SECI-GAN: Semantic and Edge Completion for dynamic objects removal

F. Pinto[1,2], A. Romanoni[1], M. Matteucci[1], P. Torr[2]

[1] *Politecnico di Milano*
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Image Inpainting

Input

Damaged Image

Output

Inpainted Image

Image Inpainting Applications

https://it.wikipedia.org/wiki/Inpainting#/media/File:Restoration.jpg

Image Inpainting Applications

Youngjoo Jo and Jongyoul Park. "SC-FEGAN: Face Editing Generative Adversarial Network with User's Sketch and Color". In: arXiv e-prints, arXiv:1902.06838

Dynamic Object Removal

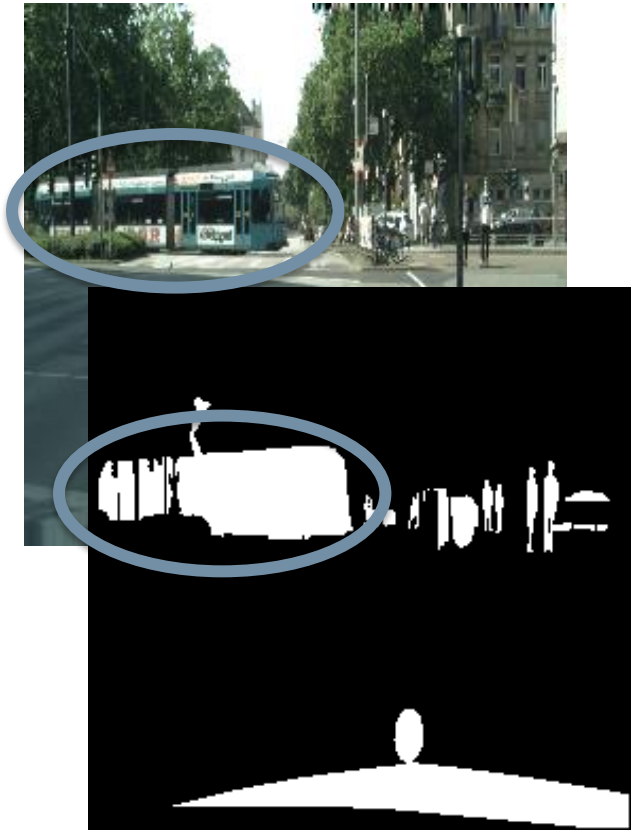
DEMO: https://www.nvidia.com/research/inpainting/

