Detail Fusion GAN: High-Quality Translation for Unpaired Images with GAN-based Data Augmentation

Ling Li¹ Yaochen Li¹ Chuan Wu¹ Hang Dong² and Peilin Jiang¹

¹ School of Software Engineering, Xi'an Jiaotong University, Xi'an, China
² Institute of Artificial Intelligence and Robotics, Xi'an Jiaotong University, Xi'an, China





• High-Quality Translation for Unpaired Images





Style image



Translated image (I_{tra})

Original image (I_{ori})



INPUT



TRANSLATED



Challenge



Related Work



INPUT



Contribution

- Introducing super-resolution loss as a guidance
- Two branches and a filter module
- Generating better results and converging faster







DFGAN (Ours)

Network Architecture







SYNTHIA



GTA



BDD



Cityscapes

Ablation Study



Model	Transfer	Detail	Filter	Reconstruction	Input		Output		EID / SSIM
	Branch	Branch	Module	Module	Iori	I_{hr}	I_{tra}	I_{sr}	FID / SSIN
CycleGAN	\checkmark				256×256	-	256×256	-	62.53 / 0.62
Model-1	\checkmark	\checkmark			256×256	512×512	256×256	512×512	56.30 / 0.76
Model-2	\checkmark	\checkmark	\checkmark		256×256	512×512	256×256	512×512	54.51 / 0.79
DFGAN-s	\checkmark	\checkmark	\checkmark	\checkmark	128×128	256×256	128×128	256×256	48.87 / 0.84
DFGAN	\checkmark	\checkmark	\checkmark	\checkmark	256×256	512×512	256×256	512×512	47.76 / 0.86

• The lower FID, the better

• The higher SSIM, the better.

Evaluation





Evaluation

Method	Input		Output		acc. of FCN		AP of YOLO		FID
Method	I_{ori}	I_{hr}	I_{tra}	I_{sr}	Day	Night	Day	Night	TID
Daytime Only	-	-	-	-	0.7946	0.4798	0.7999	0.5840	-
CycleGAN	256×256	-	256×256	-	0.8223	0.7560	0.8326	0.7294	62.53
UNIT	256×256	-	256×256	-	0.7983	0.8097	0.8462	0.7132	52.03
MUNIT	256×256	-	256×256	-	0.8393	0.7931	0.8411	0.6873	53.47
DRIT	256×256	-	256×256	-	0.8389	0.7972	0.8502	0.7408	65.62
DFGAN-s	128×128	256×256	128×128	256×256	0.8421	0.8162	0.8624	0.7501	48.87
DFGAN	256×256	512×512	256×256	512×512	0.8518	0.8227	0.8801	0.7553	47.76

• The lower FID, the better

• The higher ACC. of FCN or AP of YOLO, the better.

Image translation cases



