

Neuromorphic Camera Guided High Dynamic Range Imaging

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Supplementary Material

More Synthetic Results ----- pages 3-7

High Resolution Results ----- pages 8-16

To complement Fig. 6 in the paper with more examples, we show a set of additional synthetic reconstruction results using the proposed method and other comparing methods including DrTMO¹, ExpandNet², HDRCNN³, and traditional method⁴ merging an over- and an under-exposed images with the exposure ratio of 50 : 1.

¹Y. Endo, Y. Kanamori, and J. Mitani. Deep reverse tone mapping. ACM Transactions on Graphics, 36(6):177:1-177:10, 2017.

²D. Marnerides, T. Bashford-Rogers, J. Hatchett, and K. Debattista. ExpandNet: A deep convolutional neural network for high dynamic range expansion from low dynamic range content. In Computer Graphics Forum, volume 37, 2018.

³G. Eilertsen, J. Kronander, G. Denes, R. K. Mantiuk, and J. Unger. HDR image reconstruction from a single exposure using deep CNNs. ACM Transactions on Graphics, 36(6):178:1-178:15, 2017.

⁴P. E. Debevec and J. Malik. Recovering high dynamic range radiance maps from photographs. In Proc. of SIGGRAPH, 2017.

More Synthetic Results

4



LDR

Ground truth

Ours

DrTMO

ExpandNet

HDRCNN

Merge 2 LDRs

More Synthetic Results

5



LDR

Ground truth

Ours

DrTMO

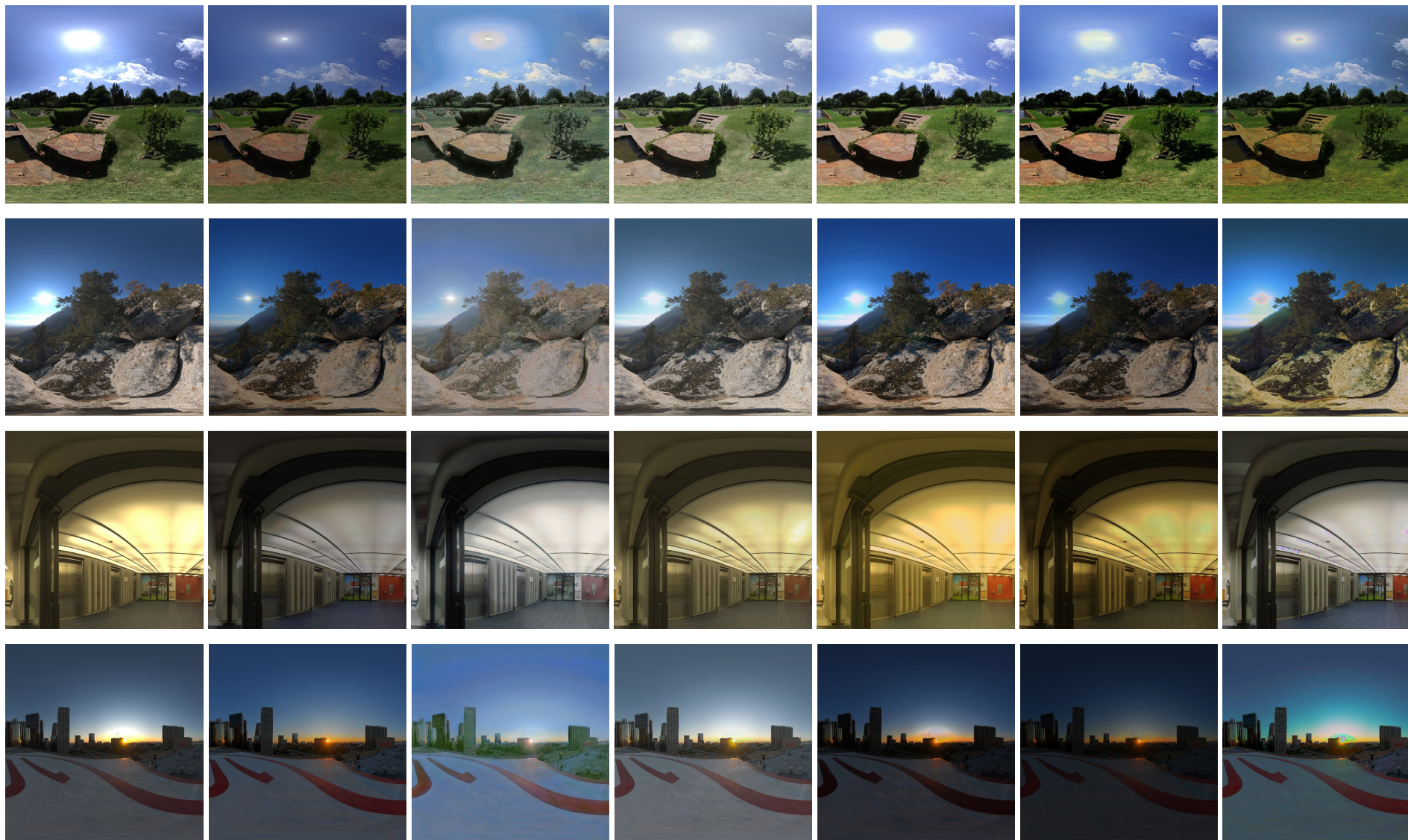
ExpandNet

HDRCNN

Merge 2 LDRs

More Synthetic Results

6



LDR

Ground truth

Ours

DrTMO

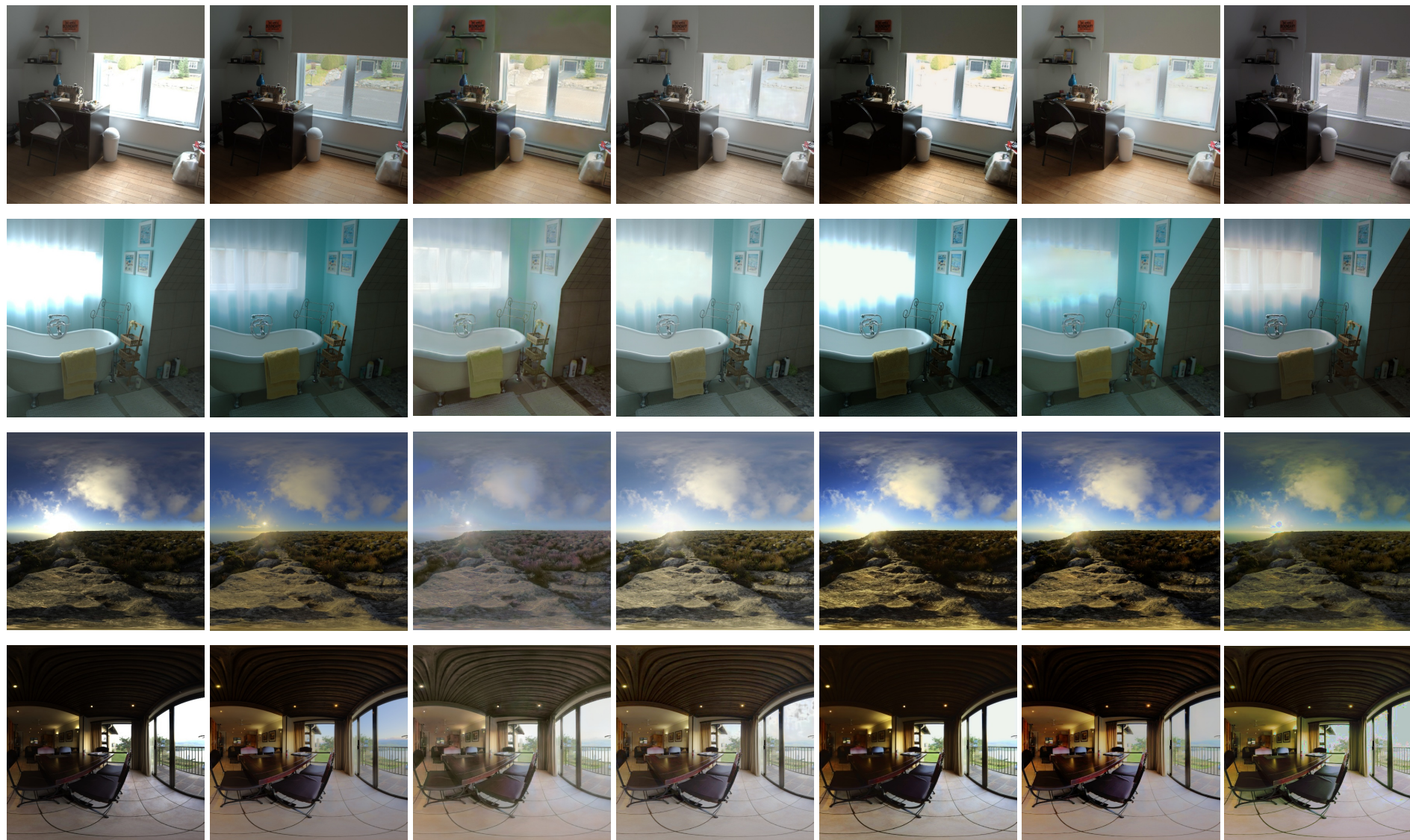
ExpandNet

HDRCNN

Merge 2 LDRs

More Synthetic Results

7



LDR

Ground truth

Ours

DrTMO

ExpandNet

HDRCNN

Merge 2 LDRs

