Dual-path Image Inpainting with Auxiliary GAN Inversion

Wentao Wang, Li Niu, Jianfu Zhang, Xue Yang, Liqing Zhang
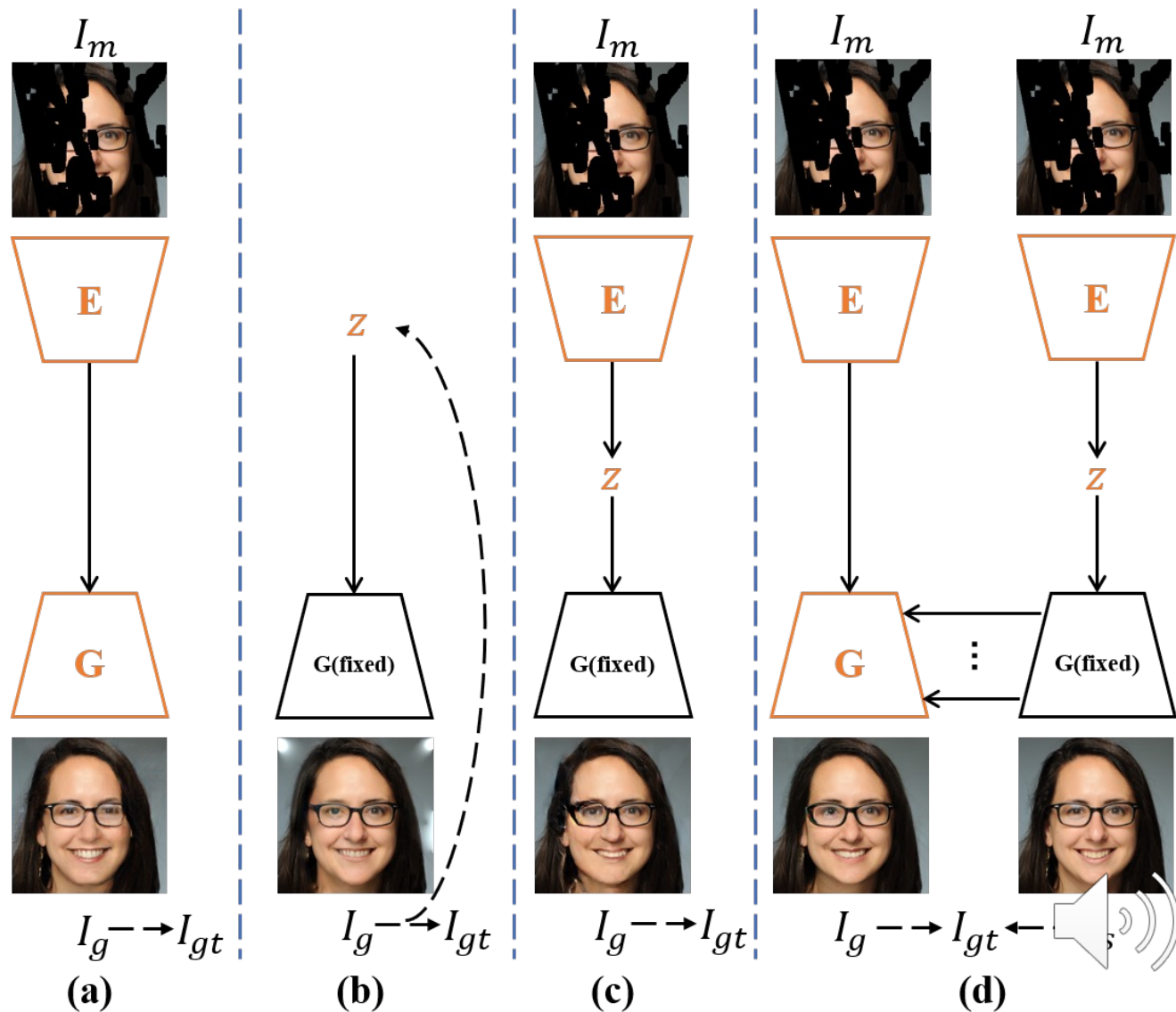
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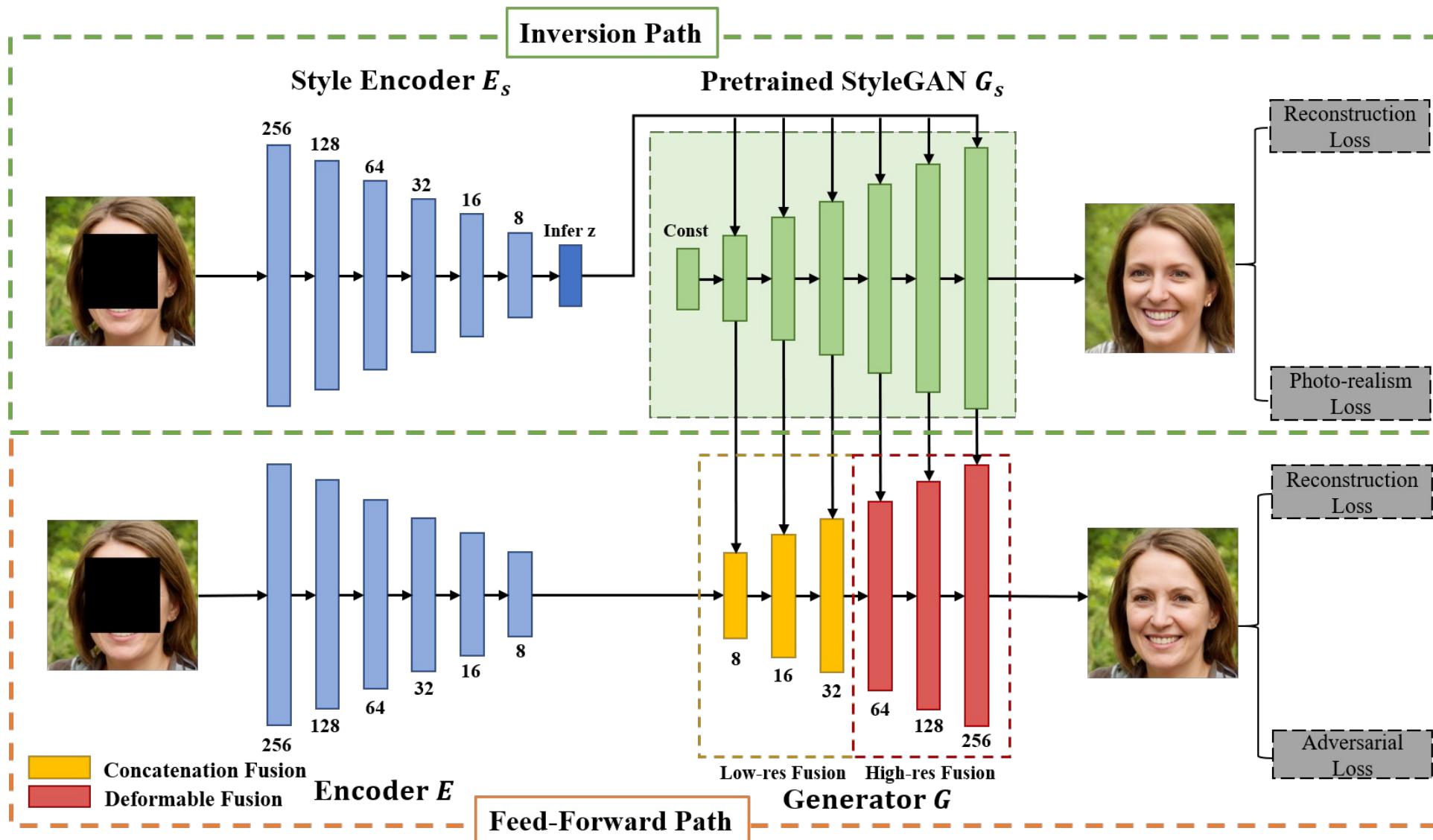
Proposed Method

