

DC-ShadowNet: Single-Image Hard and Soft Shadow Removal Using Unsupervised Domain-Classifer Guided Network

Yeying Jin, Aashish Sharma, and Robby T. Tan

Codes and model: <https://github.com/jinyeying/DC-ShadowNet-Hard-and-Soft-Shadow-Removal>

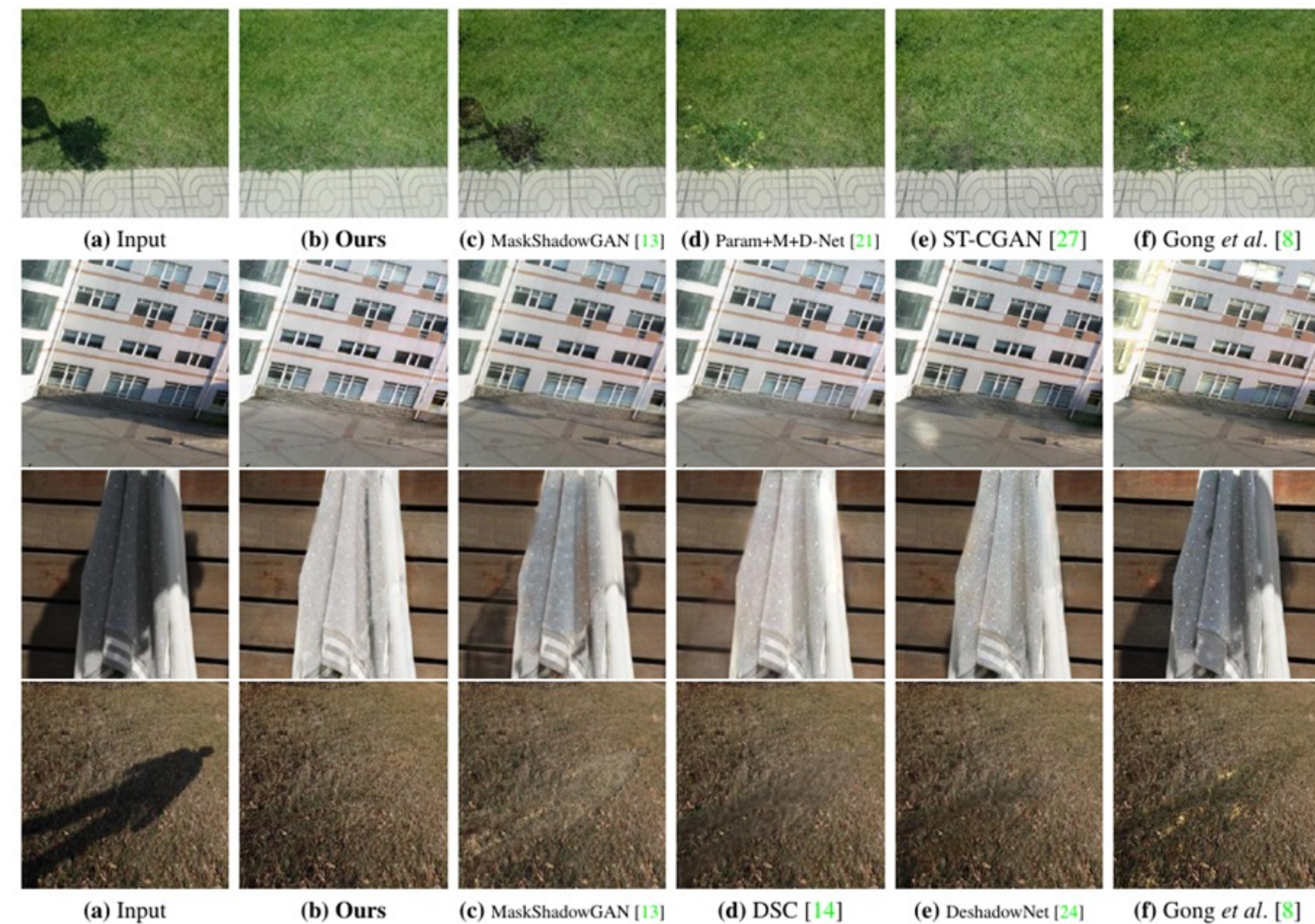
Introduction:

- Physics-based methods fail to handle achromatic surfaces and soft shadows.
- Supervised learning methods require shadow and non-shadow pairs.
- The current unsupervised method fails to remove soft shadows.

