EverLight: Indoor-Outdoor Editable HDR Lighting Estimation

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Please check the project page for more results and implementation details!

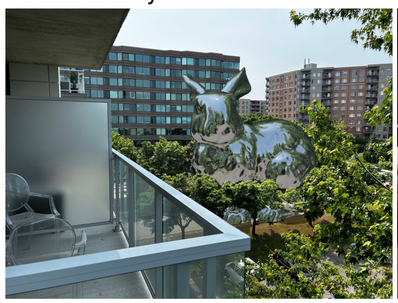
The first author is on the job market but cannot be here in person (visa issues). Please feel free to reach out!

Motivations

- Lighting plays a crucial role in realistic virtual object insertion.
- Estimating lighting from a single image is an ill-posed problem.
- Previous methods have attempted to tackle this by categorizing the domain into indoor and outdoor settings.

Therefore, when it comes to rendering a shiny in these images, we find ourselves navigating two distinct pathways.

Outdoor only:



- Tang et al. ECCV'22
- Yu et al. ICCV'21
- Zhu et al. CVPR'21
- Zhang et al. CVPR'19
- Hold-Geoffroy et al CVPR'19
- Hold-Geoffroy et al. CVPR'17

Indoor only:

- StyleLight [Wang et al. ECCV'22]
- Weber et al. ECCV'22
- Gardner et al. ICCV'19
- Garon et al. CVPR'19
- EMLight [Zhan et al. AAAI'21]
- Gardner et al. SIGGRAPH'17

Can we merge these two trends and have a unified and editable lighting estimation model?

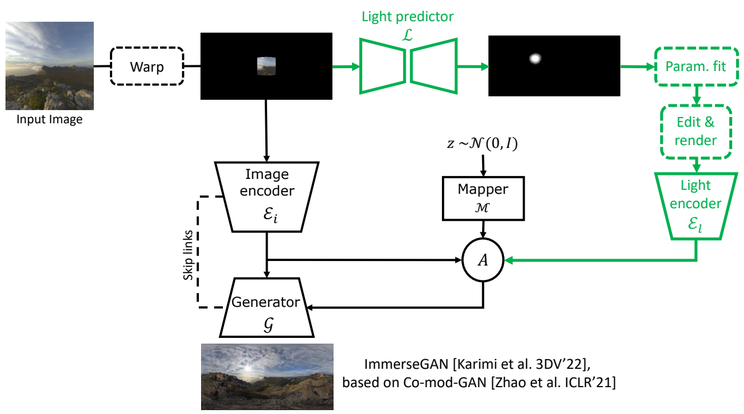
Contributions

We propose a lighting estimation model based on GANs to estimate the lighting from an image that:

- Produces high dynamic range and high-resolution panoramas.
- Works for both indoor and outdoor domains.
- Easily editable.

Method

Using parametric lighting models as style for co-modulation in generative adversarial networks (GAN)

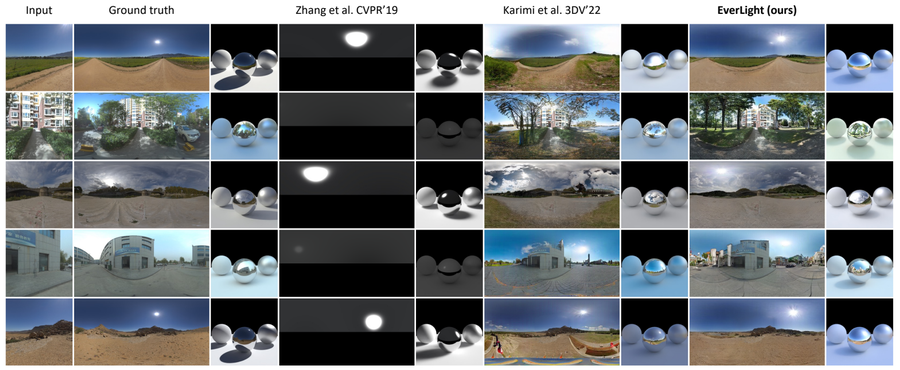


ImmerseGAN [Karimi et al. 3DV'22], based on Co-mod-GAN [Zhao et al. ICLR'21]

Results

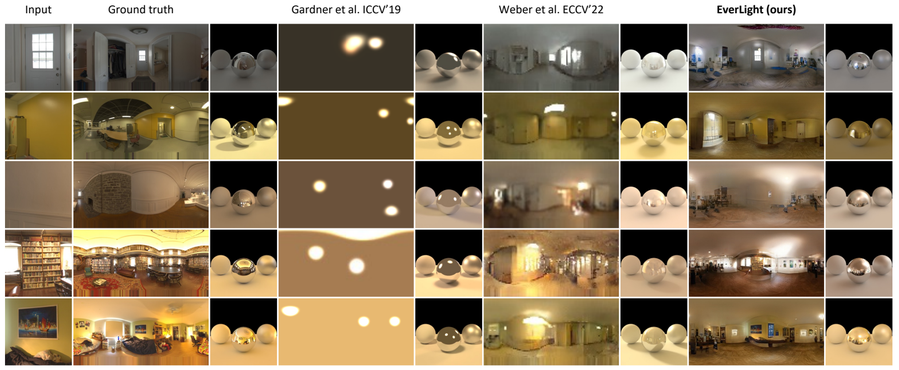
We provide examples for both outdoor and indoor scenes. Our method's performance is on par with domain-specific methods.