Four Types of Inpainting Methods

- Feed-Forward Inpainting Methods (a)

- GAN Inversion Inpainting Methods

  - Optimization-based (b)

  - Learning-based (c)

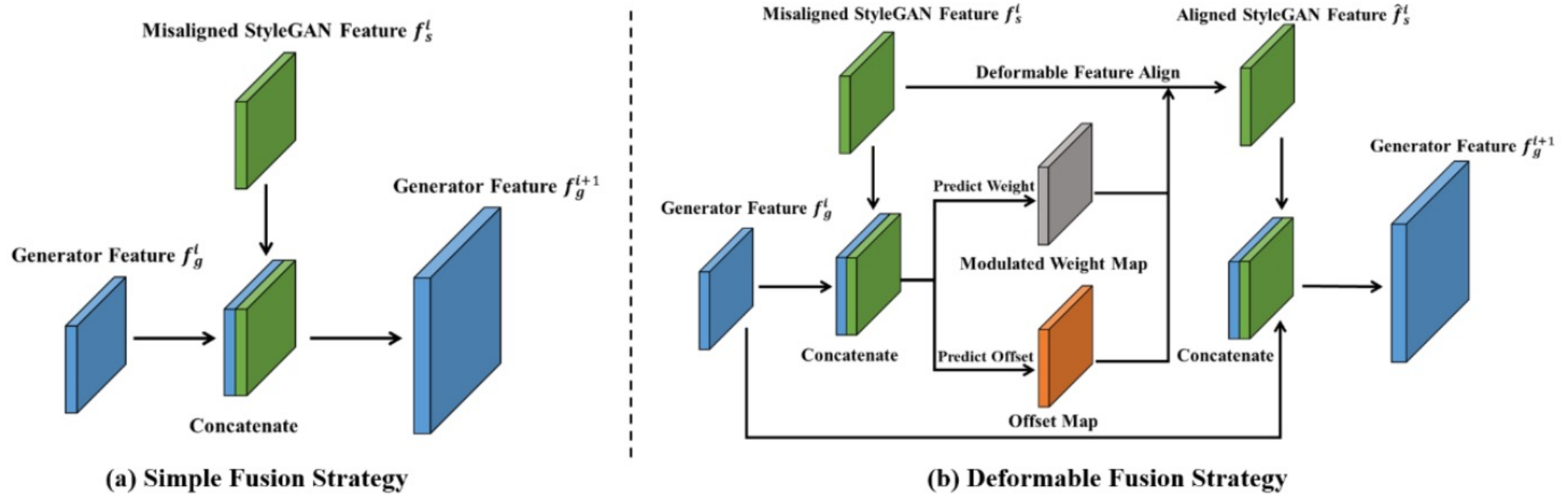- Ours--A Hybrid Two-Path Framework (d)

Network Architecture

Hybrid Two-Path Inpainting Network

Deformable Feature Fusion Module

Two Fusion Strategies

(a) Simple Fusion Strategy

(b) Deformable Fusion Strategy

Deformable Feature Fusion Module

Two Fusion Strategies

(a) Masked Image   Feed-forward Path   Inversion Path   Feed-forward Path   Inversion Path

(b) Ground Truth   (c) Simple Fusion Strategy   (d) Deformable Fusion Module

Experimental Results

Qualitative Comparison on FFHQ

(a) Masked Image (b) Yeh et al. (c) PICNet (d) GC (e) Lahiri et al. (f) CoModGAN (g) Ours (h) Ground Truth