To achieve higher resolution reconstruction results, we upsample the intensity maps using bicubic interpolation to the corresponding scale level with LDR images, *e.g.*, a 1024×1024 LDR image with a 512×512 upsampled intensity map. We denote the results upsampled with this method as ① in the following slides.

Another option is using a pre-trained super-resolution network⁵ to increase the spatial resolution of the output HDR images. We denote the results upsampled with this method as ② in the following slides.

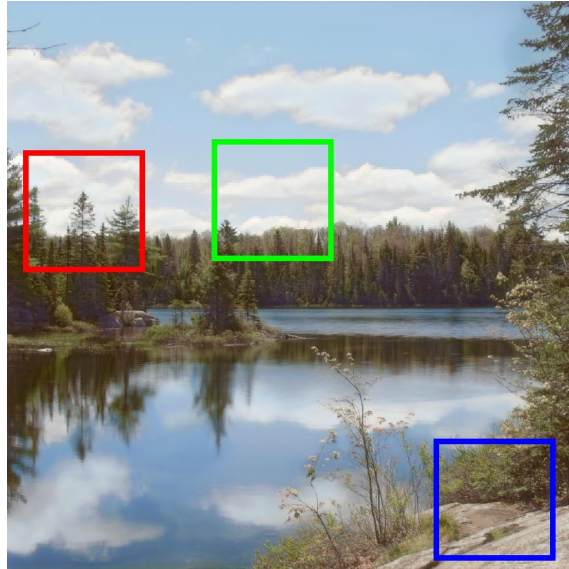
We conduct super-resolution experiments on both synthetic data (pages 9-13) and real-world data (pages 14-16).

⁵B. Lim, S. Son, H. Kim, S. Nah, and K. M. Lee. Enhanced Deep Residual Networks for Single Image Super-resolution. 2nd NTIRE: New Trends in Image Restoration and Enhancement workshop and challenge on image super-resolution in conjunction with CVPR 2017.

