

Comprehensive Relighting: Generalizable and Consistent Monocular Human Relighting and Harmonization

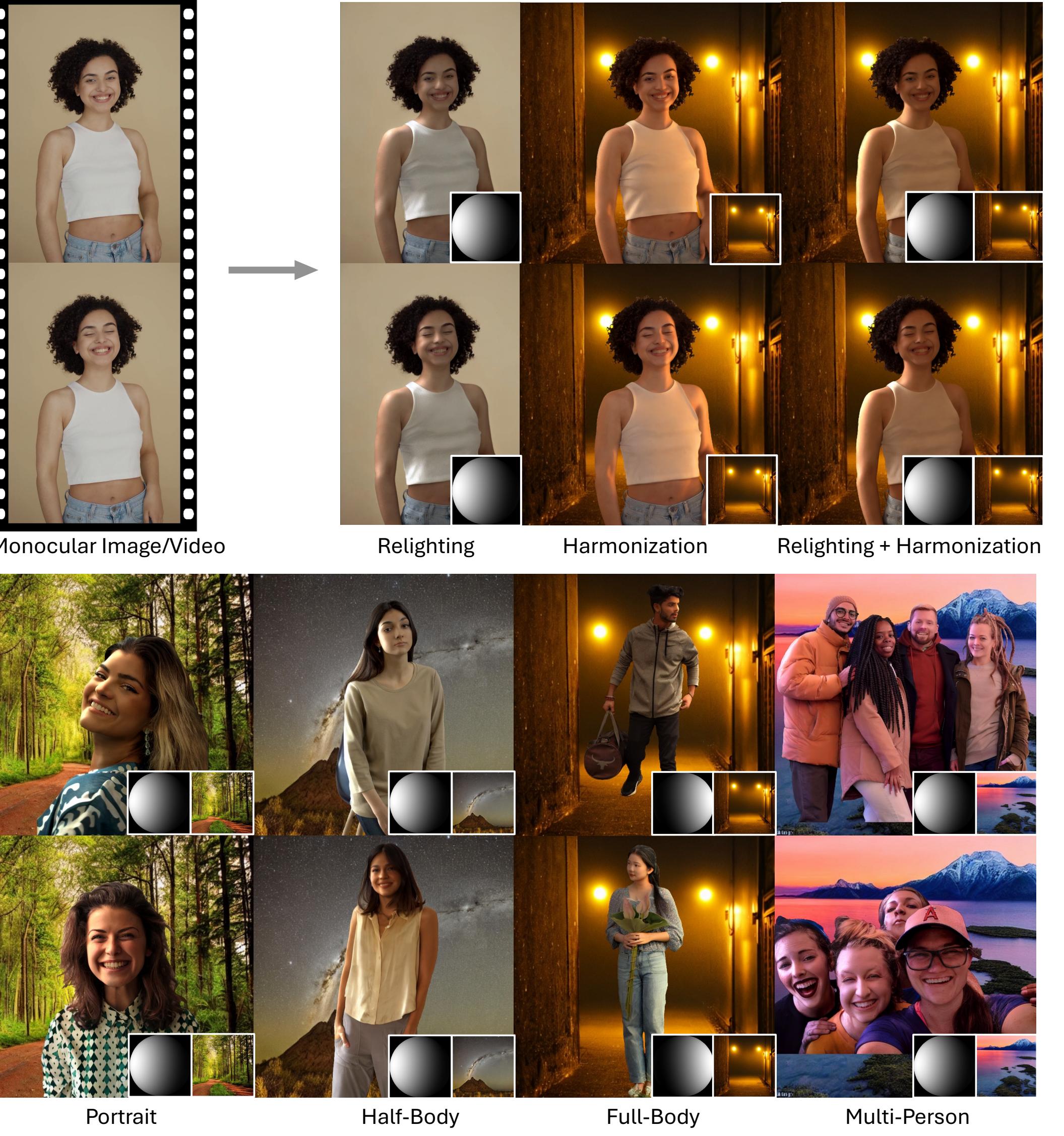
