Supplementary Material: Photorealistic Style Transfer with Screened Poisson Equation

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Supplementary Material

1. Complete qualitative evaluation This supplementary provides comprehensive qualitative evaluation over the entire dataset via the following link to results.

For each content-style pair we produce four style transfer results using: NeuralStyle (NS) [2], NS with segmentation (NS+segment) [4], StyleSwap [1] and CNNMRF [3]. We then compare our post-processing based on Screened Poisson Equation (SPE) output with the post-processing of Matting Laplacian (MT) [4], on all four style transfer methods. Note that NS+Segment+ML is actually the Deep Photo Style Transfer (DPST) of Luan et al. [4].

2. Zoom-in Examples Several advantages of our method over DPST are highlighted in Figure 1 which presents zoomed-in examples:

- Fine details are better preserved. Our output images do not have smoothing-like artifacts.

- Our method is better at preserving image boundaries.

- The identity of the content image is nicely preserved.

3. Applicability to video An example video `NYC.mp4` file is attached in the supplementary folder. The color consistency between frames can be observed. The style transfer used in this video is StyleSwap [1]. The style image used to produce this video is shown in Figure 2.

4. End-to-end results: We provide example results of our RealismNet, easy to browse through the following link to results.
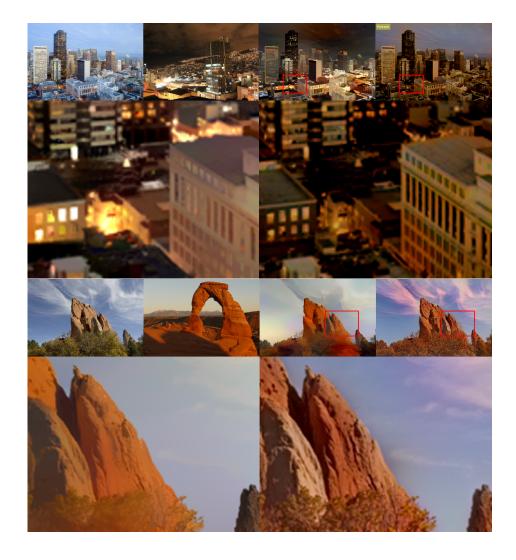
Figure 1: **Comparison with DPST [4].** Two examples where the top row shows (from left to right): the content image, reference style image, DPST result and our SPE result. The bottom row zooms on the red bounding boxes marked on the top row. Our SPE is better at preserving high frequencies and fine textures that lead to a more photorealistic appearance.

Figure 2: The style reference image used in the example video `NYC.mp4`.

References

[1] Tian Qi Chen and Mark Schmidt. Fast patch-based style transfer of arbitrary style. *arXiv preprint arXiv:1612.04337*, 2016.

[2] Leon A. Gatys, Alexander S. Ecker, and Matthias Bethge. Image style transfer using convolutional neural networks. In *IEEE CVPR*, June 2016.

[3] Chuan Li and Michael Wand. Combining Markov random fields and convolutional neural networks for image synthesis. In *IEEE CVPR*, 2016.

[4] Fujun Luan, Sylvain Paris, Eli Shechtman, and Kavita Bala. Deep photo style transfer. *arXiv preprint arXiv:1703.07511*, 2017.