AI6126 Project 2: DIV2K Single Image Super-Resolution Challenge

BAI WEN
G1903363K
wbai001@e.ntu.edu.sg

November 2020

1 Introduction

The goal of this mini challenge is to increase the resolution of a single image (by four times). The data for this task comes from the DIV2K dataset [1]. This challenge has a mini-dataset, which consists of 500 training and 80 validation pairs of images, where the HR images have 2K resolution and the LR images are downsampled four times. For each LR image, algorithms will increase the resolution of the images. The quality of the output will be evaluated based on the PSNR between the output and HR images. The idea is to allow an algorithm to reveal more details imperceptible in the LR image.

2 Experiments

The base code takes reference from BasicSR[2]. In my experiment, I applied paired random crop, random horizontal flip and random rotation.

The model is trained on the Tesla P40. Other parameters are set as following: (1) Base model: SRResNet with 64 hidden feature and 20 blocks, 1,812,995 total parameters; (2) Total Epoch: 320, total iterations: 1000000, iterations per epoch: 3125; (3) Batch Size: 16; (4) Learning Rate: Initially 2e-4, using CosineAnnealing scheduler; (5) Optimizer: Adam with 0 weight decay; (6) Loss: L1.

3 Results

3.1 Metrics

The PSNR on the validation dataset is 28.9446.

3.2 Case Study

Here we take two example *0002.png* and *0030.png* from the private dataset, shown in Figure 1 and Figure 3 respectively. We can see from the Figure 2 and 4 that the intuitive effect of Super Resolution on Japanese manga is better than the photographic picture, as the details of manga is naturally less than the photographic picture thus human are more sensitive to the distortion of photographic picture. The figure produced by Super Resolution is apparently smearing.

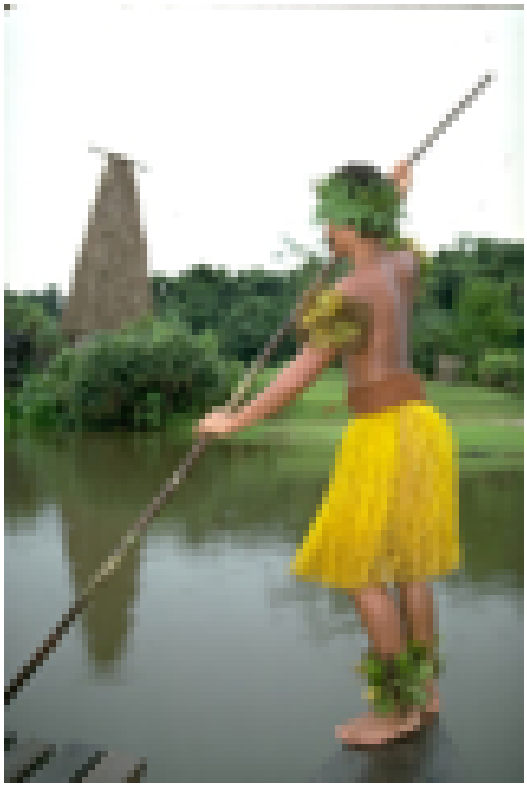

Figure 1: The Low Resolution figure of nature and people in Private Dataset

Figure 2: The figure of nature and people after Super Resolution

Figure 3: The Low Resolution figure of Japanese manga in Private Dataset

Figure 4: The figure of Japanese manga after Super Resolution

References

[1] Eirikur Agustsson and Radu Timofte. Ntire 2017 challenge on single image super-resolution: Dataset and study. In *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, July 2017.

[2] Xintao Wang, Ke Yu, Kelvin C.K. Chan andChao Dong, and Chen Change Loy. Basicsr. `https://github.com/xinntao/BasicSR`, 2020.