Goal: Unsupervised hard and soft shadow removal from a single image.

Experimental Results:

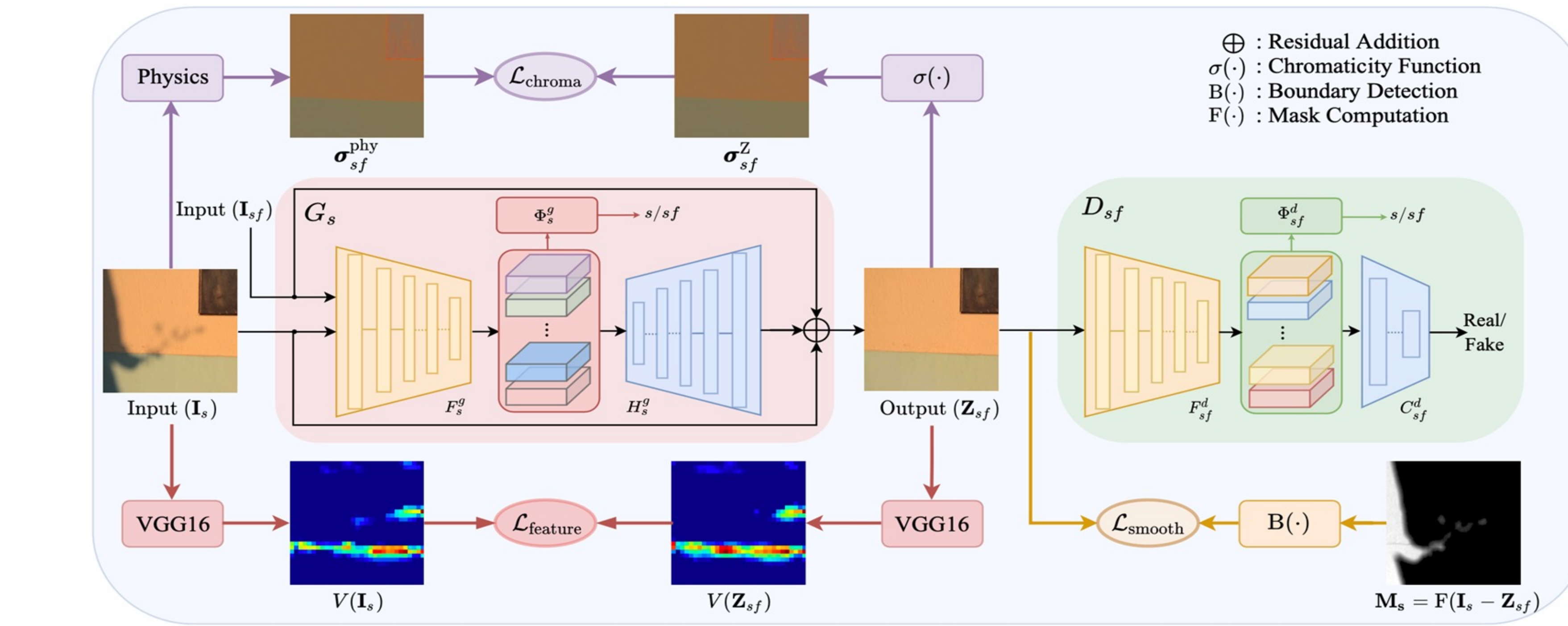
- Visual results on the ISTD and SRD datasets.



