

Supplementary Materials: Generalizing ISP Model by Unsupervised Raw-to-raw Mapping

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1 DETAILED EXPERIMENT RESULTS OF CROSS CAMERA ISP TASK

In Sec. 4.3 of the main text, we report the average performance of four deep ISP models [2–5]. Here, we present their separate performances. Quantitative results can be found in Table 1. Additionally, more visualization results are illustrated in Fig. 1 and Fig. 2.

Table 1: Detailed quantitative results of the cross-camera ISP task. Results were obtained by training and testing four Deep ISP models: PyNET[5], microISP[4], PyNET-v2[3], and syenet[2]. Bold indicates the best result.

ISP Model	R2r Model	Deploy iPhone-x ISP After Samsung-s9 Sensor				Deploy Samsung-s9 ISP After iPhone-x Sensor			
		Train Set	Test Set	KL↓	FID↓	Train Set	Test Set	KL↓	FID↓
PyNET [5]	W/o R2r	$A \rightarrow A$	$B \rightarrow A$	1.18	76.21	$B \rightarrow B$	$A \rightarrow B$	2.07	78.81
	UVCGAN [6]	$AB \rightarrow A$	$B \rightarrow A$	1.36	82.39	$BA \rightarrow B$	$A \rightarrow B$	1.00	81.11
		$A \rightarrow A$	$BA \rightarrow A$	0.72	125.16	$B \rightarrow B$	$AB \rightarrow B$	0.90	88.79
	Afifi et al.'s [1]	$AB \rightarrow A$	$B \rightarrow A$	1.14	59.83	$BA \rightarrow B$	$A \rightarrow B$	0.74	69.63
		$A \rightarrow A$	$BA \rightarrow A$	0.97	74.22	$B \rightarrow B$	$AB \rightarrow B$	0.76	75.43
	Ours	$AB \rightarrow A$	$B \rightarrow A$	0.90	54.97	$BA \rightarrow B$	$A \rightarrow B$	0.83	64.84
		$A \rightarrow A$	$BA \rightarrow A$	0.75	60.17	$B \rightarrow B$	$AB \rightarrow B$	0.75	71.66
MicroISP [4]	W/o R2r	$A \rightarrow A$	$B \rightarrow A$	1.48	84.60	$B \rightarrow B$	$A \rightarrow B$	2.18	83.58
	UVCGAN [6]	$AB \rightarrow A$	$B \rightarrow A$	0.91	127.72	$BA \rightarrow B$	$A \rightarrow B$	0.96	92.48
		$A \rightarrow A$	$BA \rightarrow A$	1.24	80.30	$B \rightarrow B$	$AB \rightarrow B$	1.00	88.07
	Afifi et al.'s [1]	$AB \rightarrow A$	$B \rightarrow A$	0.82	58.01	$BA \rightarrow B$	$A \rightarrow B$	0.67	71.45
		$A \rightarrow A$	$BA \rightarrow A$	1.01	76.19	$B \rightarrow B$	$AB \rightarrow B$	0.89	81.66
	Ours	$AB \rightarrow A$	$B \rightarrow A$	0.86	64.62	$BA \rightarrow B$	$A \rightarrow B$	0.88	76.49
		$A \rightarrow A$	$BA \rightarrow A$	0.95	63.90	$B \rightarrow B$	$AB \rightarrow B$	1.13	78.12
PyNET-v2 [3]	W/o R2r	$A \rightarrow A$	$B \rightarrow A$	1.41	80.79	$B \rightarrow B$	$A \rightarrow B$	2.34	81.08
	UVCGAN [6]	$AB \rightarrow A$	$B \rightarrow A$	1.41	78.62	$BA \rightarrow B$	$A \rightarrow B$	1.03	71.84
		$A \rightarrow A$	$BA \rightarrow A$	0.87	128.77	$B \rightarrow B$	$AB \rightarrow B$	0.96	92.67
	Afifi et al.'s [1]	$AB \rightarrow A$	$B \rightarrow A$	1.01	75.11	$BA \rightarrow B$	$A \rightarrow B$	0.78	77.80
		$A \rightarrow A$	$BA \rightarrow A$	0.69	61.49	$B \rightarrow B$	$AB \rightarrow B$	0.71	79.73
	Ours	$AB \rightarrow A$	$B \rightarrow A$	0.71	61.12	$BA \rightarrow B$	$A \rightarrow B$	0.77	68.62
		$A \rightarrow A$	$BA \rightarrow A$	1.10	63.82	$B \rightarrow B$	$AB \rightarrow B$	0.72	68.07
syenet [2]	W/o R2r	$A \rightarrow A$	$B \rightarrow A$	1.65	82.11	$B \rightarrow B$	$A \rightarrow B$	2.16	88.69
	UVCGAN [6]	$AB \rightarrow A$	$B \rightarrow A$	1.02	85.97	$BA \rightarrow B$	$A \rightarrow B$	0.91	101.22
		$A \rightarrow A$	$BA \rightarrow A$	1.15	133.62	$B \rightarrow B$	$AB \rightarrow B$	0.69	126.90
	Afifi et al.'s [1]	$AB \rightarrow A$	$B \rightarrow A$	1.25	75.11	$BA \rightarrow B$	$A \rightarrow B$	0.72	92.89
		$A \rightarrow A$	$BA \rightarrow A$	1.63	86.80	$B \rightarrow B$	$AB \rightarrow B$	0.71	79.73
	Ours	$AB \rightarrow A$	$B \rightarrow A$	1.63	64.45	$BA \rightarrow B$	$A \rightarrow B$	0.72	68.07
		$A \rightarrow A$	$BA \rightarrow A$	1.06	62.24	$B \rightarrow B$	$AB \rightarrow B$	0.68	78.13
Average	W/o R2r	$A \rightarrow A$	$B \rightarrow A$	1.43	80.93	$B \rightarrow B$	$A \rightarrow B$	2.19	83.04
	UVCGAN [6]	$AB \rightarrow A$	$B \rightarrow A$	1.18	93.68	$BA \rightarrow B$	$A \rightarrow B$	0.98	86.66
		$A \rightarrow A$	$BA \rightarrow A$	1.00	116.96	$B \rightarrow B$	$AB \rightarrow B$	0.89	99.11
	Afifi et al.'s [1]	$AB \rightarrow A$	$B \rightarrow A$	1.06	67.01	$BA \rightarrow B$	$A \rightarrow B$	0.73	77.94
		$A \rightarrow A$	$BA \rightarrow A$	1.08	74.68	$B \rightarrow B$	$AB \rightarrow B$	0.77	79.14
	Ours	$AB \rightarrow A$	$B \rightarrow A$	1.03	61.29	$BA \rightarrow B$	$A \rightarrow B$	0.80	69.51
		$A \rightarrow A$	$BA \rightarrow A$	0.97	62.53	$B \rightarrow B$	$AB \rightarrow B$	0.82	74.00