Outdoor



	Si-RMSE↓	RMSE↓	RGB ang.↓	PSNR↑	FID↓	Editability
EverLight (ours)	0.163	0.469	8.53°	10.03	38.44	Yes
Zhang et al. CVPR'19	0.225	1.058	11.80°	5.31	449.49	Yes
Karimi et al. 3DV'22	0.174	0.332	9.26°	11.02	37.05	No

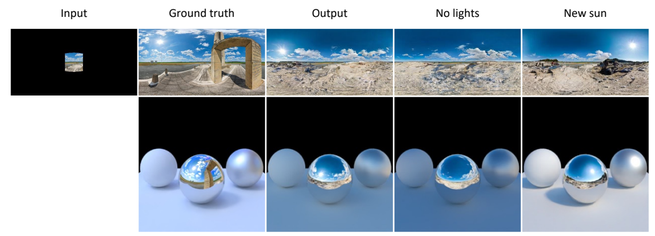
Indoor

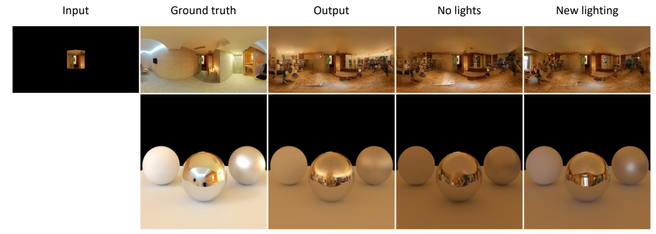


	Si-RMSE↓	RMSE↓	RGB ang.↓	PSNR↑	FID↓	Editability
EverLight (ours)	0.091	0.238	6.36°	10.03	78.90	Yes
Wang et al. ECCV'22	0.123	0.316	7.09°	12.35	78.55	Yes
Weber et al. ECCV'22	0.079	0.196	4.08°	12.95	130.13	Yes
Gardner et al. (1) ICCV'19	0.099	0.229	4.42°	12.21	410.12	Yes
Gardner et al. (3) ICCV'19	0.105	0.507	4.59°	10.90	386.43	Yes
Gardner et al. TOG'17	0.123	0.628	8.29°	10.22	253.40	No
Garon et a. CVPR'19	0.096	0.255	8.06°	9.73	324.51	No
Srinivasan et al. CVPR'20	0.121	0.254	4.56°	9.81	174.52	No
Zhan et al. AAAI'17	0.099	0.232	3.99°	10.34	135.97	No
Somanath et Kurz [CVPR'21]	0.097	0.286	7.67°	11.74	221.85	No
Karimi et al. 3DV'22	0.094	0.226	8.61°	10.72	65.98	No

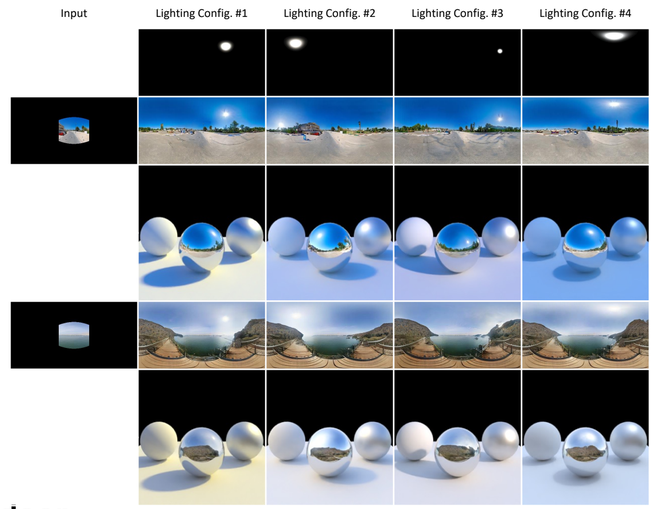
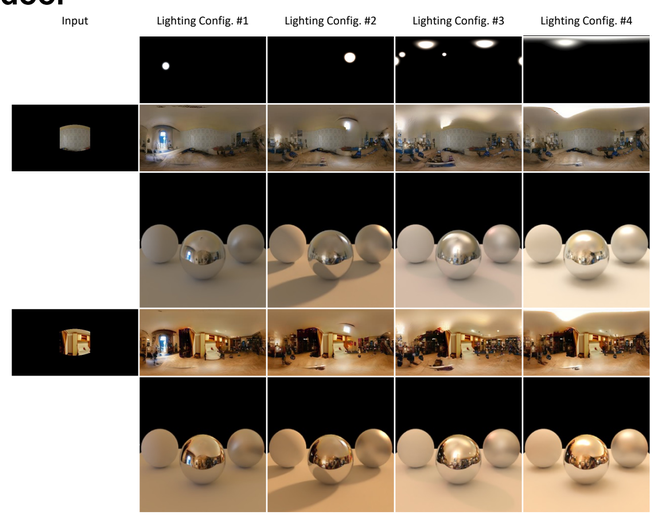
Our method achieves a strong balance between generation quality and editability.

Editing





Outdoor



Indoor