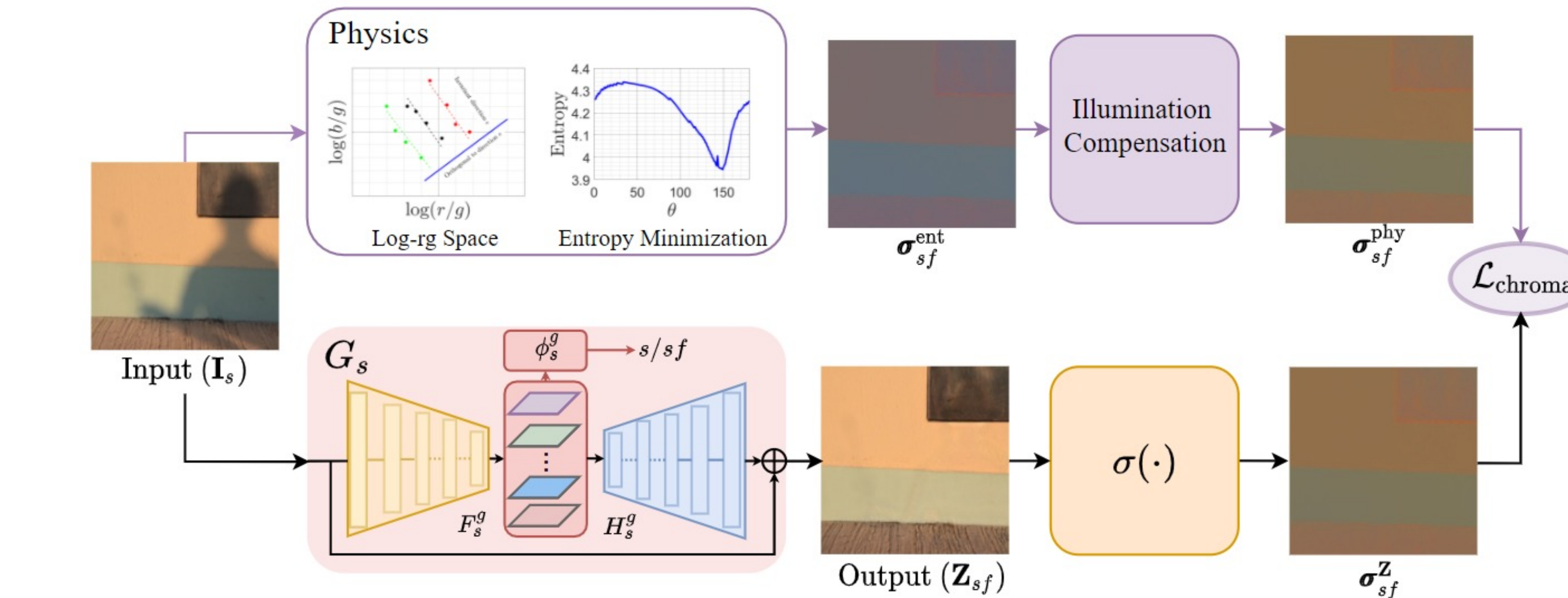
- Comparison using SRD testing sets (RMSE)

Method	Training	All	S	NS
Our DC-ShadowNet	Unpaired	4.66	7.70	3.39
Mask-ShadowGAN [13]	Unpaired	6.40	11.46	4.29
DSC [14]	Paired	4.86	8.81	3.23
DeShadowNet [24]	Paired	5.11	3.57	8.82
Gong et al. [8]	-	12.35	25.43	6.91
Input Image	-	13.77	37.40	3.96