Contribution 1: Better Inpainting on Urban Scenes

SECI-GAN

EdgeConnect

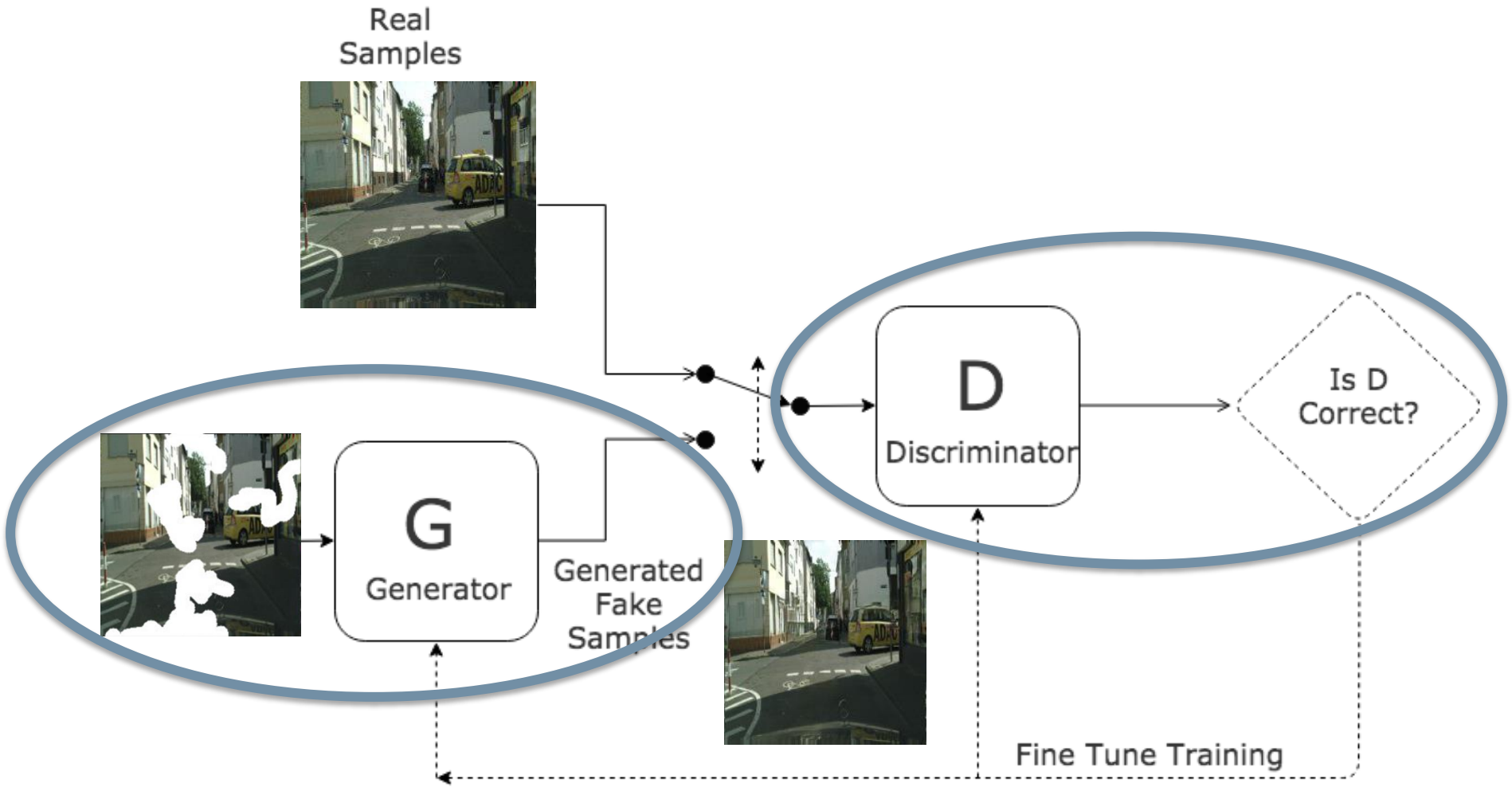
Contribution 2: Better Dynamic Object Removal