High Resolution Synthetic Data Results

9

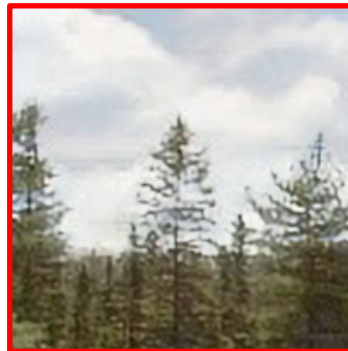
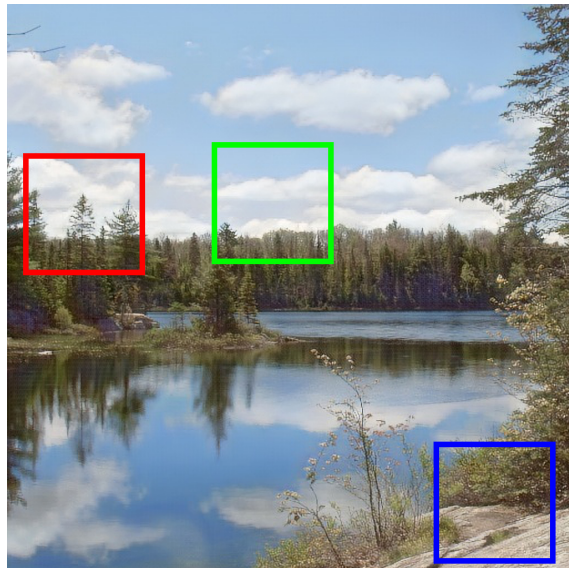
①



①

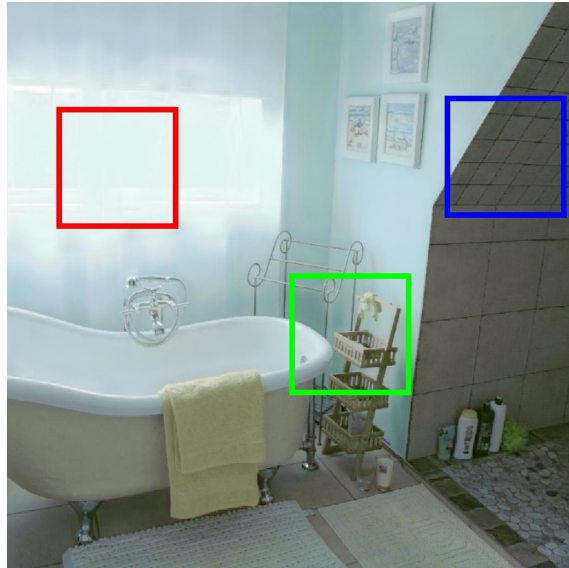
Low resolution
corresponding
parts

②



②

①



①

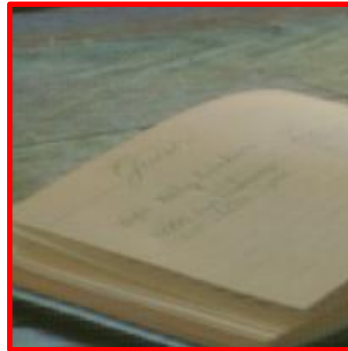
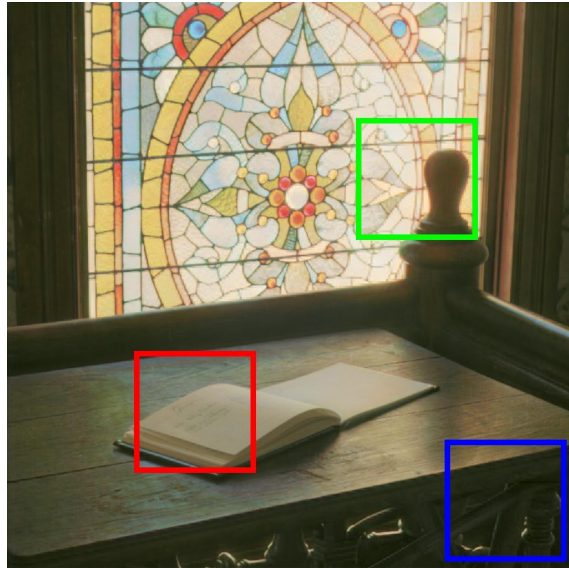
Low resolution
corresponding
parts

