Appendix

6. Additional Ablation Study

Table 4. Different values of λ_{dcd} on horse2zebra.

λ_{dcd}	**FID(↓)**
0.1	58.76
10	59.94
100	74.90
1000	87.25
1 (Ours)	**48.24**

Trade-off Parameter of Discriminator-Cooperated Distillation. Table 4 shows the ablation experiments on horse2zebra using CycleGAN with the various trade-off value λ_{dcd}. In the table the FID increase is limited if the hyperparameter is large or small, whereas the best results can be obtained as λ_{dcd} is set to 1.

Table 5. Different values of λ_{stu} on horse2zebra.

λ_{stu}	**FID(↓)**
0.1	69.97
10	60.73
100	78.97
1000	94.17
1 (Ours)	**48.24**

Trade-off Parameter of Adversarial Training. Considering the teacher discriminator as an alternative model to the student discriminator, we adjust the weight λ_{stu} to see its impact. As seen in Table 5, the negative effect is brought about when the weight λ_{stu} is too large, *i.e.*, 1000, which drops to 94.17; while reducing the weight causes an even greater drop in performance, which drops the FID to 69.97. The optimal performance of 48.24 is obtained by setting the trade-off value λ_{stu} to 1.

7. Additional Visualization

In this section, we supplement the visual comparison images of edges2shoes and summer2winter.

Edges2shoes. The edges2shoes task refers to filling a shoe's outline sketch with a shoe that contains rich patterns and colors, which can be done using Pix2Pix. We compare the previous state-of-the-art method, namely OMGD, with the DCD used in this paper, demonstrating in various ways that our method can render more colorful and clear for the generation of detailed textures. As the images in the fifth and sixth rows of Fig. 5 show, DCD is more sensitive to colors, such as green and red, and tends to produce brighter and sharper textures in the generated results, which leads to more vibrant generation effects.

Summer2winter. The summer2winter task refers to adding snow, blue light and other winter-specific effects to input summer images, making the images rendered with a winter mood. In Fig. 6, the overall generation effects of DCD and OMGD on summer2winter are relatively close, yet DCD is more sensitive to vivid colors and can generate more vivid winter landscapes. The various generated results prove that DCD can more focus on blue tones so that the generated winter images have a more wintery feel.

Figure 5. Visualization comparison on edges2shoes with Pix2pix.

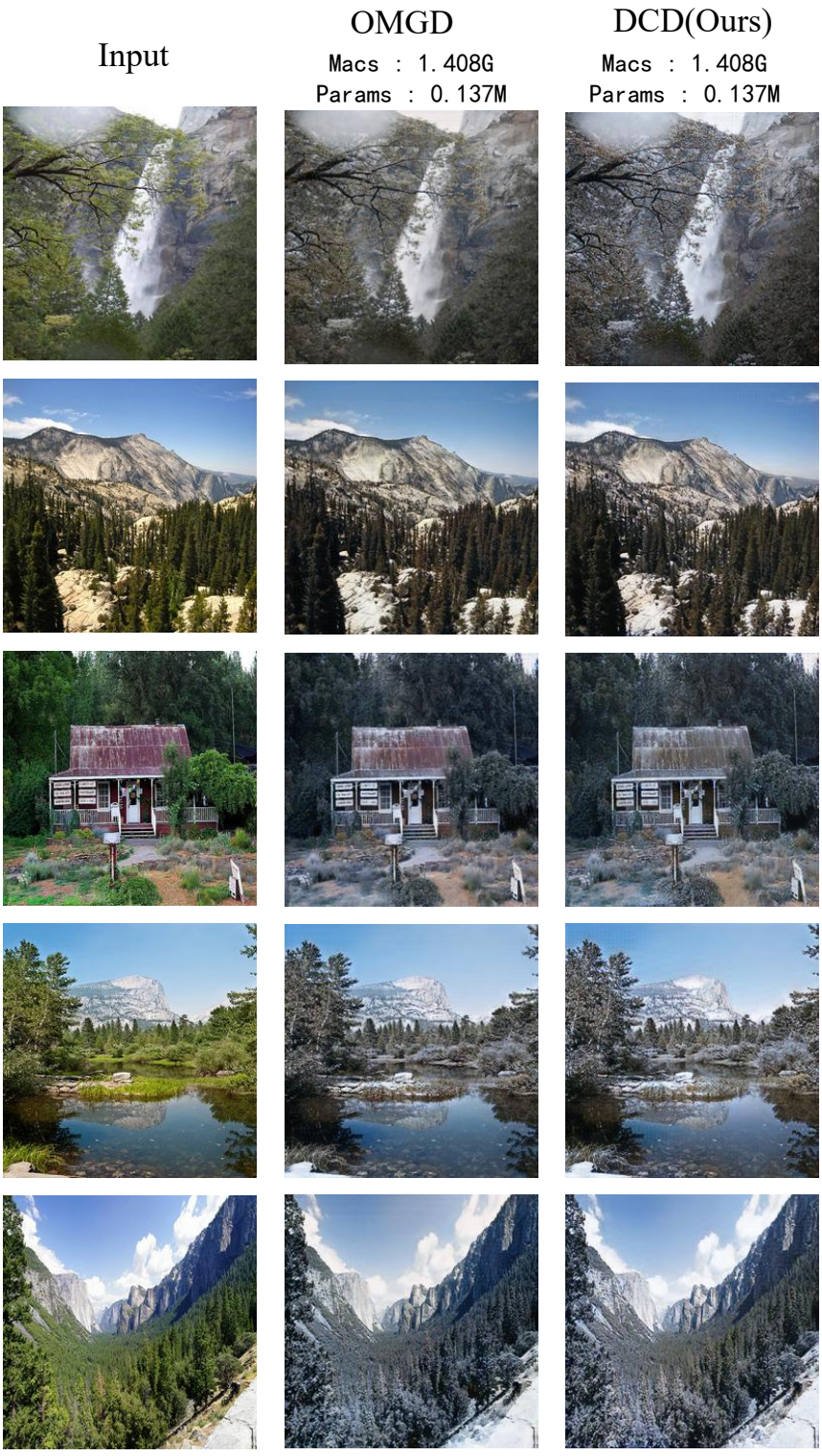

Figure 6. Visualization comparison on summer2winter with CycleGAN.