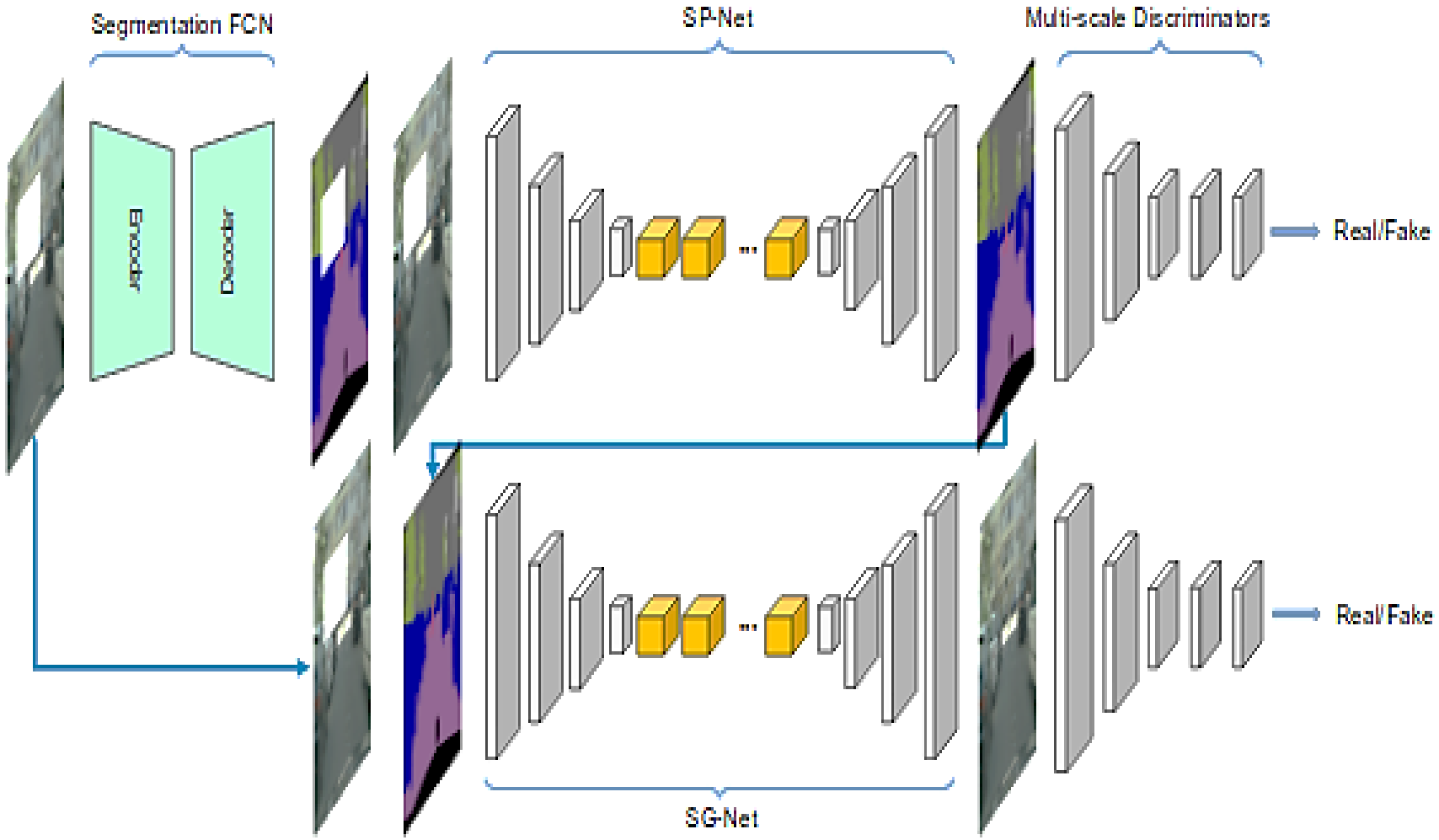
SECI-GAN

EdgeConnect

Generative Adversarial Networks

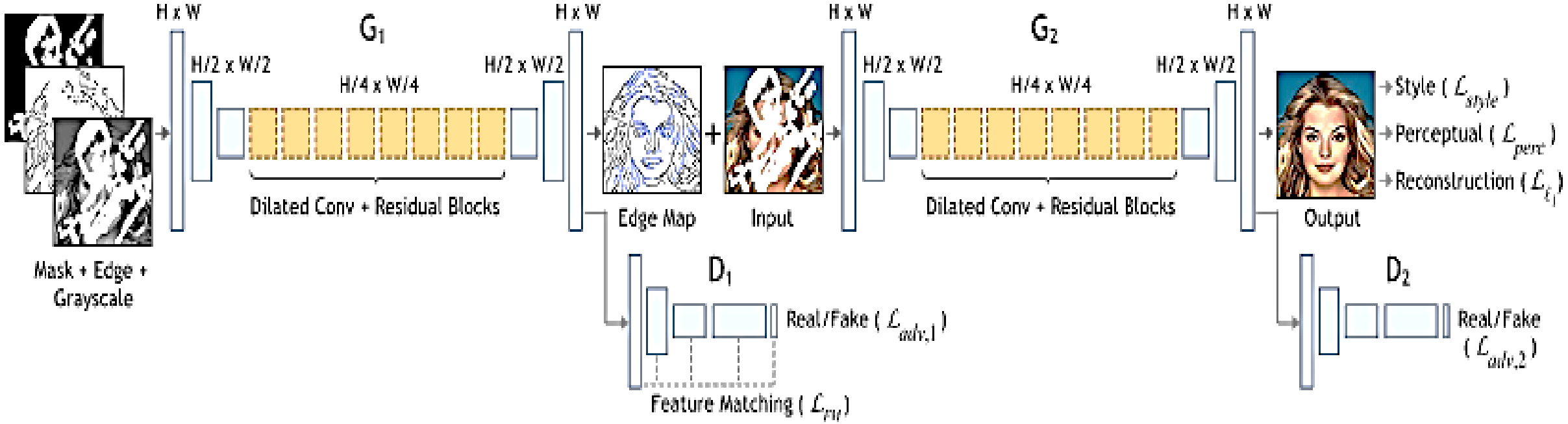


Semantic Conditioning



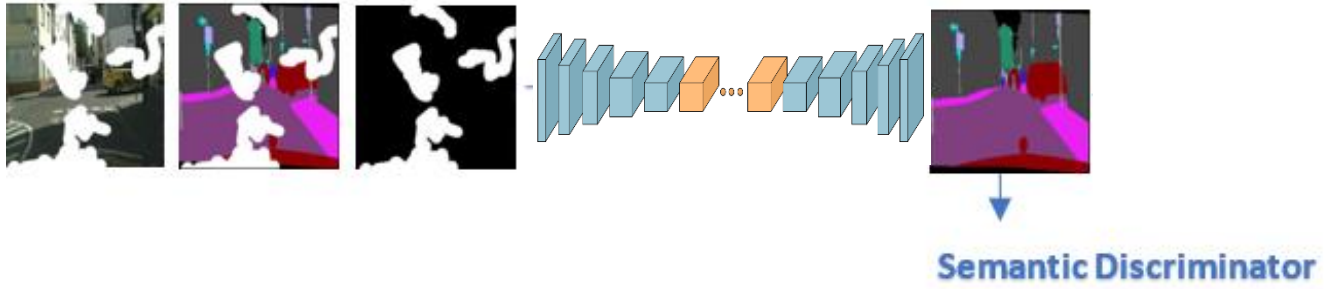
Yuhang Song et al. "SPG-Net: Segmentation Prediction and Guidance Network for Image Inpainting". In: BMVC 2018 (2018).

Edge Conditioning



Kamyar Nazeri et al. "EdgeConnect: Generative Image Inpainting with Adversarial Edge Learning". In: 2019. url: http://arxiv.org/abs/1901.00212