②



②

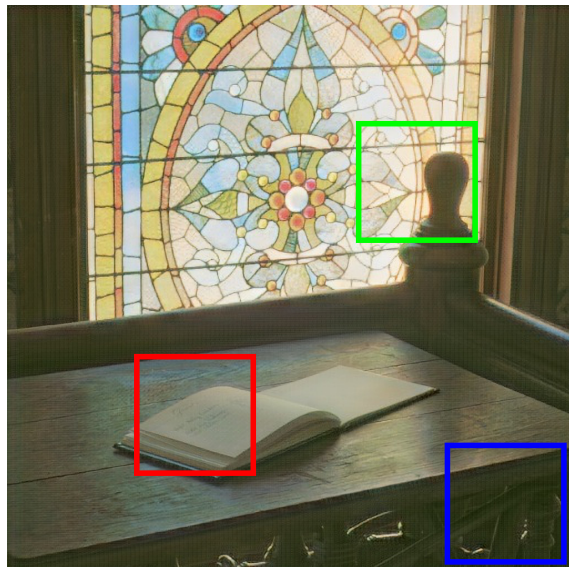
①



①

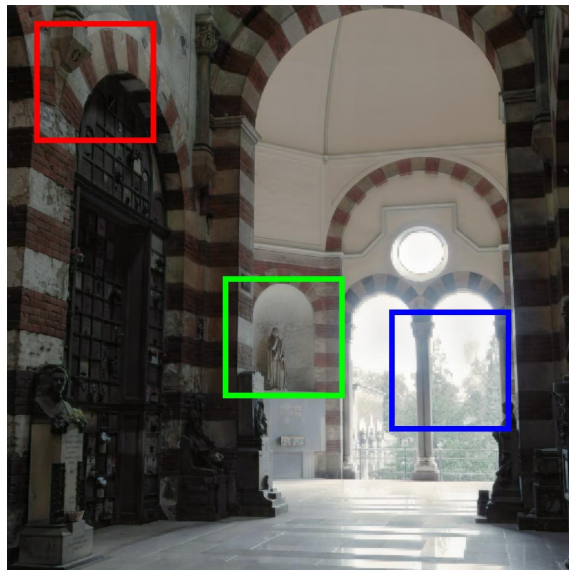
Low resolution
corresponding
parts

②



②

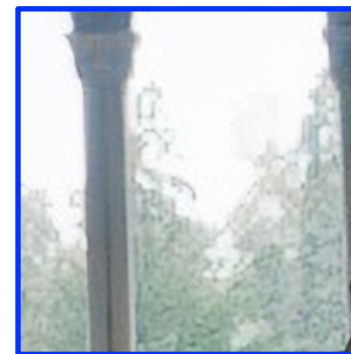
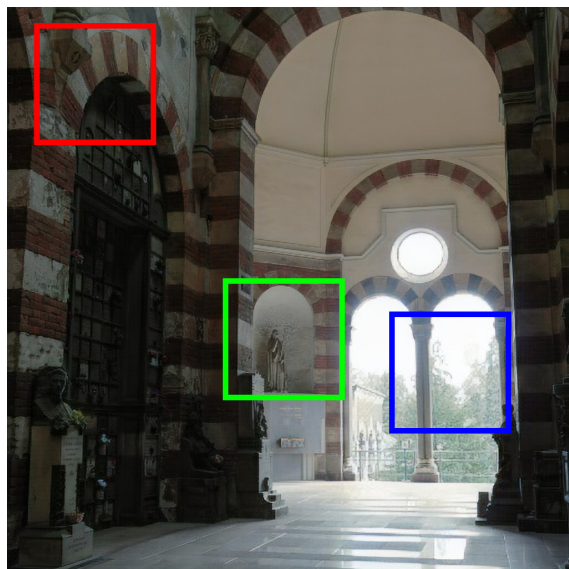
①



