Event-based Blurry Frame Interpolation under Blind Exposure
Supplementary Material

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1. Video Demonstration

We provide a supplement video at https://drive.google.com/file/d/1-R8DrGMx1HUWGSrdr3ToUWMygSCN_cY/view?usp=sharing. We strongly recommend referring to it for the qualitative comparison.

2. Details of the Self-collected Dataset

In order to evaluate our method on the real-world system, we make a real-world dataset called RealBlur-DAVIS, which contains real blurry frames and spatially aligned real events. We use a DAVIS346 color event cameras to capture this dataset, as shown in Fig. 1(a). The self-collected RealBlur-DAVIS contains diverse light conditions and motion speeds. For the different exposure assumptions, we set the exposure time as {30, 60, 90, 120, 150, 180} ms, with a shutter period of 200 ms to generate low frame-rate blurry videos. Each sequence has a period of about 20 seconds. Our dataset contains indoor and outdoor scenes. For the indoor capturing, we also make a black box as shown in Fig. 1(b) to manually control the illumination intensity. This dataset will be available at https://github.com/WarranWeng/EBFI-BE.

3. Additional Experimental Results

Quantitative Results. We provide additional quantitative results with train-test inconsistency on GoPro [5] in Tab. 1. As can be observed, when evaluated on the dataset whose exposure assumption is inconsistent with that of training dataset, we can achieve the best results compared with other competitors, validating the adaptation ability of our method.

Qualitative Results. We show additional qualitative results on RealSharp-DAVIS [8] in Fig. 2 and Fig. 3, and on the self-collected RealBlur-DAVIS in Fig. 4, Fig. 5, Fig. 6 and Fig. 7. It can be clearly observed that we can achieve satisfactory results with fine details and sharp edges in comparison to other competitors, demonstrating the strong ability of generalization and robustness of our method.

4. Extreme Interpolation Results

As mentioned in the main paper, the proposed temporal-exposure control component is able to take arbitrary timestamp as input. In other words, it is possible to perform extreme interpolation if the step of timestamp is small enough. We show the results in Fig. 8 and the supplement video. As can be clearly observed, our method is capable of generating the high frame-rate sharp video even up to 640 FPS from the 5 FPS low frame-rate blurry video.

<table>
<thead>
<tr>
<th>Methods</th>
<th>Inputs</th>
<th>7-5 PSNR</th>
<th>9-3 PSNR</th>
<th>11-1 PSNR</th>
<th>7-5 SSIM</th>
<th>9-3 SSIM</th>
<th>11-1 SSIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDVR [10]+SloMo [1]</td>
<td>RGB</td>
<td>20.809</td>
<td>0.726</td>
<td>21.155</td>
<td>0.739</td>
<td>21.476</td>
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<td>UPNet [3]+TLens [9]</td>
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<td>23.625</td>
<td>0.836</td>
<td>23.609</td>
<td>0.836</td>
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<td>UEVD [3]+TLens [9]</td>
<td>RGB+Events</td>
<td>23.577</td>
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<td>23.600</td>
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<td>23.607</td>
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<td>TNTT [3]</td>
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<td>0.717</td>
<td>21.605</td>
<td>0.735</td>
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<td>BIN [7]</td>
<td>RGB</td>
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<td>17.745</td>
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<td>UTI [13]</td>
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<td>20.203</td>
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<td>24.819</td>
<td>0.841</td>
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<td>EVDI [12]</td>
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<td>26.131</td>
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<td>Ours</td>
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<td>0.928</td>
<td>29.167</td>
<td>0.930</td>
<td>29.066</td>
<td>0.928</td>
</tr>
</tbody>
</table>

*Corresponding author.
Figure 2. Additional qualitative results on RealSharp-DAVIS [8].
Figure 3. Additional qualitative results on RealSharp-DAVIS [8].
Figure 4. Additional qualitative results on the self-collected real-world blurry video dataset RealBlur-DAVIS.
Figure 5. Additional qualitative results on the self-collected real-world blurry video dataset RealBlur-DAVIS.
Figure 6. Additional qualitative results on the self-collected real-world blurry video dataset RealBlur-DAVIS.
Figure 7. Additional qualitative results on the self-collected real-world blurry video dataset RealBlur-DAVIS.
Figure 8. Extreme interpolation results on the self-collected real blurry video dataset RealBlur-DAVIS. Given a 5 FPS blurry video, we can generate the sharp video even up to 640 FPS (i.e., the interpolation number is 128). Please refer to the supplement video for a better visual experience.
References