Our Method: SECI-GAN



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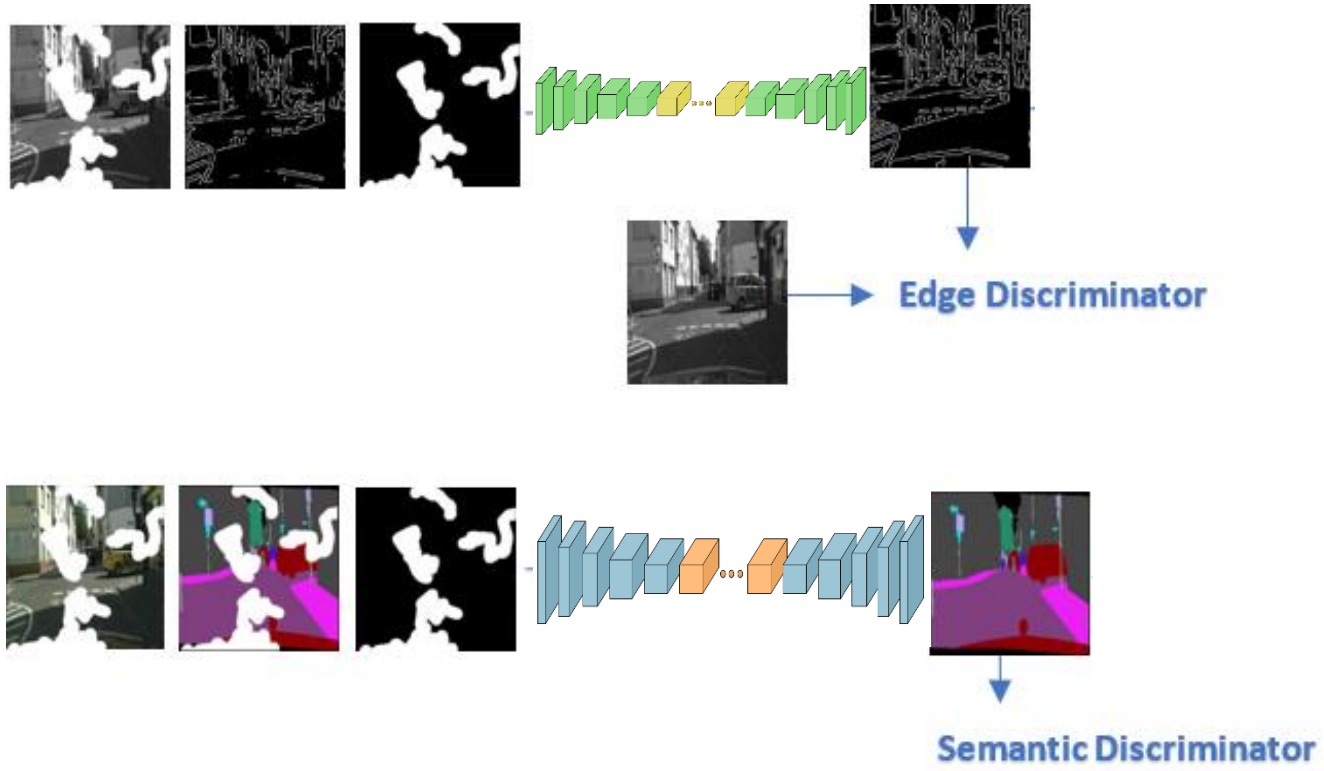

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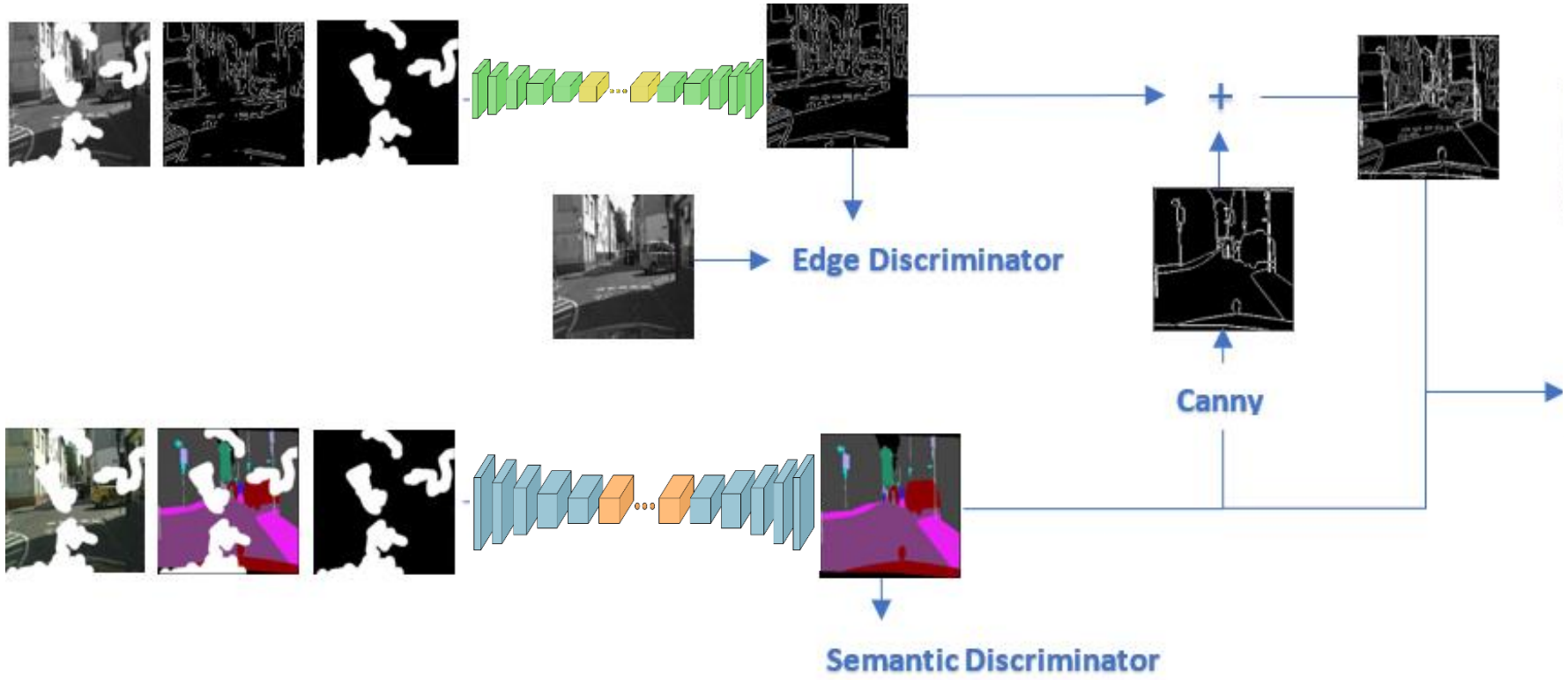