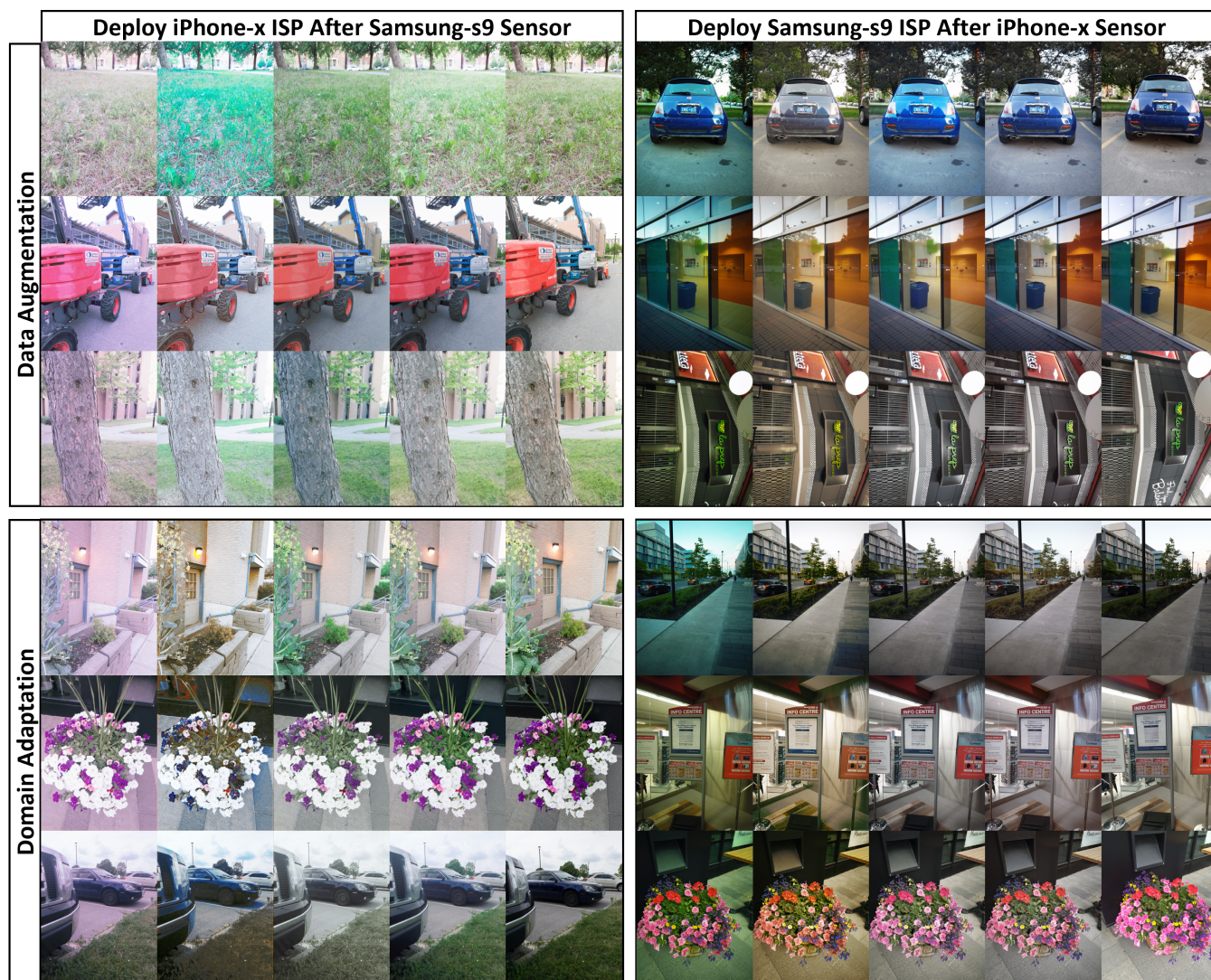


Figure 1: Qualitative results of the cross-camera ISP task using PyNET [5]. Each block, from left to right, represents the w/o r2r, UVCGAN [6], Affi et al.'s [1], our method, and ground truth, respectively.



Figure 2: Qualitative results of the cross-camera ISP task using syenet [2]. Each block, from left to right, represents the w/o r2r, UVCGAN [6], Affi et al.'s [1], our method, and ground truth, respectively.

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