ReFocusEraser: Refocusing for Small Object Removal with Robust Context-Shadow Repair

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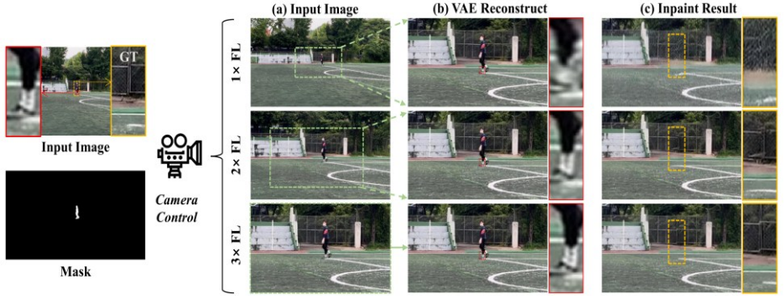
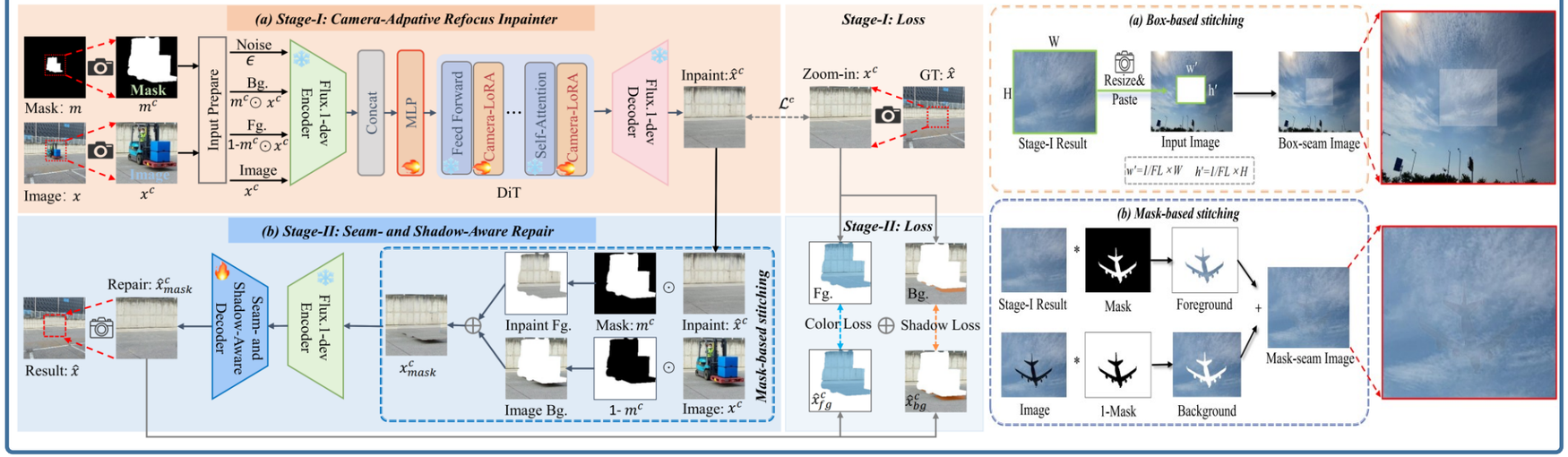
Motivation

➢ **Problem:** The fixed downsampling of VAEs causes severe detail loss, making small object removal highly challenging for diffusion-based models.