Experimental Results

Qualitative Comparison on LSUN

(a) Masked Image   (b) Yeh et al.   (c) PICNet   (d) GC   (e) Lahiri et al.   (f) Ours   (g) Ground Truth
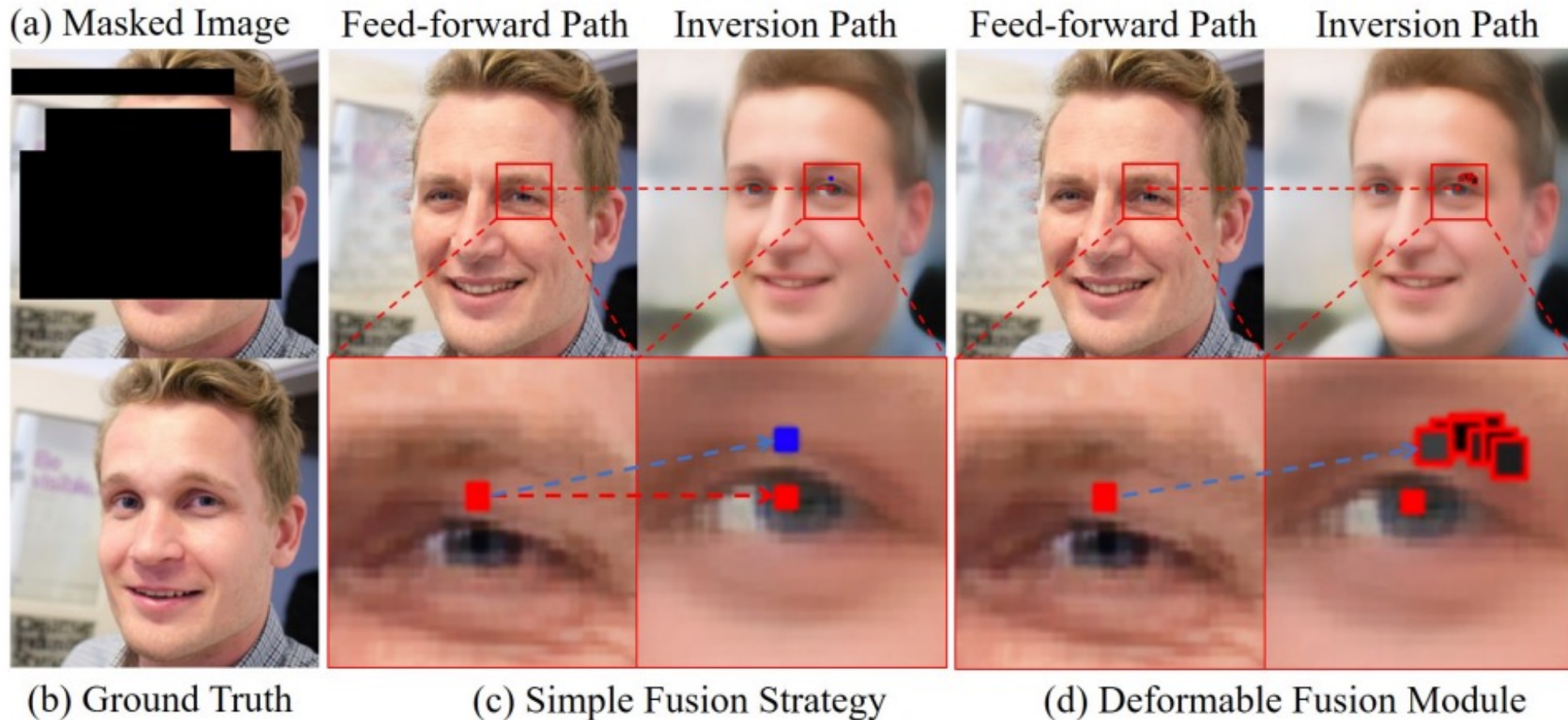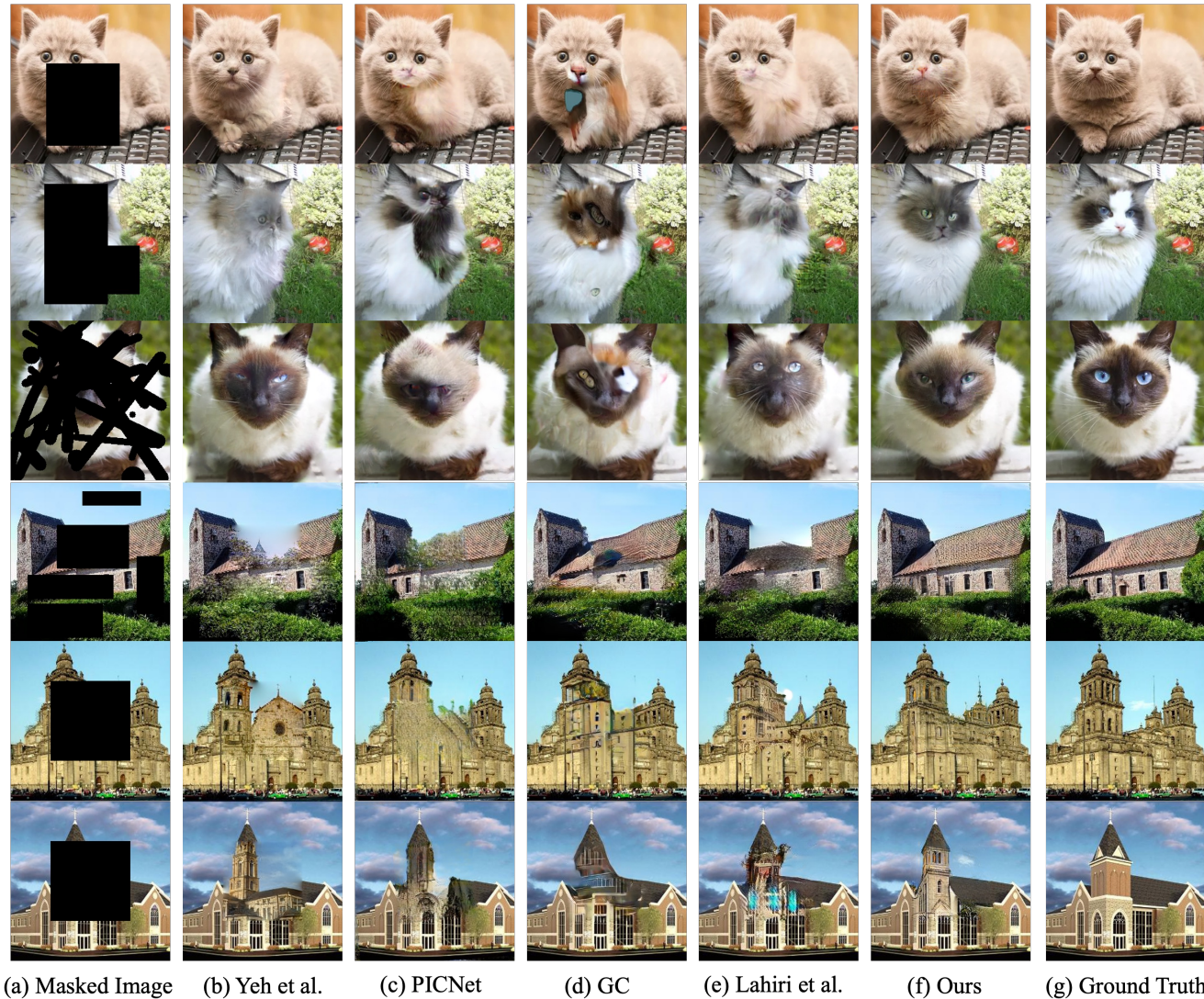
Experimental Results