①

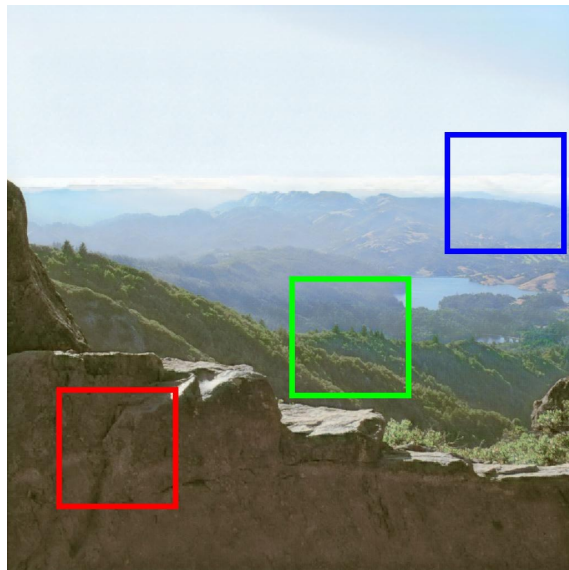
Low resolution
corresponding
parts

②



②

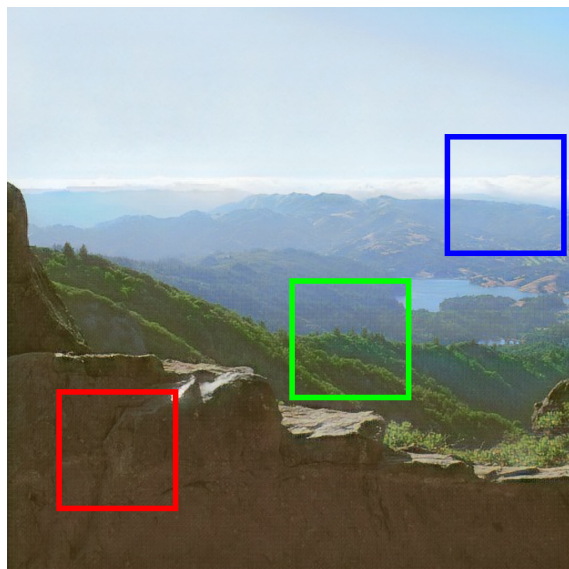
①



①

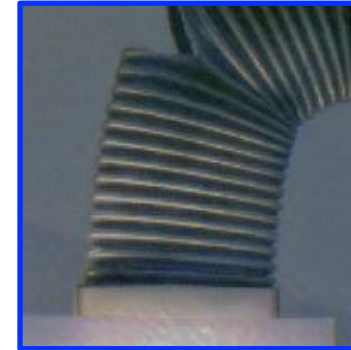
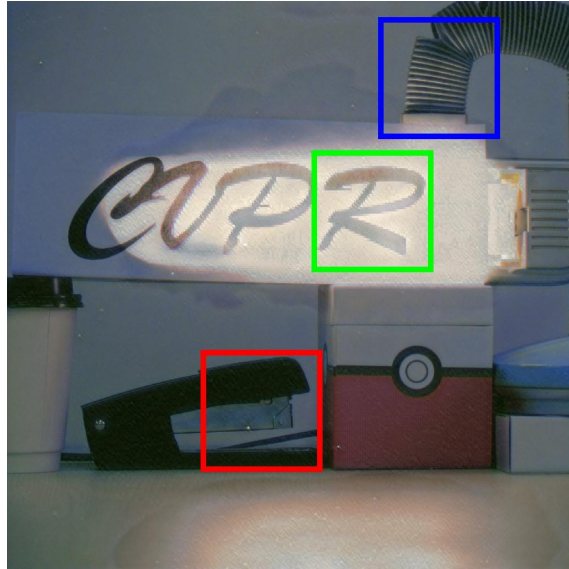
Low resolution
corresponding
parts

