Residual Feature Aggregation Network for Image Super-Resolution (Supplementary Material)

A. Study of the strided convolution in ESA block

As shown in Table 1, the strided convolution has a higher PSNR than the palin convolution, which indicates that a large receptive field is essential for image SR.

	PSNR
strided conv	32.65
plain conv	32.61

Table 1. Investigation of the effect of strided convolution in the ESA block with scale factor of $\times 4$ on Set5.

B. Study of the window size for max-pooling in ESA block

As shown in Table 2, we can achieve a higher PSNR by using a pooling window size of 7×7, further proving the critical importance of a large receptive field for image SR.

	PSNR
7×7	32.65
3×3	32.59

Table 2. Investigation of the effects of different window sizes for max-pooling in the ESA block with scale factor of $\times 4$ on Set5.

C. Running time comparison

In Table 3, we compare average forward time of our proposed RFANet with RCAN [2] and SAN [1] on Urban100 with scale factor $\times 4$. The forward time of all the netowrks is evaluated on the same machine with 4.3GHz Intel i7 CPU (32G RAM) and an NVIDIA 1080Ti GPU using their official codes. Our RFANet runs the fastest while achieving the best PSNR which demonstrates the effectiveness of our method.

Model	Forward Time (s)	PSNR
RCAN [2]	0.3197	26.82
SAN [1]	2.5689	26.79
RFANet (Ours)	0.2109	26.92

Table 3. Average forward time comparison on Urban100 with scale factor 4 on an NVIDIA 1080Ti GPU

D. More Qualitative Results

In Fig. 1 and Fig. 2, we provide more visual results of BI and BD degradation models to prove the superiority of the proposed RFANet.

References

[1] Tao Dai, Jianrui Cai, Yongbing Zhang, Shu-Tao Xia, and Lei Zhang. Second-order attention network for single image super-resolution. In *CVPR*, pages 11065–11074. Computer Vision Foundation / IEEE, 2019.

[2] Yulun Zhang, Kunpeng Li, Kai Li, Lichen Wang, Bineng Zhong, and Yun Fu. Image super-resolution using very deep residual channel attention networks. In *ECCV (7)*, volume 11211 of *Lecture Notes in Computer Science*, pages 294–310. Springer, 2018.

