

LENVIZ: A High-Resolution Low-Exposure Night Vision Benchmark Dataset



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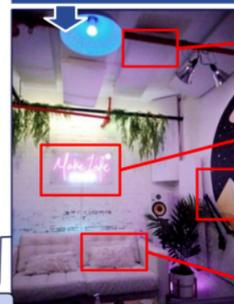
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MOTIVATION

What the user sees



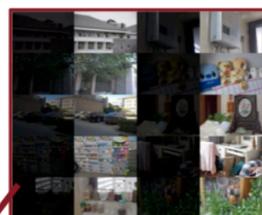
What their camera captures



- Noise (mixed Poisson-Gaussian / Chroma)
- Over-exposure
- Color inaccuracy
- Loss of detail

Current Benchmarks

Dataset	Type	Resolution	Frames	Environment	Humans	Human GT
MIT 5K[4]	S	3040x2014	5,000	I,O	✓	✗
NEF[27]	S	-	88	I,O	-	✗
Phos[26]	M	-	15	I,O	✗	✗
VV Dataset	S	-	24	I,O	✗	✗
LLIE[24]	M	64x64	10,000	I,O	✗	✓
SID[6]	M+L	4240x2832 6000x4000	424	I,O	✓	✗
LOL[30]	M	400x600	500	I,O	✗	✗
SICE[5]	M	3000x2000 6000x4000	4,431	I,O	✓	✗
LENVIZ	S+M+L	4080x3072 3264x2448	80,642 154,046	I,O	✓	✓