②



②

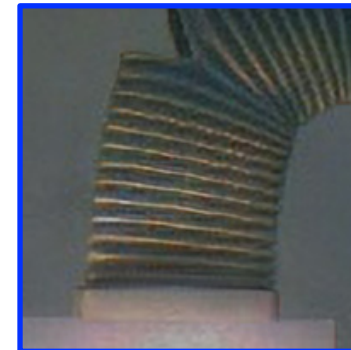
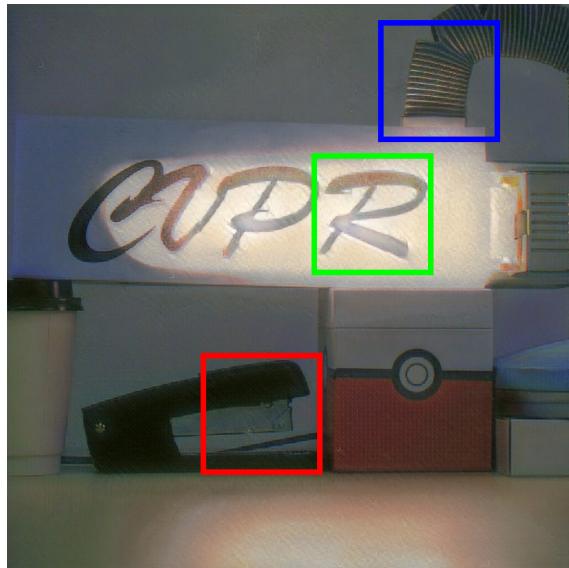
①



①

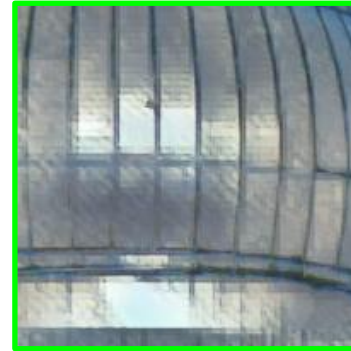
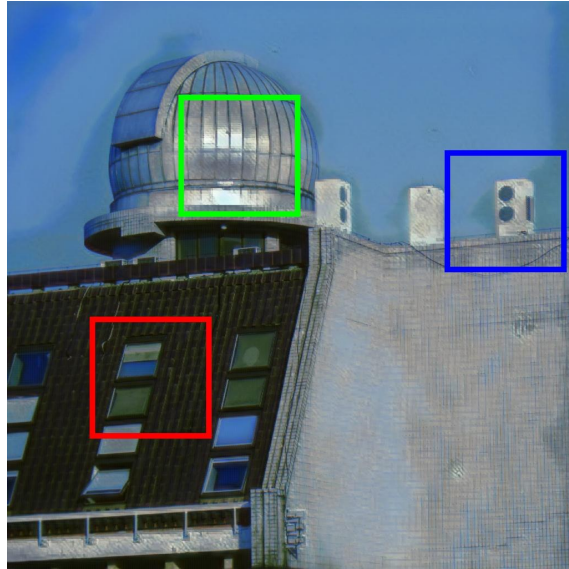
Low resolution
corresponding
parts

②



②

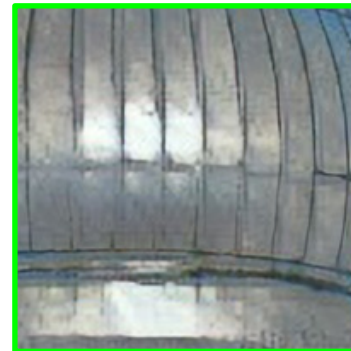
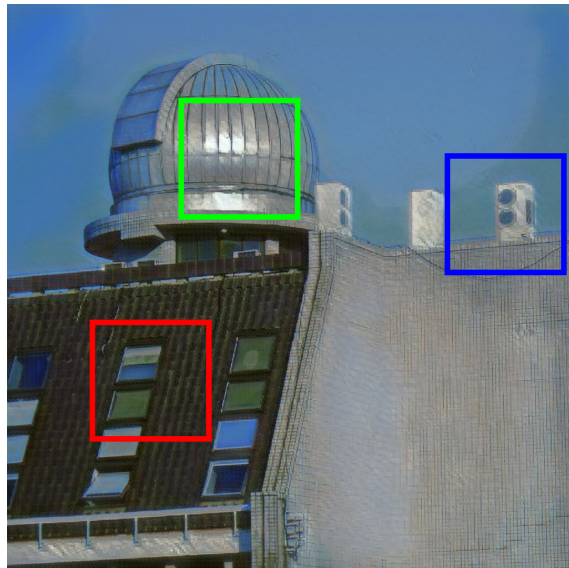
①



