64	35.53	88.00
			0.924	-	0.945	-	0.958	0.960	0.976	0.980	0.980	0.966	0.954	0.965	0.956	0.945	0.977	0.964	0.970	0.987	0.952	
		CVF-SID [163]	36.31	34.43	29.13	31.02	33.08	33.35	36.68	39.08	39.73	36.40	33.13	33.16	32.07	33.33	36.92	38.40	35.22	38.56	29.89	0.12
			0.923	0.912	0.853	0.898	0.912	0.929	0.933	0.974	0.976	0.929	0.895	0.920	0.857	0.917	0.946	0.961	0.927	0.952	0.849	
		IDR [162]	-	-	34.26	36.18	36.28	36.44	39.33	40.31	40.94	39.74	37.38	37.39	38.30	38.15	39.68	38.22	38.01	43.15	34.64	0.32
			-	-	0.877	0.923	0.925	0.910	0.955	0.962	0.961	0.935	0.927	0.957	0.938	0.944	0.951	0.913	0.941	0.978	0.929	
		LGBPN [169]	38.43*	37.28*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			0.942*	0.936*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Neigh2Neigh [161]	-	-	34.47	35.65	37.10	36.59	40.22	40.41	41.29	41.24	38.13	37.94	39.71	38.50	39.63	38.05	39.17	44.49	35.30	2.48
			-	-	0.883	0.907	0.942	0.908	0.967	0.960	0.966	0.958	0.940	0.961	0.956	0.936	0.952	0.919	0.958	0.984	0.944	
		Noise2Noise [154]	-	-	33.55	34.67	35.91	35.28	38.88	39.07	39.34	39.26	36.81	36.99	38.04	37.21	38.00	36.35	37.67	42.59	34.44	0.03
			-	-	0.850	0.874	0.913	0.875	0.950	0.940	0.938	0.931	0.919	0.948	0.936	0.916	0.924	0.876	0.936	0.975	0.926	
		R2R [160]	-	34.78*	36.32	38.11	38.47*	38.71	-	-	-	-	-	-	-	-	-	-	-	-	-	4481.98
			-	0.844*	0.937	0.961	0.965*	0.958	-	-	-	-	-	-	-	-	-	-	-	-	-	
		SASL [170]	38.00	37.41	34.93	-	37.13	38.24	40.04	41.86	43.07	40.29	37.22	37.38	36.45	37.64	40.85	41.64	39.10	42.89	34.25	0.06
			0.936	0.934	0.936	-	0.954	0.964	0.966	0.982	0.987	0.963	0.947	0.965	0.933	0.958	0.977	0.976	0.965	0.980	0.930	
		Self2Self [157]	-	-	36.26	38.23	-	39.49	-	-	-	-	-	-	-	-	-	-	-	-	-	4100.76
			-	-	0.947	0.969	-	0.963	-	-	-	-	-	-	-	-	-	-	-	-	-	