End-to-end CNN with Selective Kernel Based Fusion and Inverse Tone-mapping Based Up-sampling for High-resolution HDR Imaging of Dynamic Scenes

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Background

Ghost problem of HDR reconstruction

Dynamic LDR Images　Result with ghost

Problem

① Information Loss and extra time cost by pre-alignment

② Information utilization unbalance in motion areas

③ Ghost-like artifacts in the guide image generation

Solution

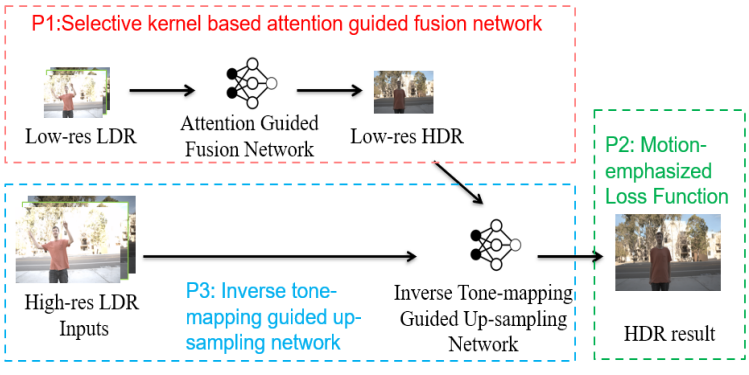
Proposal 1: Selective kernel based attention guided fusion network

Proposal 2: Motion-emphasized loss function

Proposal 3: Inverse tone-mapping guided up-sampling network

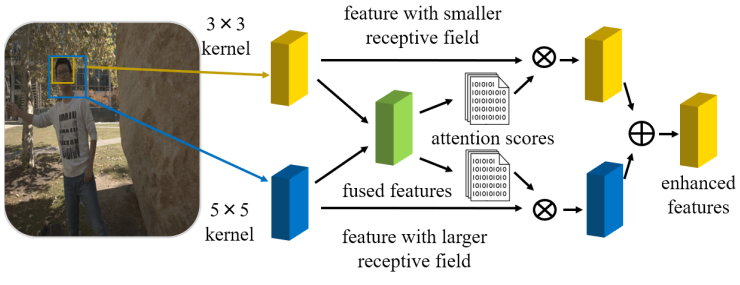
Proposals

Basic framework:



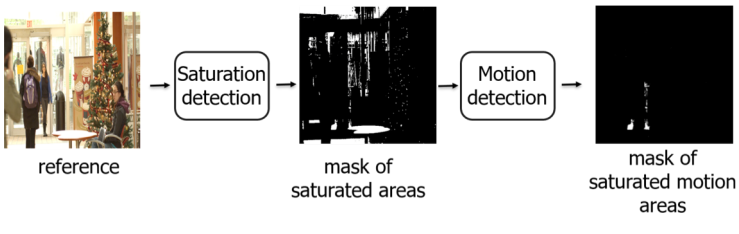
1.1 Selective Kernel Based Channel Attention Module

➢ Robustness with selective kernel channel attention module



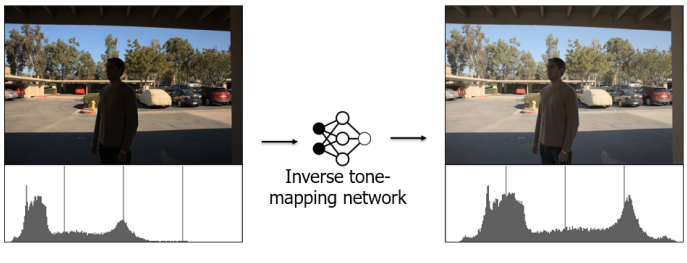
2. Motion-emphasized Loss Function

➢Saturated motion mask with larger weights



3. Inverse Tone-mapping Based Up-sampling

➢ Enhancement of LDR's dynamic range



Details in dark areas are lost.

Details in dark and bright areas are preserved well.

Experiment result

	Sen12	Kalantari17	Wu18	Yan19	Ours
PSNR(T)	40.9545	42.7423	41.7403	42.9167	43.1733
PSNR(L)	38.3156	41.2158	40.8739	40.1648	40.8990
HDR-VDP-2	56.8968	60.5088	60.5006	60.8320	61.0222

Conclusion

The proposed method scores 43.17 with PSNR metric and 61.02 with HDR-VDP-2 metric on test which outperforms all conventional works.

And with an up-sampling module, the proposed network produces HDR at an 80% time off with quality degradation from 43.17 to 38.16 in PSNR.

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