

Supplementary Materials: SIRLUT: Simulated Infrared Fusion Guided Image-adaptive 3D Lookup Tables for Lightweight Image Enhancement

1 Appendices

1.1 Simulated infrared images

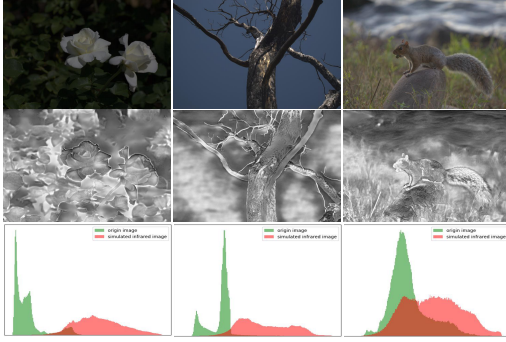


Figure 1: The distribution of pixel values for images in the MIT-Adobe FiveK dataset and their corresponding simulated infrared images are presented in this study.



Figure 2: The distribution of pixel values for images in the PPR10K dataset and their corresponding simulated infrared images are presented in this study.

In this study, we extend the MIT-Adobe FiveK dataset and PPR10K dataset by generating simulated infrared images with richer texture details than the original images, as shown in Figures 1 and 2. The MIT-Adobe FiveK dataset contains numerous scene images with pixel values that are concentrated due to environmental factors and camera parameters. The distribution of simulated infrared pixel values can equalize this concentration. The PPR10K dataset is a portrait dataset that includes various effects such as perspective distortion, background blurring, backlit shooting, and close-ups. Although the pixel distribution is improved, there are still issues with the structure and pixel distribution that need to be adjusted, requiring post-image processing techniques. The distribution of



Figure 3: Qualitative comparison of tone mapping and error maps conducted on MIT-Adobe FiveK dataset. It can be found that the proposed method achieves better performance than other methods. Best viewed on the screen.

pixel values in simulated infrared images can directly supplement the pixel values in original camera shots, providing richer modal information for image enhancement.

1.2 Tone mapping task

We qualitatively compare our method with two state-of-the-art (SOTA) methods, Sep LUT and AdaInt, for tone mapping of human subjects on the MIT-Adobe FiveK dataset. This task primarily evaluates the color mapping performance of networks. Simulated infrared images compensate for non-uniform pixel distribution and provide contextual guidance in structure and texture, as shown in Figure 3. Our method achieves the best enhancement results in handling light transitions, local photo blurring, detail textures, and distant images.