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

**Background**

Ghost problem of HDR reconstruction

![Dynamic LDR Images](image1.png) ![Result with ghost](image2.png)

**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. Selective kernel based attention guided fusion network
2. Motion-emphasized Loss Function
3. Inverse tone-mapping guided up-sampling network

**Experiment result**

<table>
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<tr>
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<th>Sen12</th>
<th>Kalantari17</th>
<th>Wu18</th>
<th>Yan19</th>
<th>Ours</th>
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<tbody>
<tr>
<td>PSNR(T)</td>
<td>40.9545</td>
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<td>PSNR(L)</td>
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<td>HDR-VDP-2</td>
<td>56.8968</td>
<td>60.5088</td>
<td>60.5006</td>
<td>60.8320</td>
<td>61.0222</td>
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**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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