①

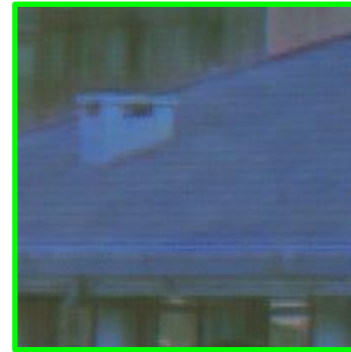
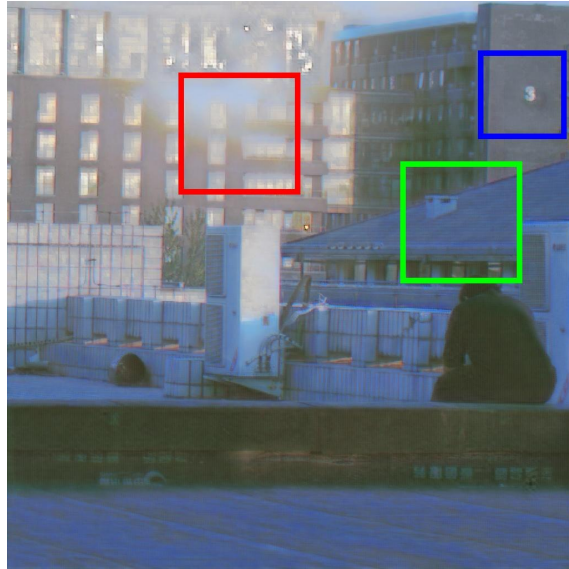
Low resolution
corresponding
parts

②



②

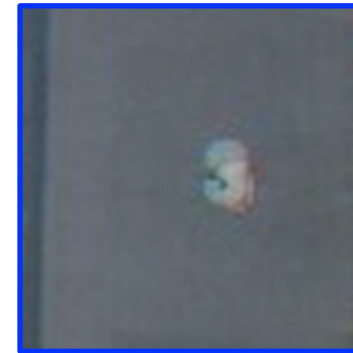
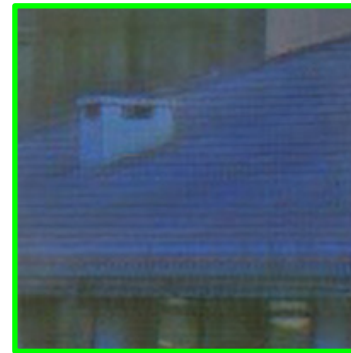
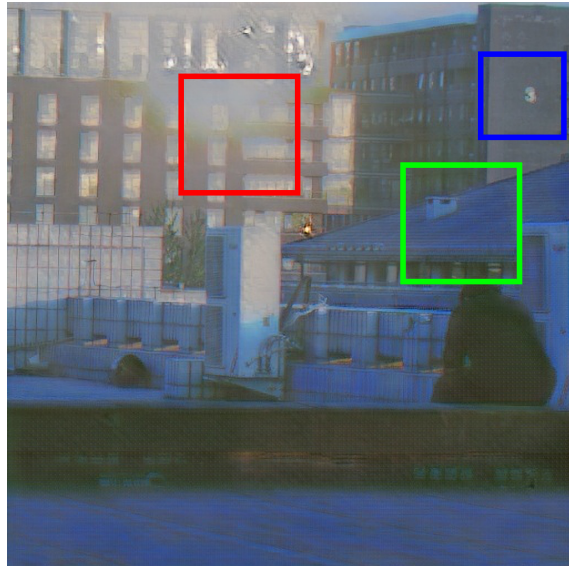
①



①

Low resolution
corresponding
parts

②



②