Structure-Preserving Super Resolution with Gradient Guidance
Supplementary Material

Figure 1. User study results of different GAN-based SR methods. Our SPSR method outperforms state-of-the-art SR methods in generating high-quality images.

1. User Study

We conduct a user study as a subjective assessment to evaluate the visual performance of different SR methods on benchmark datasets. HR images are displayed as references while SR results of our SPSR method, ESRGAN [5], NatSR [3] and SRGAN [1] are presented in a randomized sequence. Human raters are asked to rank the four SR versions according to the perceptual quality. Finally, we collect 1290 votes from 43 human raters. The summarized results are presented in Figure 1. As shown, our SPSR method gets much more votes of rank-1 than ESRGAN, NatSR and SRGAN. Meanwhile, most SR results of ESRGAN are voted the second best among the four methods since there are more structural distortions in the recovered images of ESRGAN than ours. NatSR and SRGAN fail to obtain satisfactory results. We think the reason is that they sometimes generate relatively blurry textures and undesirable artifacts. The comparison with the state-of-the-art GAN-based SR methods verifies the superiority of our proposed method in generating high-fidelity SR results.

2. More Qualitative Results

2.1. SR Comparison

We display more SR performance comparison with state-of-the-art SR methods including EnhanceNet [2], SFTGAN [4], SRGAN [1], ESRGAN [5] and NatSR [3], as shown in Figure 2, Figure 3, Figure 4, Figure 5 and Figure 6. The results show the proposed SPSR method performs better than other SR methods in recovering structural-pleasant and photo-realistic images.

2.2. Visualization of Gradient Maps

We visualize the outputs of the gradient branch, as shown in Figure 7. We can see the gradient branch succeeds in converting LR gradient maps to the HR ones.

References
Figure 2. Visual comparison of SR performance with state-of-the-art SR methods.
Figure 3. Visual comparison of SR performance with state-of-the-art SR methods.
Figure 4. Visual comparison of SR performance with state-of-the-art SR methods.
Figure 5. Visual comparison of SR performance with state-of-the-art SR methods.
Figure 6. Visual comparison of SR performance with state-of-the-art SR methods.
Figure 7. Visualization of gradient maps.