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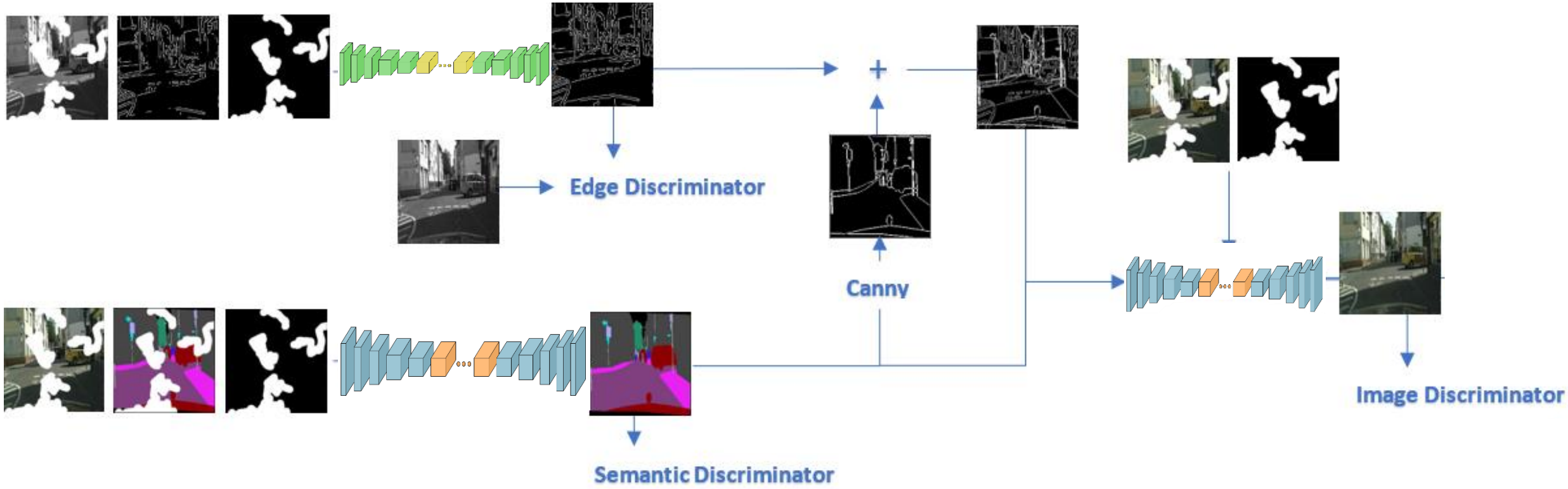