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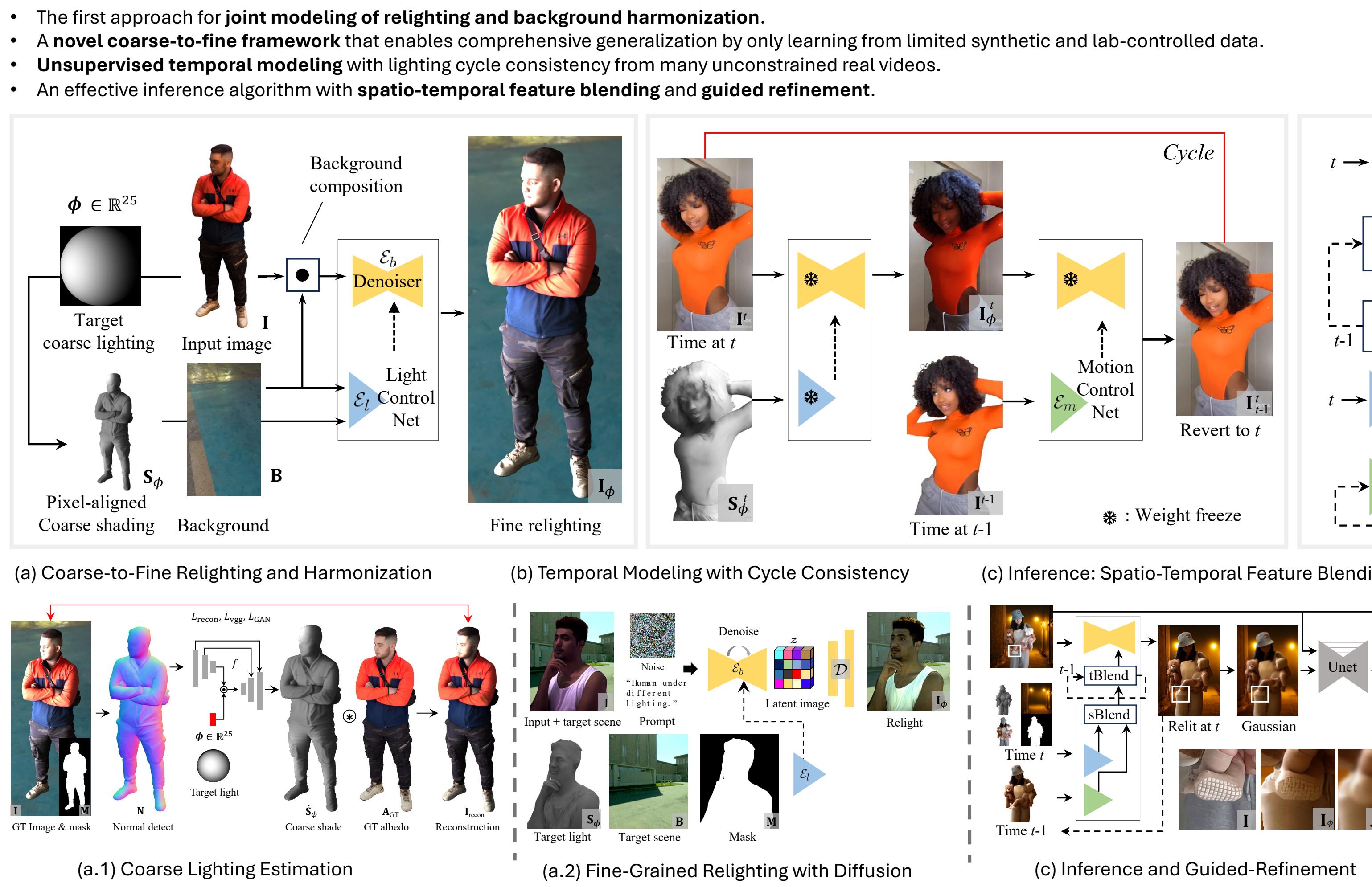
² Adobe Research