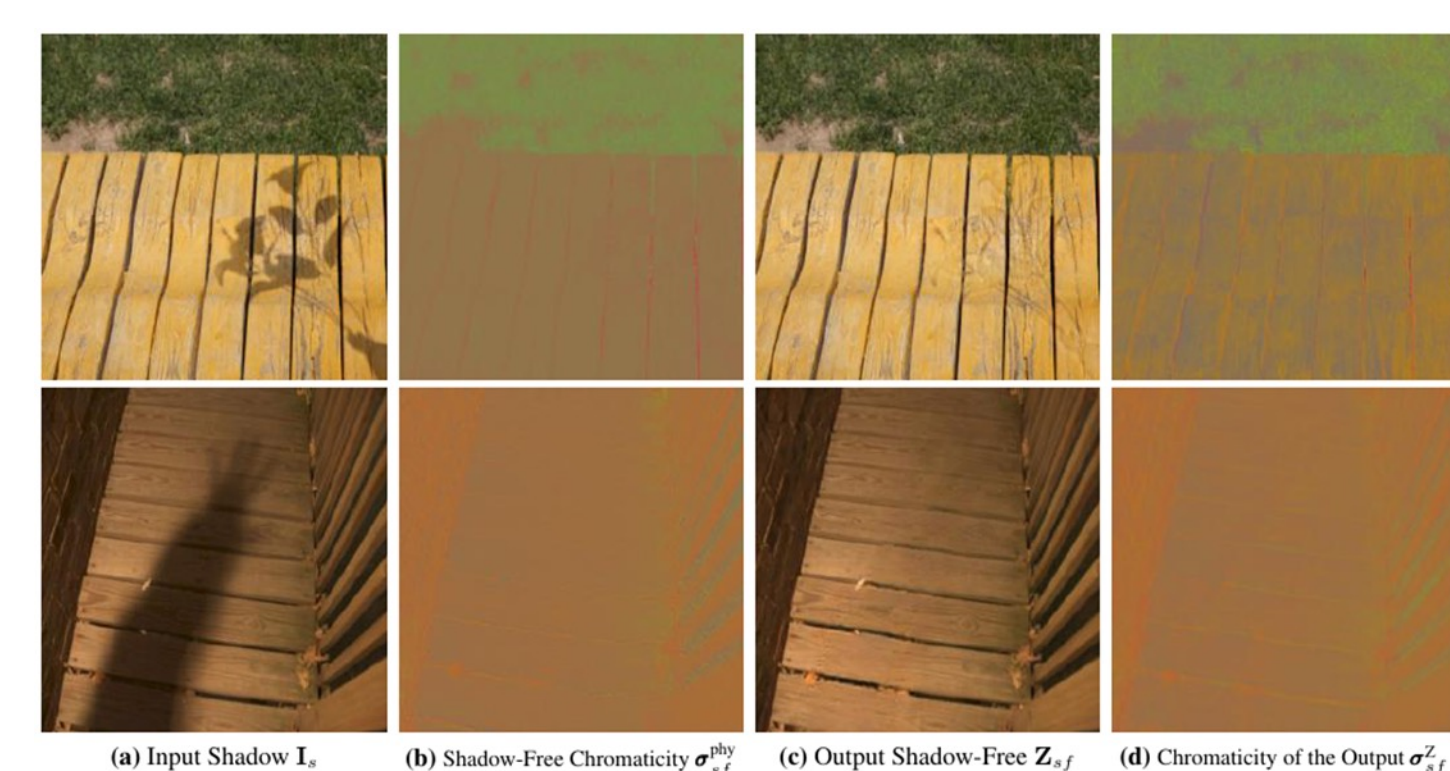
DC-ShadowNet:



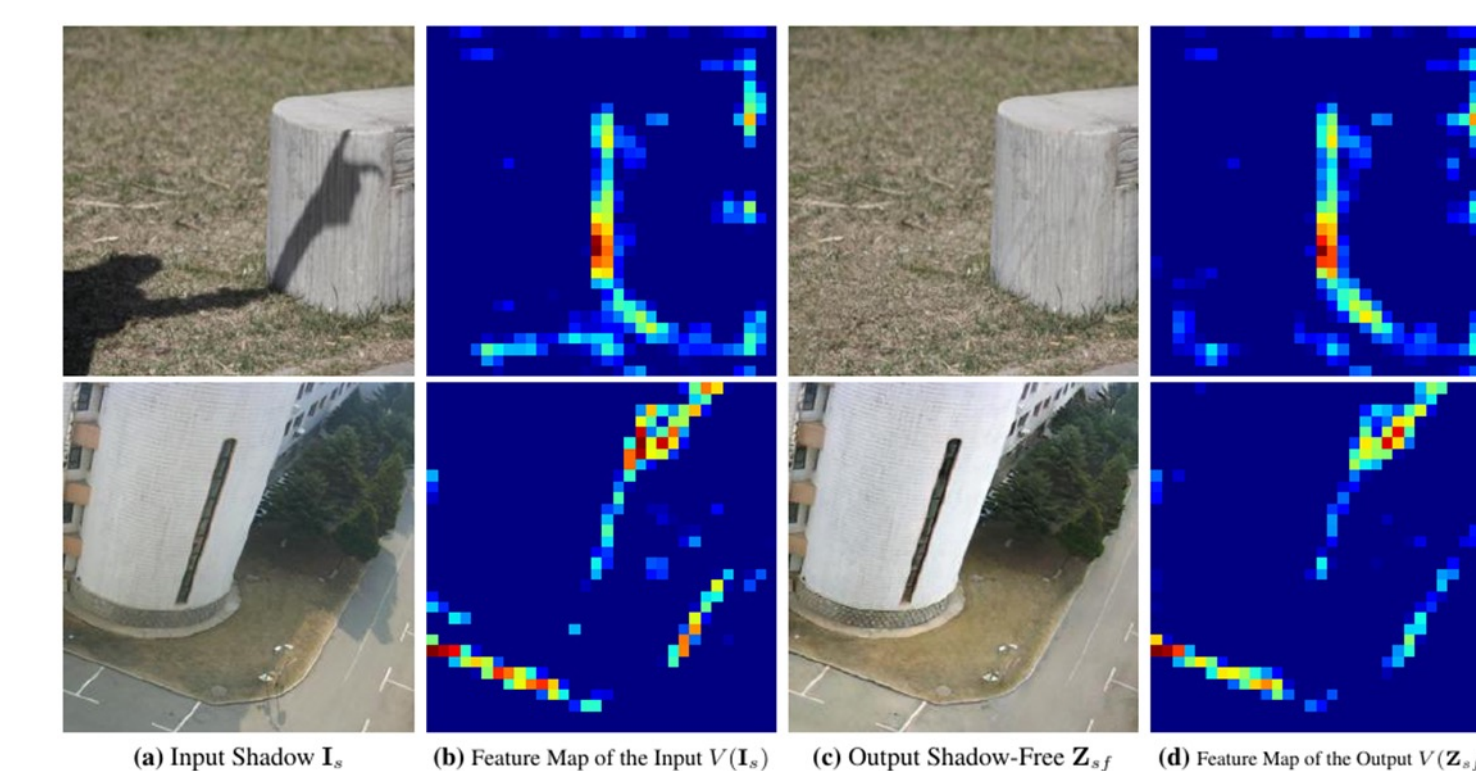
Shadow-Free Chromaticity:



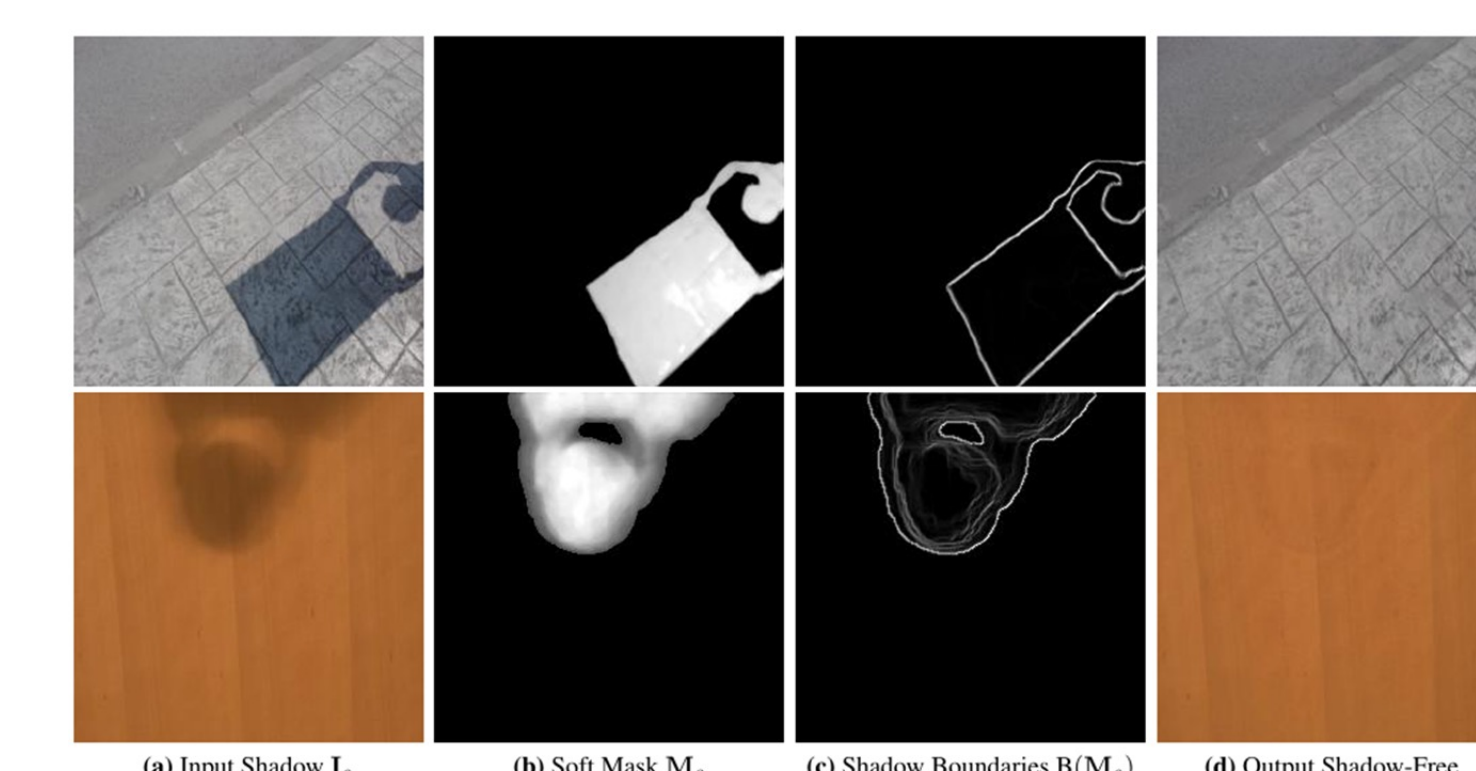
Shadow-Free Chromaticity:



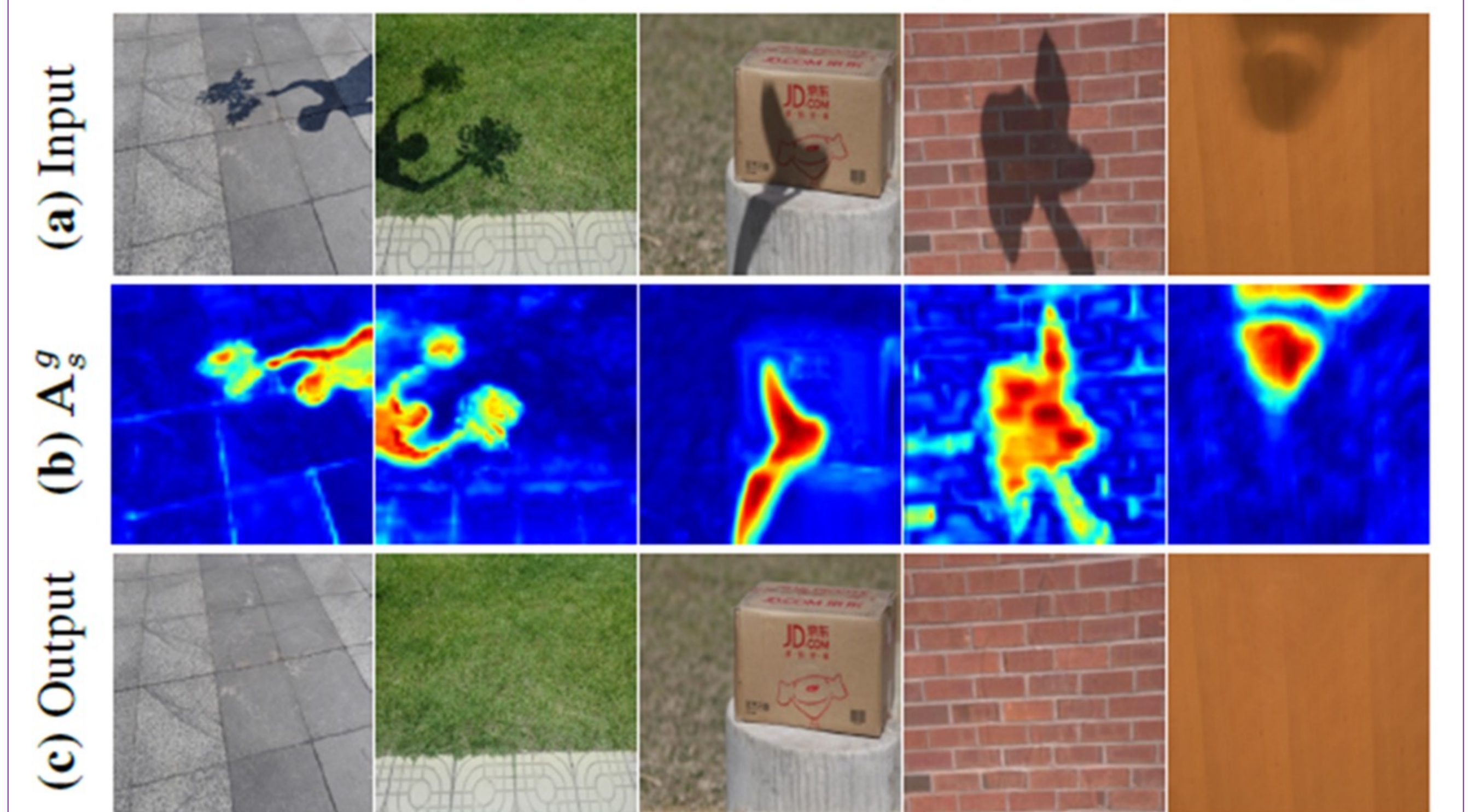
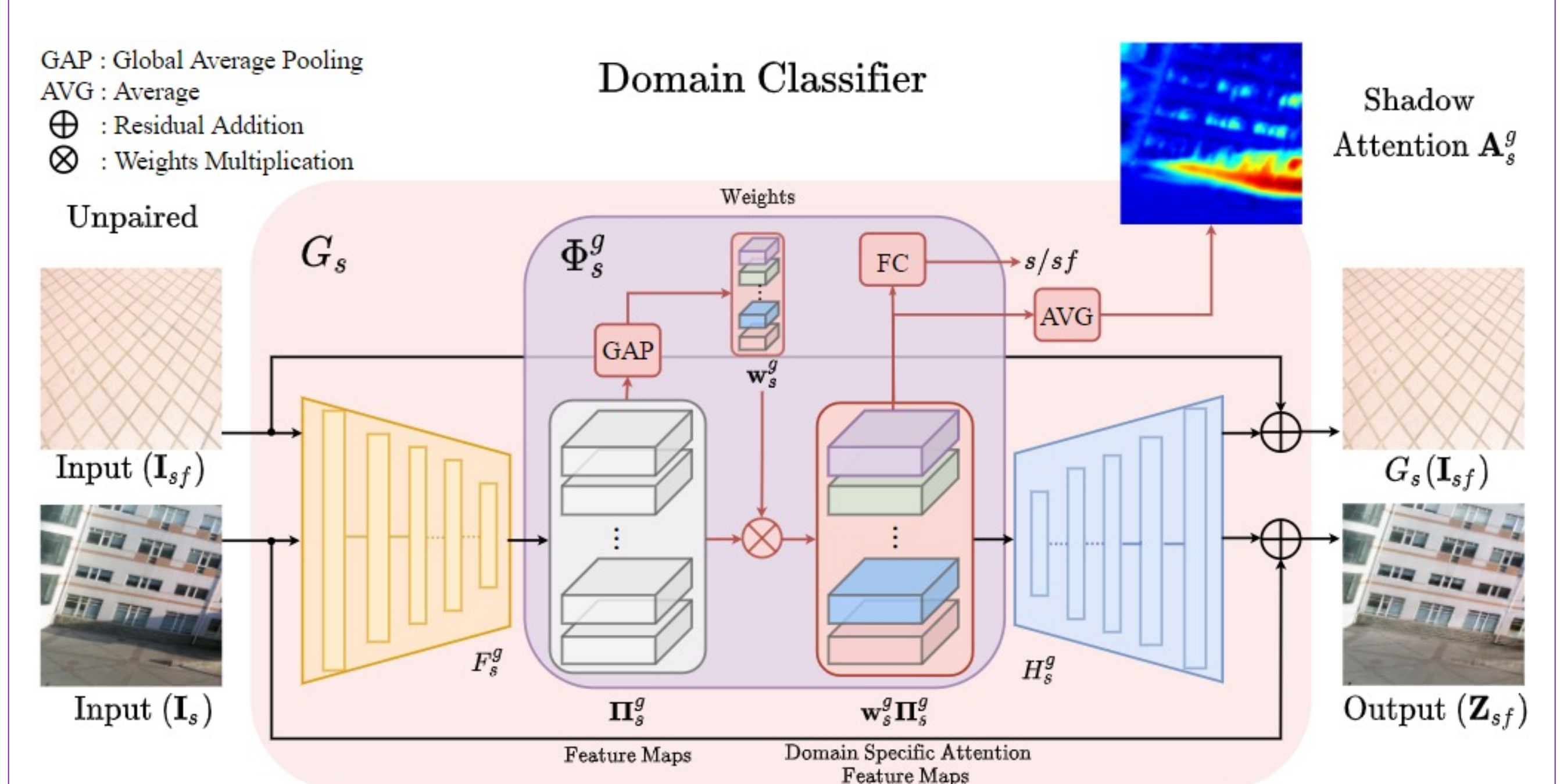
Shadow-Robust Feature:



Boundary Smoothness:



Domain-Classifer and Attention:



Conclusion:

- Unsupervised** single-image shadow removal network guided by a **domain classifier**.
- Novel **unsupervised losses** based on physics, perceptual features, and boundary smoothness.
- The first unsupervised** method for both hard and soft shadow removal from a single image.