Appendix SepLUT: Separable Image-adaptive Lookup Tables for Real-time Image Enhancement

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A Additional Visual Analysis

As shown in Figure 1, the predicted 1D LUT in the proposed method is mainly responsible for adjusting the brightness and contrast of the input image in an image-adaptive manner, making its histogram more similar to that of the groundtruth. To verify this, we compare the histogram *chi-square distance* [1] between the input image and the groundtruth with the distance between the image transformed by the 1D LUT and the groundtruth. The chi-square distance is a typical measure of dissimilarity between two histograms, formulated as

$$\chi^2_{A,B} = \sum_{i=1}^{N} \frac{(x_i - y_i)^2}{x_i + y_i}, \ A = \{x_i\}_{i=1}^{N}, \ B = \{y_i\}_{i=1}^{N}.$$
 (1)

The statistics show that the predicted 1D LUT decreases the average histogram chi-square distance on the FiveK dataset from 1.6895 to 0.7520, with a 55.49% reduction. The result is in line with our expectations and is also consistent with the observation in our visual analysis.

B Additional Qualitative Results

In this section, we provide additional visual results in Figures 2 and 3.

References

Pele, O., Werman, M.: The quadratic-chi histogram distance family. In: European Conference on Computer Vision (ECCV). pp. 749–762 (2010) 1

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Fig. 1. Illustration of the transform procedure and the predicted LUTs. Images are selected from the PPR10K dataset (360P). Best viewed on screen.



Fig. 2. Qualitative comparisons with corresponding error maps on the FiveK dataset (4K) for the **photo retouching** task. Best viewed on screen.



Fig. 3. Qualitative comparisons with corresponding error maps on the **PPR10K** dataset (360P) for the **photo retouching** task. Best viewed on screen.