Method

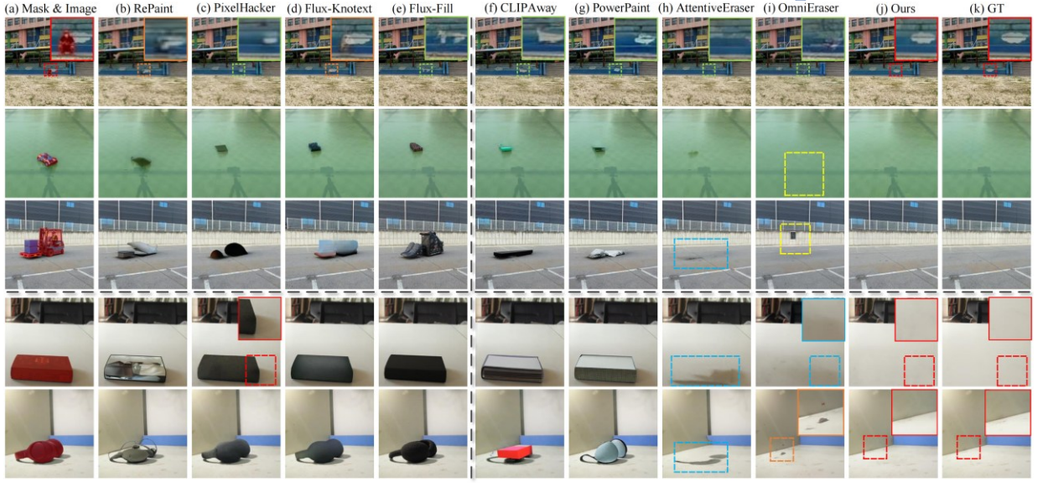


Contribution

- **Camera-Adaptive Refocus Inpainter**: We introduce a mechanism that enlarges small masked objects via simulated near-field perspectives and improves semantic consistency through LoRA fine-tuning.

- **Seam- and Shadow-Aware Repair:** We develop a module that seamlessly integrates inpainted regions and automatically corrects shadows using a robust mask-based stitching strategy.

Experiments



Method	RORD-val Sagong et al. (2022)					RemovalBench Wei et al. (2025)				
	PSNR↑	SSIM↑	LPIPS↓	FID↓	CMMD↓	PSNR↑	SSIM↑	LPIPS↓	FID↓	CMMD↓
Repaint Lugmayr et al. (2022)	15.250	0.330	0.787	144.320	1.011	20.747	0.705	0.564	155.695	0.548
PixelHacker Xu et al. (2025)	22.600	0.530	0.340	44.108	0.499	22.058	0.728	0.425	143.315	0.483
CLIPAway Ekin et al. (2024)	21.916	0.511	0.333	61.670	0.535	22.076	0.721	0.412	140.610	0.404
PowerPaint Zhuang et al. (2024)	23.229	0.619	0.176	42.519	0.301	23.228	0.732	0.323	143.619	0.463
OmniEraser Wei et al. (2025)	22.380	0.562	0.226	47.765	0.293	24.624	0.728	0.291	66.871	0.324
Flux-Knotext Battrd et al. (2025)	13.522	0.251	0.628	127.330	0.824	22.234	0.679	0.317	88.768	0.191
Flux-Fill Black-Forest-Labs (2024)	25.025	0.794	0.092	65.215	0.297	21.526	0.744	0.348	177.571	0.434
AttentiveEraser Sun et al. (2025)	24.064	0.656	0.145	25.393	0.276	25.265	0.751	0.284	65.326	0.169
Our ReFocusEraser	**31.256**	**0.924**	**0.041**	**21.378**	**0.263**	**30.495**	**0.841**	**0.223**	**38.115**	**0.117**

Exp.	Configuration			Capabilities			RORD-val Sagong et al. (2022)				
	LoRA	Stitch	Decoder	Seam	Shadow	Color Shift	PSNR↑	SSIM↑	LPIPS↓	FID↓	CMMD↓
(a)	✗	✗	✗	N	Y	N	23.683	0.626	0.323	40.287	0.476
(b)	CAR	S_{box}	✗	Y	N	Y	31.082	0.923	0.046	24.288	**0.258**
(c)	CAR	S_{mask}	✗	Y	Y	Y	**31.732**	**0.932**	**0.039**	25.036	0.272
(d)	CAR	S_{mask}	✓	N	N	N	31.256	0.924	0.041	**21.378**	0.263