Quantitative Comparison on FFHQ

	Mask	Yeh et al. [25]	Lahiri et al. [12]	GC [29]	PICNet [33]	CoModGAN [32]	Ours
ℓ_1 (%)↓	0-10%	0.94	1.27	0.73	0.74	0.64	**0.62**
	10-20%	1.59	1.83	1.23	1.23	1.11	**1.06**
	20-30%	2.53	2.38	1.97	1.95	1.75	**1.41**
	30-40%	3.64	4.05	2.83	2.79	2.61	**2.16**
	40-50%	5.06	5.94	3.90	3.84	3.69	**3.21**
	50-60%	7.73	9.21	5.73	5.76	5.62	**4.59**
	Ave%	3.58	4.18	2.73	2.71	2.54	**2.17**
SSIM↑	0-10%	0.969	0.911	0.974	0.973	0.978	**0.979**
	10-20%	0.932	0.876	0.941	0.939	0.948	**0.951**
	20-30%	0.881	0.827	0.895	0.893	0.905	**0.914**
	30-40%	0.827	0.774	0.845	0.843	0.857	**0.879**
	40-50%	0.767	0.711	0.789	0.785	0.802	**0.827**
	50-60%	0.688	0.621	0.713	0.702	0.727	**0.743**
	Ave%	0.844	0.787	0.859	0.856	0.870	**0.882**
PSNR↑	0-10%	33.576	31.994	35.600	35.726	36.211	**36.342**
	10-20%	28.937	27.311	30.807	31.053	31.209	**31.607**
	20-30%	25.714	24.729	27.467	27.813	27.703	**28.365**
	30-40%	23.281	22.512	25.113	25.474	25.214	**26.251**
	40-50%	23.282	20.201	23.093	23.462	23.069	**24.155**
	50-60%	21.087	17.039	20.625	20.804	20.490	**21.751**
	Ave%	25.152	23.964	27.117	27.388	27.366	**28.078**
FID↓	0-10%	1.83	1.97	1.50	1.57	1.31	**1.20**
	10-20%	3.33	3.85	2.40	2.71	2.14	**2.00**
	20-30%	5.42	6.70	3.93	4.55	3.86	**2.99**
	30-40%	7.92	10.01	6.25	6.90	5.56	**4.13**
	40-50%	11.04	14.42	9.69	10.64	6.25	**5.67**
	50-60%	13.89	21.73	15.91	16.71	9.08	**8.13**
	Ave%	7.24	9.77	6.61	7.18	4.75	**4.02**

