Supplementary Material: DeLiEve-Net: Deblurring Low-light Images with Light Streaks and Local Events

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6. Examples of our training dataset.

In this section, we provide some examples of our training dataset for both two stages (blur kernel estimator F and nonblind image deconvolver G), as shown in Figure 9, corresponding to "Training dataset generation" in Section 3.4 of the paper.



Figure 9. Examples of our training dataset. (a) Blurry image **B** (256×256 pixels). (b) Sharp image **S** (256×256 pixels). (c) Blur kernel **K** (48×48 pixels). (d) Light streak patch **B**_p (48×48 pixels). (e) Local events **e**_p (48×48 pixels). Note that **K**, **B**_p and **e**_p are for the blur kernel estimator *F*, and **B**, **S** and **K** are for the non-blind image deconvolver *G*. We use color pair (red, blue) to represent the event polarity (1, -1) throughout the supplementary material. Note that all these images are resized to the same scale for visualization.

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7. More synthetic results

In this section, we provide more qualitative comparisons on synthetic data among DeLiEve-Net, two state-of-the-art learning-based blind deblurring methods (Zhang *et al.* [5] and Ren *et al.* [4]), two state-of-the-art event-based methods (Pan *et al.* [3] and Lin *et al.* [2]), and a low-light image deblurring method which also specially utilizes light streaks (Hu *et al.* [1]), as shown in Figure 10, Figure 11, Figure 12, and Figure 13, corresponding to Section 4.1 of the paper.



Figure 10. Qualitative comparisons on synthetic data (part 1). (a) Blurry image. (b) Ground truth sharp image. (c) \sim (h) Deblurring results of Zhang *et al.* [5], Ren *et al.* [4], Pan *et al.* [3], Lin *et al.* [2], Hu *et al.* [1], and ours.



Figure 11. Qualitative comparisons on synthetic data (part 2). (a) Blurry image. (b) Ground truth sharp image. (c) \sim (h) Deblurring results of Zhang *et al.* [5], Ren *et al.* [4], Pan *et al.* [3], Lin *et al.* [2], Hu *et al.* [1], and ours.



Figure 12. Qualitative comparisons on synthetic data (part 3). (a) Blurry image. (b) Ground truth sharp image. (c) \sim (h) Deblurring results of Zhang *et al.* [5], Ren *et al.* [4], Pan *et al.* [3], Lin *et al.* [2], Hu *et al.* [1], and ours.



Figure 13. Qualitative comparisons on synthetic data (part 4). (a) Blurry image. (b) Ground truth sharp image. (c) \sim (h) Deblurring results of Zhang *et al.* [5], Ren *et al.* [4], Pan *et al.* [3], Lin *et al.* [2], Hu *et al.* [1], and ours.

8. More real results

In this section, we provide more qualitative comparisons on real data (captured by a DAVIS346 event camera) among DeLiEve-Net, two state-of-the-art learning-based blind deblurring methods (Zhang *et al.* [5] and Ren *et al.* [4]), two state-of-the-art event-based methods (Pan *et al.* [3] and Lin *et al.* [2]), and a low-light image deblurring method which also specially utilizes light streaks (Hu *et al.* [1]), as shown in Figure 14, corresponding to Section 4.2 of the paper.



Figure 14. Qualitative comparisons on real data captured by a DAVIS346 event camera. (a) Events. (b) Blurry image. (c)~(h) Deblurring results of Zhang *et al.* [5], Ren *et al.* [4], Pan *et al.* [3], Lin *et al.* [2], Hu *et al.* [1], and ours.

9. More results using different event-image resolutions

In this section, we provide more qualitative comparisons on results using different event-image resolutions (captured by our RGB-DAVIS hybrid camera system), as shown in Figure 15, corresponding to Section 4.3 of the paper. Note that we do not compare with event-based methods [3, 2] because they require guidance from global events with the same resolution as the blurry image, which is not available.



Figure 15. Qualitative comparisons on high-resolution real RGB data captured by our RGB-DAVIS hybrid camera system. (a) Blurry image. (b)~(e) Deblurring results of Zhang *et al.* [5], Ren *et al.* [4], Hu *et al.* [1], and ours.

References

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