³ Runway

Goal:



Approach:

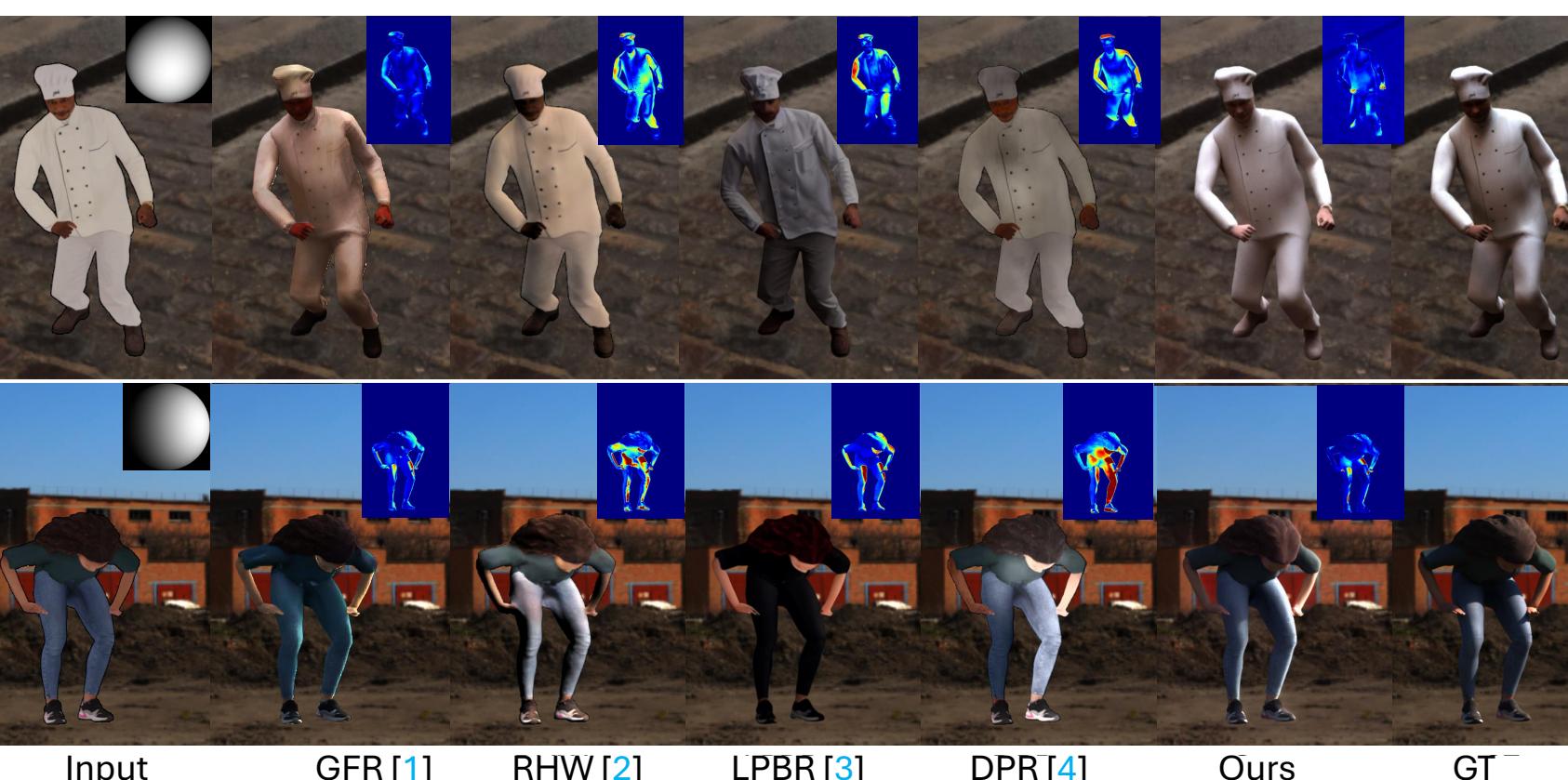


Evaluation:

Tab 1. → Comparison using PSNR/SSIM/LPIPS (fidelity) and t-variants (temporal)

Method	Scenario 1			Scenario 2			Scenario 3		
	Image	SH	Bg	Video	Consist	Gener.	Image	SH	Bg
DPR [4]	✓	✓	x	x	x	x	18.62/0.86/0.103	32.00/0.94/0.030	18.14/0.89/0.089
RHW [2]	✓	✓	x	✓	✓	x	19.78/0.87/0.113	30.74/0.95/0.027	20.12/0.88/0.078
GFR [1]	✓	✓	x	x	x	x	25.59/0.91/0.089	30.33/0.95/0.033	22.76/0.91/0.072
LPBR [3]	✓	✓	x	x	x	x	18.19/0.86/0.090	31.62/0.91/0.035	19.96/0.88/0.084
Ours	✓	✓	✓	✓	✓	✓	25.95/0.95/0.066	33.58/0.96/0.024	23.99/0.93/0.048

Fig 1. → Qualitative comparison of synthetic video frames (corresponding to Tab. 1)



Tab 2. → Left: Training data scale comparison; Right: Train & test dataset breakdown.

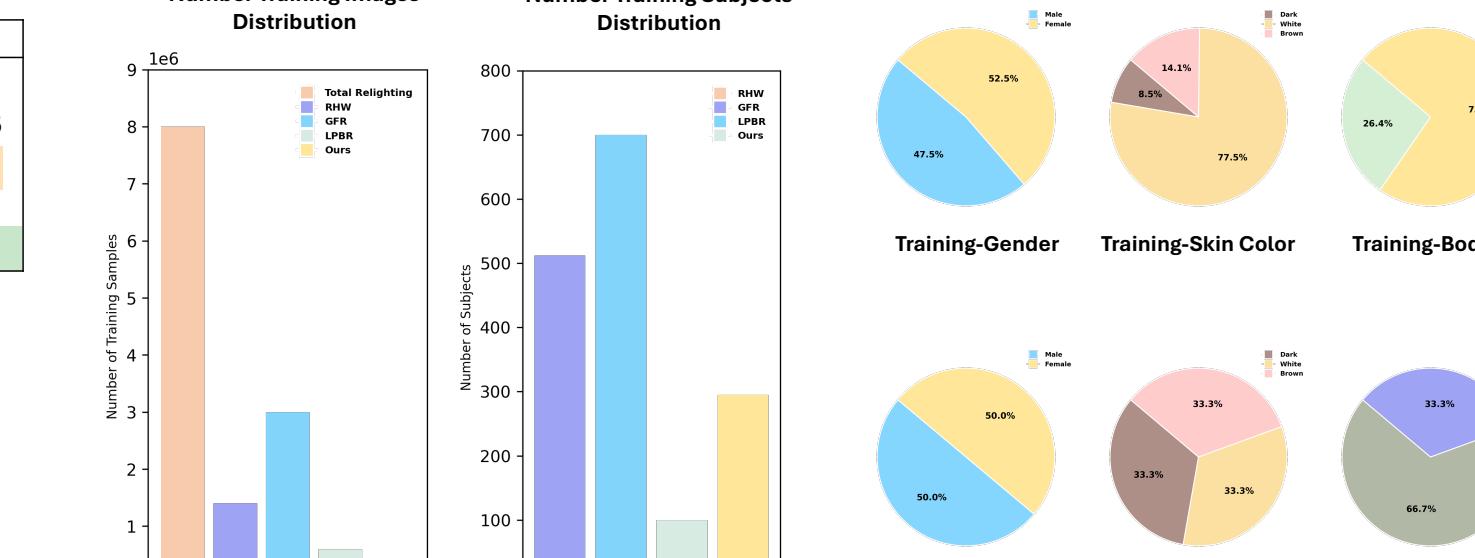


Fig 2. → Background Harmonization Comparison with IC-Light [6]



Results:

Fig 3. → Portrait and Half-Body Relighting.