Results on Dynamic Object Removal

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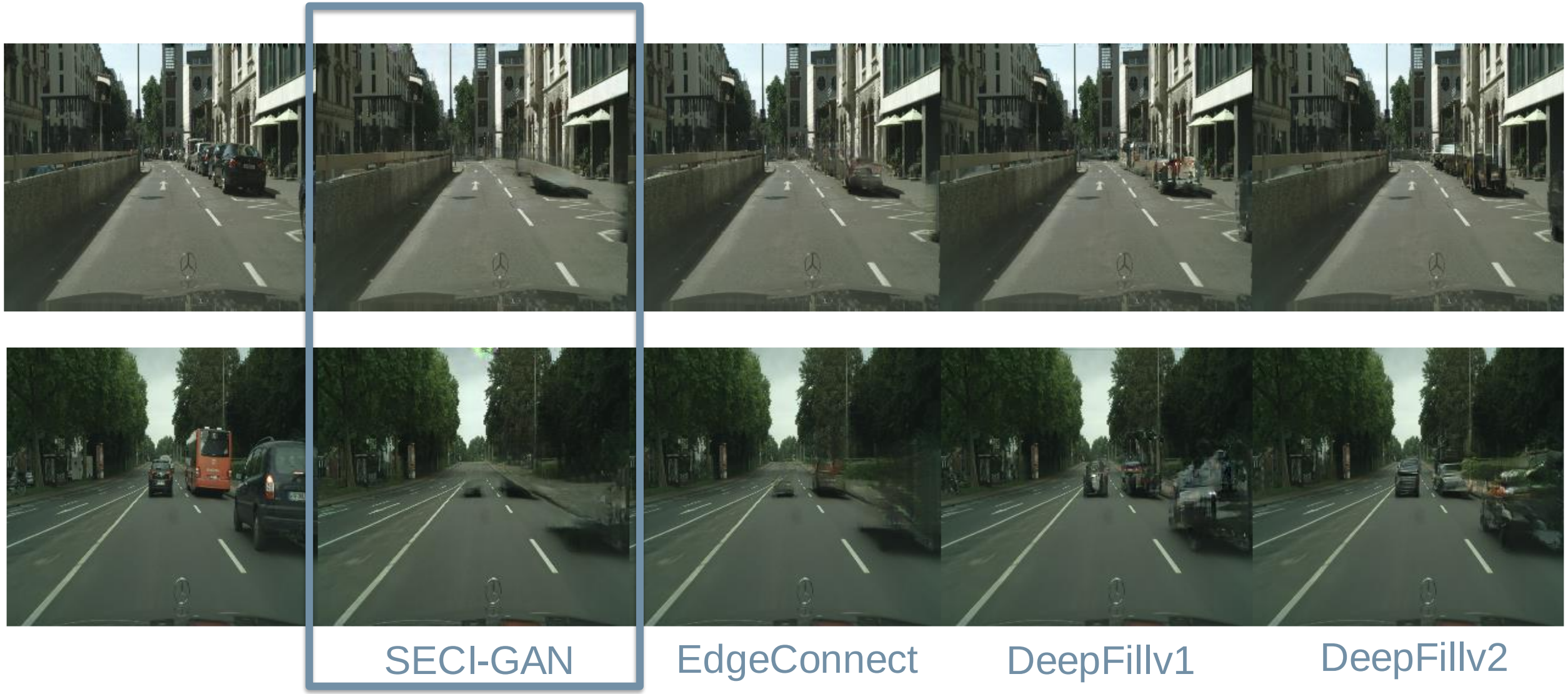
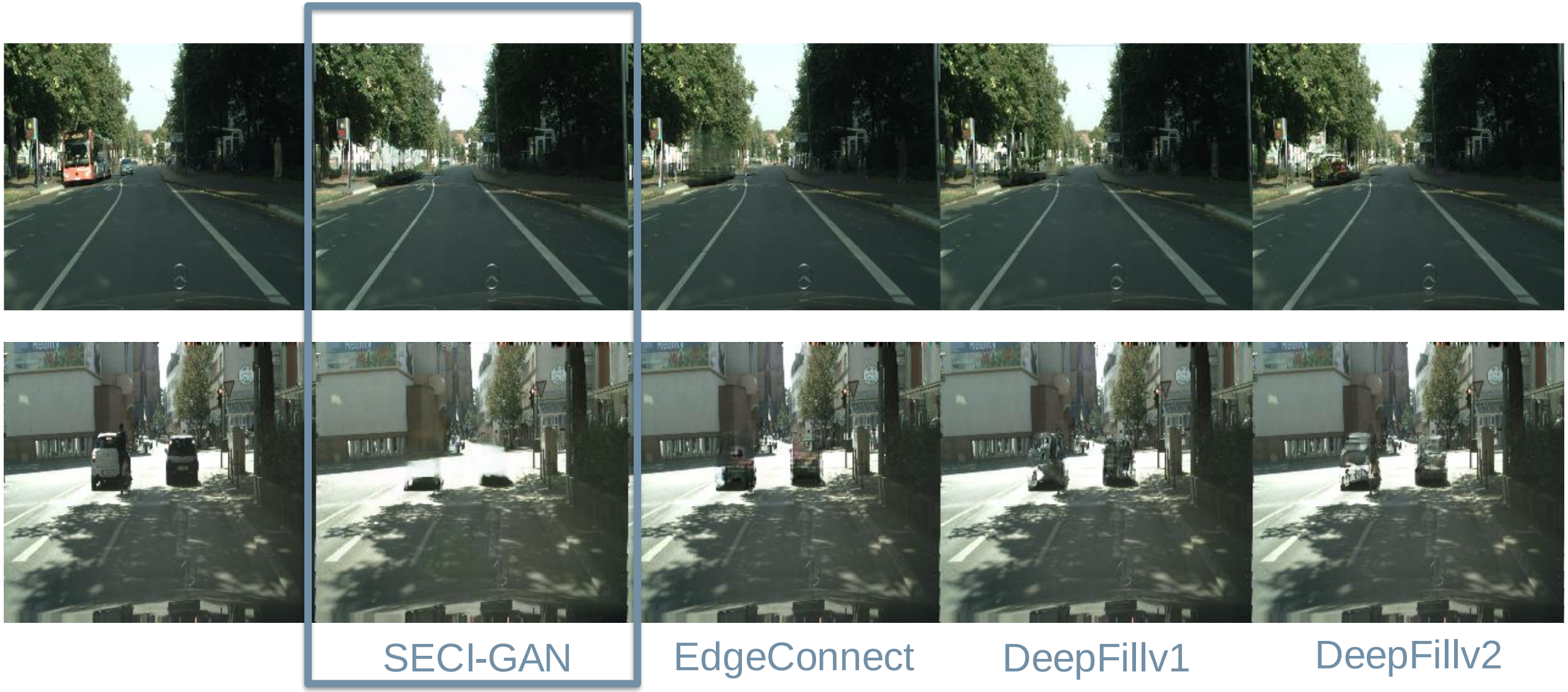