LENVIZ



9 Exposure frames



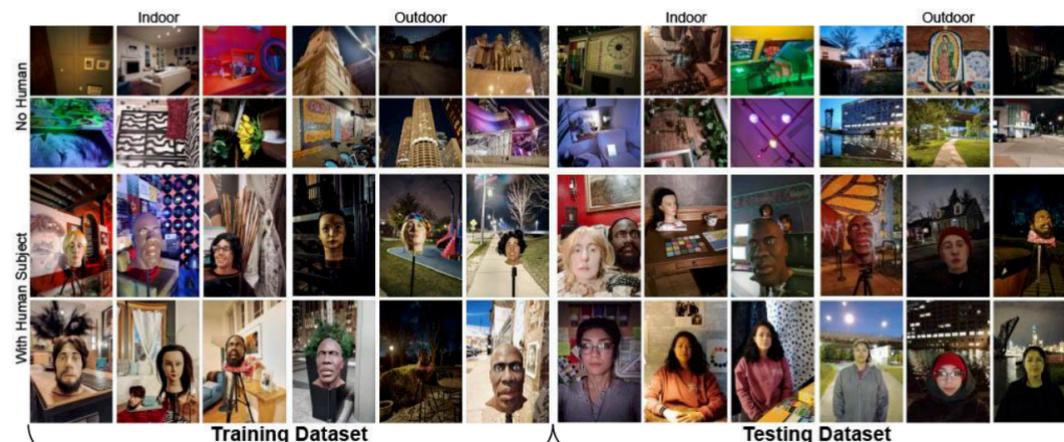
Long exposure



Human edited GT

230K frames
24K scenes

THE DATASET



Human GT		Long exposure GT	
38,321	13,067	96,367	11,015

# of files	# of scenes
1,468	203

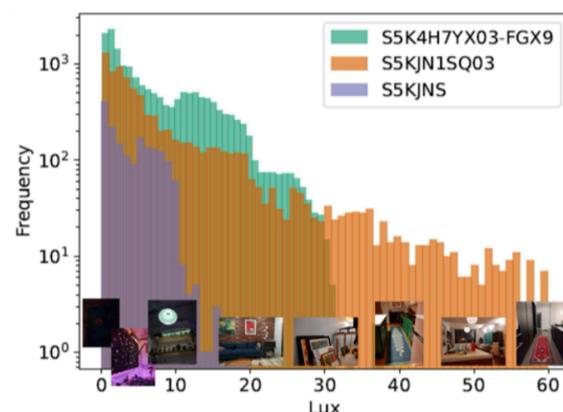
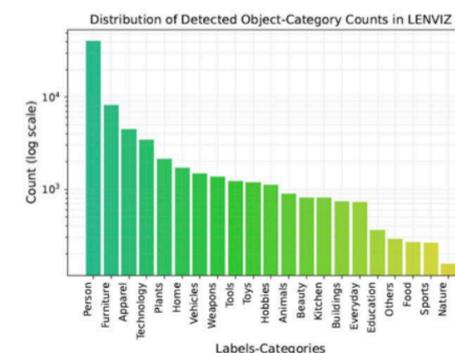
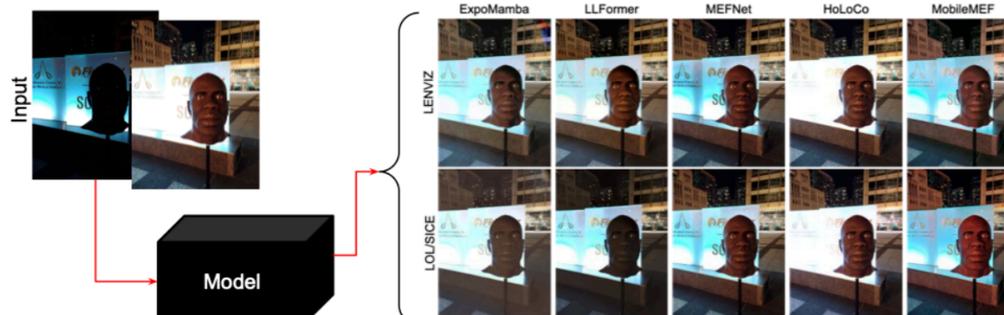


Figure 5. LENVIZ Illuminance Histogram



SOTA ANALYSIS

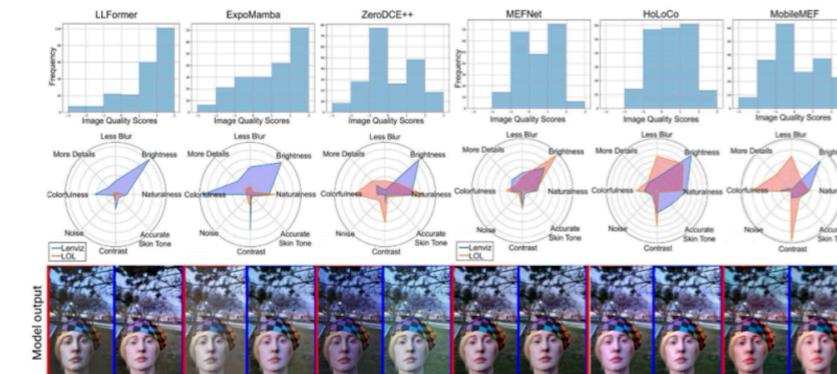


Quantitative

SOTA	Test Dataset	↑ PSNR		↑ SSIM		↓ LPIPS	
		LENVIZ trained	LOL/SICE trained	LENVIZ trained	LOL/SICE trained	LENVIZ trained	LOL/SICE trained
LLFormer [28]	LENVIZ	21.13	17.05	0.665	0.551	0.358	0.498
	LOL	19.33	19.79	0.757	0.772	0.240	0.277
ExpoMamba [2]	LENVIZ	19.8	17.04	0.585	0.534	0.524	0.599
	LOL	23.65	18.55	0.816	0.759	0.169	0.291
MEFNet [19]	LENVIZ	20.71	20.77	0.609	0.606	0.457	0.458
	SICE	21.13	20.94	0.612	0.612	0.358	0.361
HoLoCo [16]	LENVIZ	21.31	20.77	0.613	0.606	0.689	0.689
	SICE	13.78	13.90	0.614	0.615	0.526	0.529
MobileMEF [11]	LENVIZ	20.93	19.47	0.626	0.613	0.492	0.561
	SICE	13.65	14.36	0.637	0.632	0.484	0.452

Perceptual metrics has closer alignment to human judgements

Qualitative



A/B testing showed major preferences:

- Brightness
- Naturalness
- Colorfulness