Adapting Quality Metrics to Tone Mapping

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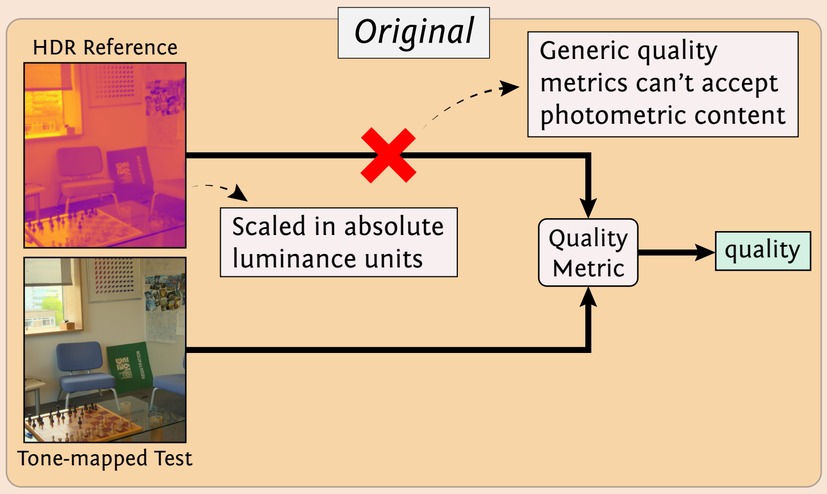
Paper + Data + Code

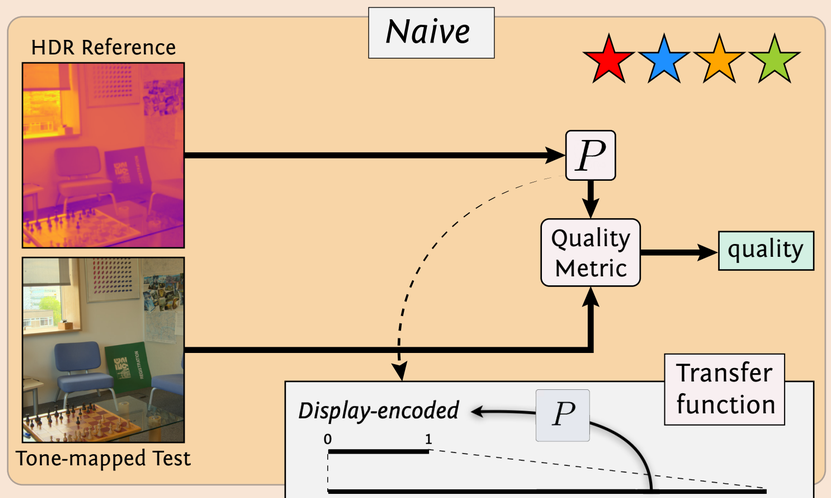
Problem

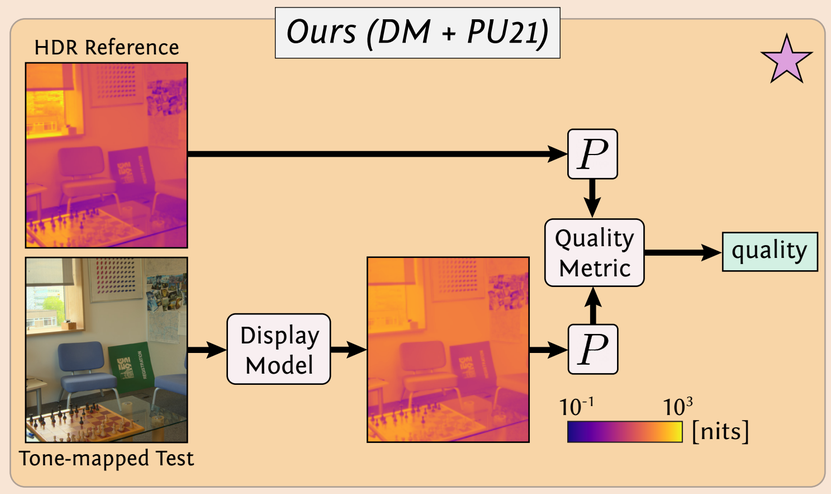
Can existing image and video quality metrics be adapted to predict tone mapping quality?

Metrics designed specifically for tone mapped content exist...

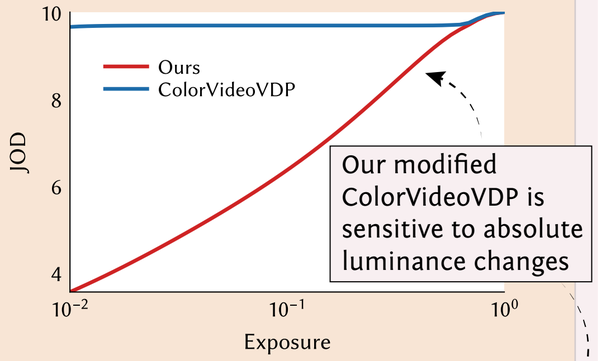
but a simple perceptual transform can adapt any metric to this task, and even outperform existing TM metrics.

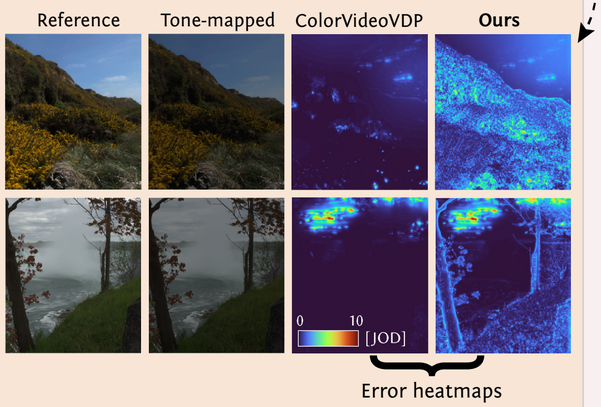






ColorVideoVDP-tm





Evaluation Parameters

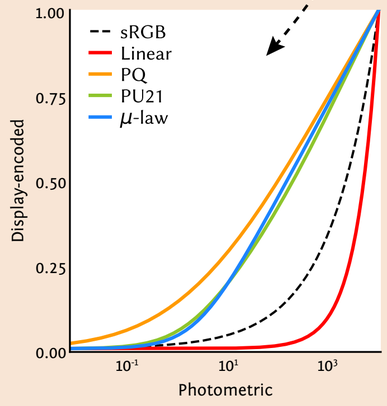
Datasets used in evaluation:

- 5 tone mapping quality assessment datasets: 3 of them are image datasets and 2 are video datasets.

Adaptation techniques:

- 5 adaptation techniques: 4 transfer functions & our display model + PU21 (★★★★★)

Dataset	Video	# stimuli
LUNAM TM Image Quality Dataset [Krasula et al., '17]	✘	180
Linköping TM HDR Video Dataset [Eilertsen et al., '16]	✔	35
LIVE TM HDR Database [Venkataramanan & Bovik, '24]	✔	1,600
"What is HDR?" [Chen et al., '25]	✔	612
TMQ-ME [Ours]	✘	420



Results