Ablation Study

- **Effectiveness of Deformable Fusion Module**

(a) Masked Image   (b) Misalignment Result   (c) Alignment Result   (d) Ground Truth
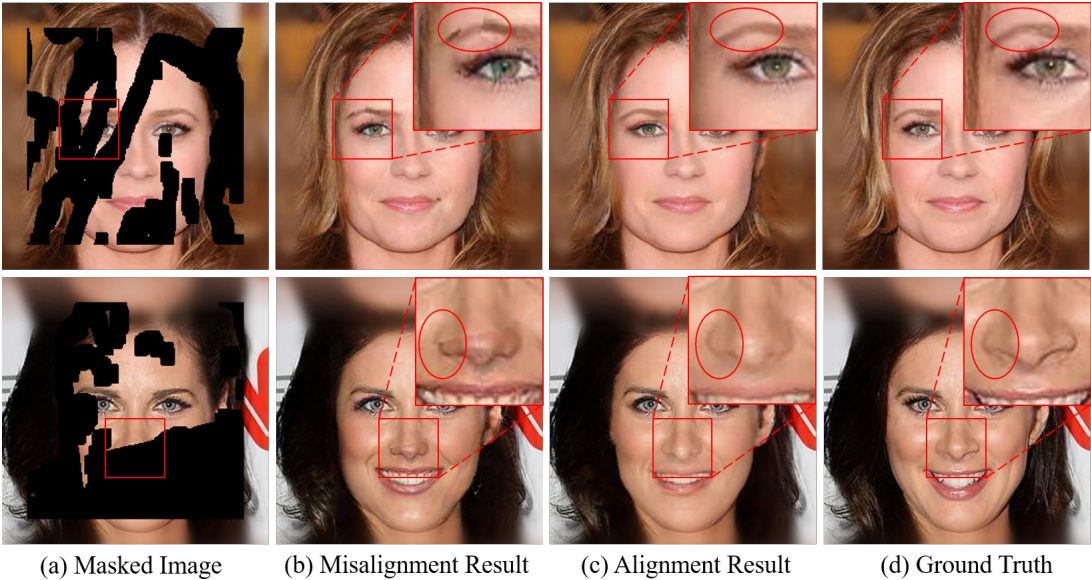
- **Effectiveness of Each Path**

(a) Masked Image   (b) Feed-Forward Path   (c) Inversion Path   (d) Dual-Path   (e) Ground Truth
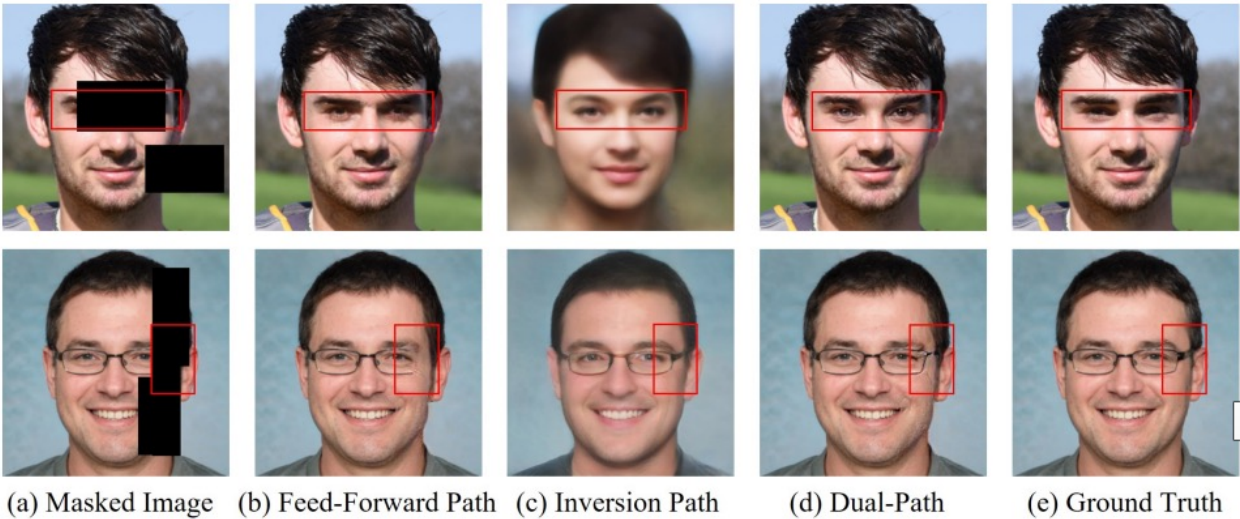
Thanks for watching!

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