Results on Dynamic Object Removal



Results (Quantitative)

	M_{small}				M_{medium}				M_{large}			
	EC	Ours	DF2	DF1	EC	Ours	DF2	DF1	EC	Ours	DF2	DF1
PSNR↑	32.05	**32.20**	29.75	28.30	28.81	**28.95**	26.85	25.58	24.59	**24.62**	23.24	21.21
SSIM↑	96.97	**97.09**	94.51	92.47	93.83	**94.00**	89.51	86.63	**88.95**	88.89	83.23	78.80
FID↓	12.63	**12.32**	16.34	24.45	**20.13**	20.14	26.43	30.85	31.91	**31.66**	35.20	46.08
LPIPS↓	3.60	**3.58**	5.40	7.70	6.85	**6.68**	9.24	11.66	**11.12**	11.37	13.67	16.87

SECI-GAN EdgeConnect DeepFillv1 DeepFillv2

Results (Qualitative)

SECI-GANvsEC	>	<	=
Maj. Votes	**53**	7	0
Stat. Test	**51**	5	4

SECI-GANvsDFv1	>	<	=
Maj. Votes	**60**	0	0
Stat. Test	**59**	0	1

SECI-GANvsDFv2	>	<	=
Maj. Votes	**60**	0	0
Stat. Test	**59**	0	1

http://airlab.deib.polimi.it/datasets-and-tools/

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