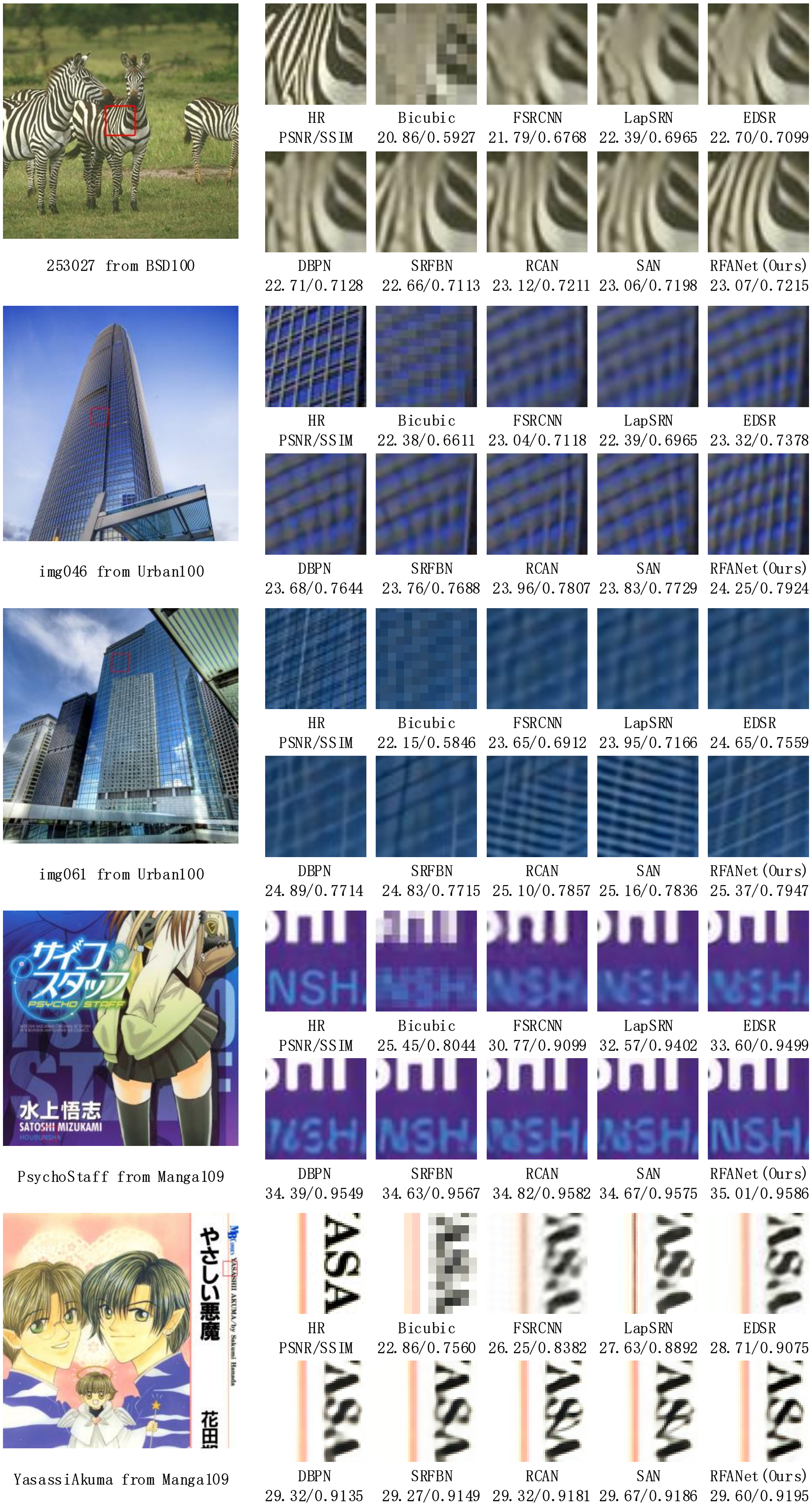

Figure 1. Visual comparisons for $\times 4$ SR with BI degradation model.

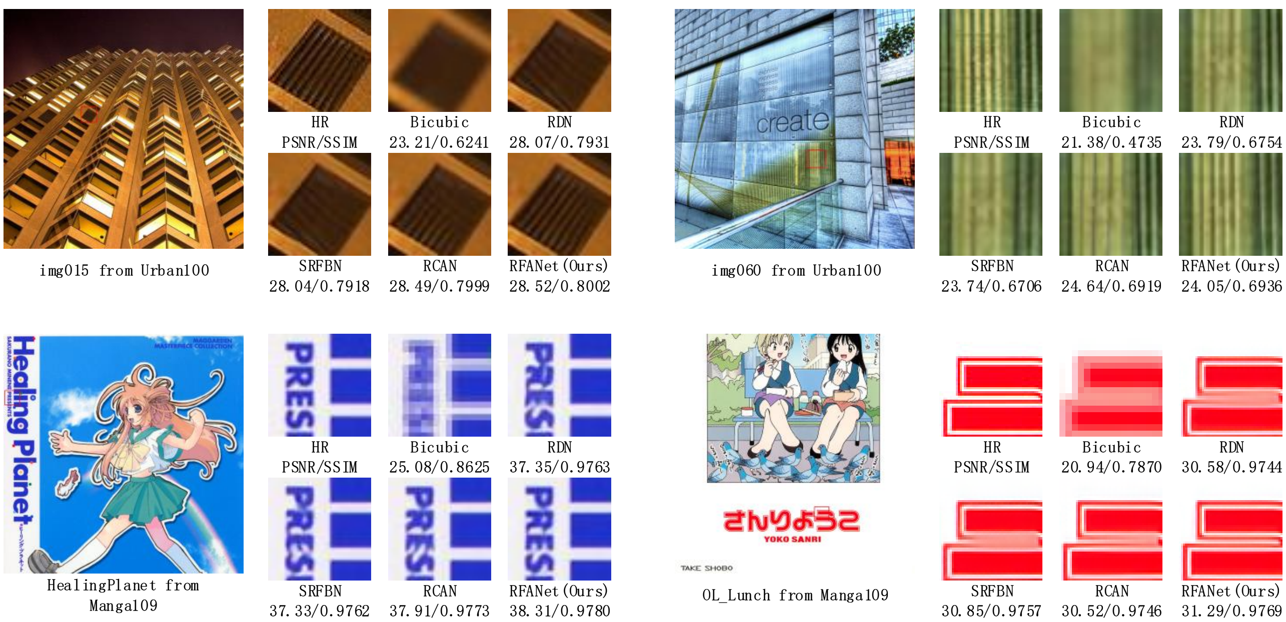

Figure 2. Visual comparisons for $\times 4$ SR with BD degradation model.