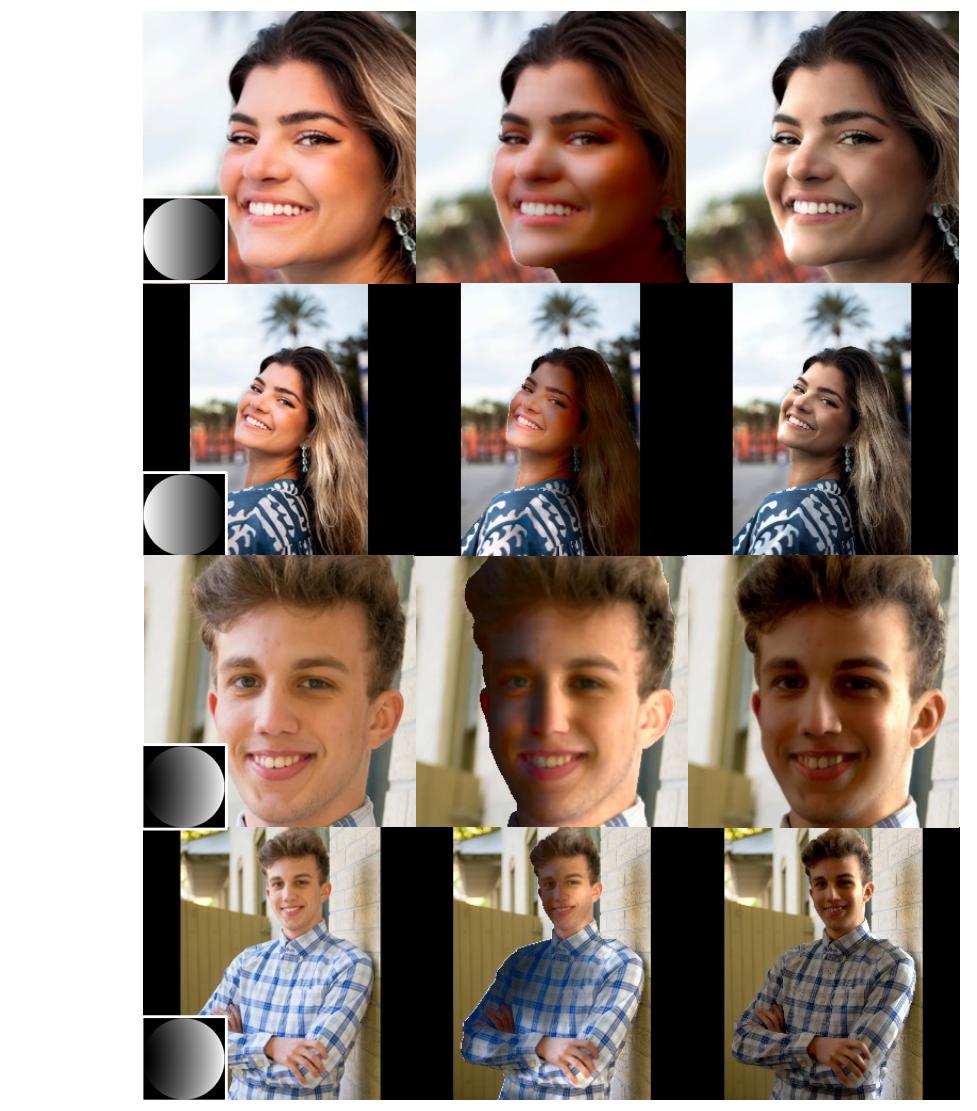


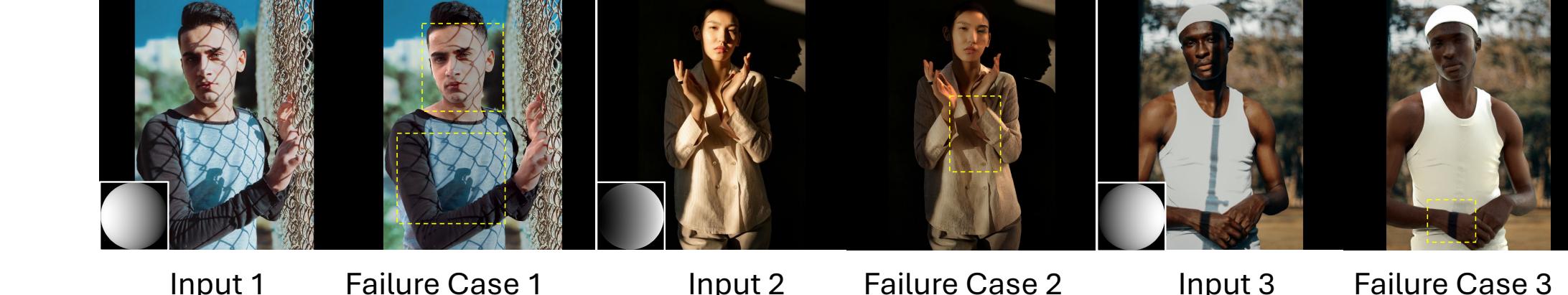
Fig 4. → Relighting across body part scenarios (half-body, full-body, multi-person).



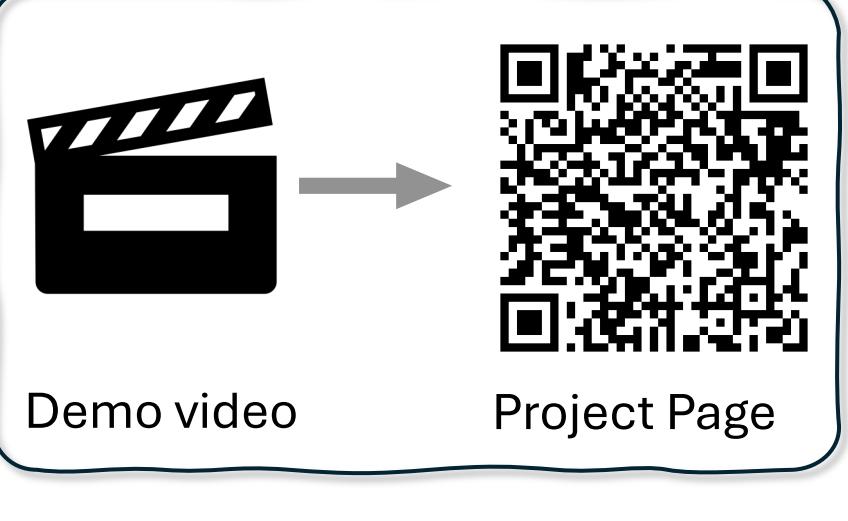
Fig 5. → Relighting and harmonization across body part scenarios (half-body, full-body, multi-person).



Limitation and Future Work:



- Struggles with **strong shadows**, especially on clothing.
- High computational cost** during inference.
- Detection noise (e.g., masks, normals) causes **flickering**.
- Less accurate on non-human materials**



Reference:

- [1] Ji, Chaonan, et al. "Geometry-aware single-image full-body human relighting." ECCV 2022
- [2] Tajima, Daichi et al. "Relighting Humans in the Wild: Monocular Full-Body Human Relighting with Domain Adaptation." CGF 2021
- [3] Ren, Mengwei, et al. "Relightful harmonization: Lighting-aware portrait background replacement." CVPR 2024
- [4] Zhou, Hao, et al. "Deep single-image portrait relighting." CVPR 2019
- [5] Cai, Ziqi, et al. "Real-time 3d-aware portrait video relighting." CVPR 2024.
- [6] Zhang, Lvmian, et al. "Scaling in-the-wild training for diffusion-based illumination harmonization and editing by imposing consistent." ICLR 2025