Cross-Domain Correlation Distillation for Unsupervised Domain Adaptation in Nighttime Semantic Segmentation

Huan Gao[1] Jichang Guo[1*] Guoli Wang[2] Qian Zhang[2]
[1]School of Electrical and Information Engineering, Tianjin University.
[2]Horizon Robotics.
{gh99, jcguo}@tju.edu.cn, {guoli.wang, qian01.zhang}@horizon.ai

Table 1. Additional ablation studies of our proposed method on Dark Zurich-test set.

Method	mIoU
RefineNet	28.5
w/o project head and L_{JS} in CDC	41.6
w/o illuminance and inherent correlation in CDC	43.8
Ours	47.5

1. Experiments

1.1. Additional qualitative results

In Fig. 1 and Fig. 2, we show additional qualitative comparison results on Dark Zurich-val [1] and ACDC-night-val [2], respectively.

1.2. Generalization test

In Section 4.4 of our main paper, we provide comparison of model performance (mIoU) on BDD100K-night [3]. Here, we provide a qualitative comparison on BDD100K-night in Fig. 3. As can be seen from the Fig. 3, the nighttime illumination style of BDD100K-night is quite different from Dark Zurich and ACDC. Even in this case, our model can still obtain relatively satisfactory predictions.

1.3. Additional ablation study

Two other ablation experiments are performed in this section to further illustrate the effectiveness of our proposed component. The project head and L_{JS} ensure that the content information contained in the feature is extracted, and the illuminantion and inherent correlation in L_{CDC} are designed for the process of transferring content knowledge and performing cross-domain content distillation. Table 1 reports the experimental results. The project head and L_{JS} are the guarantees for the effectiveness of CDC, so disabling them causes a 5.9% mIoU decrease. After getting the content embedding, the combined effect of illumination and inherent correlation can boost the performance of the model, increasing the mIoU by 3.7%.

References

[1] Christos Sakaridis, Dengxin Dai, and Luc Van Gool. Guided curriculum model adaptation and uncertainty-aware evaluation for semantic nighttime image segmentation. In *Proceedings of the IEEE/CVF International Conference on Computer Vision*, pages 7374–7383, 2019. 1

[2] Christos Sakaridis, Dengxin Dai, and Luc Van Gool. Acdc: The adverse conditions dataset with correspondences for semantic driving scene understanding. *arXiv preprint arXiv:2104.13395*, 2021. 1

[3] Fisher Yu, Wenqi Xian, Yingying Chen, Fangchen Liu, Mike Liao, Vashisht Madhavan, and Trevor Darrell. Bdd100k: A diverse driving video database with scalable annotation tooling. *arXiv preprint arXiv:1805.04687*, 2(5):6, 2018. 1

*Corresponding author

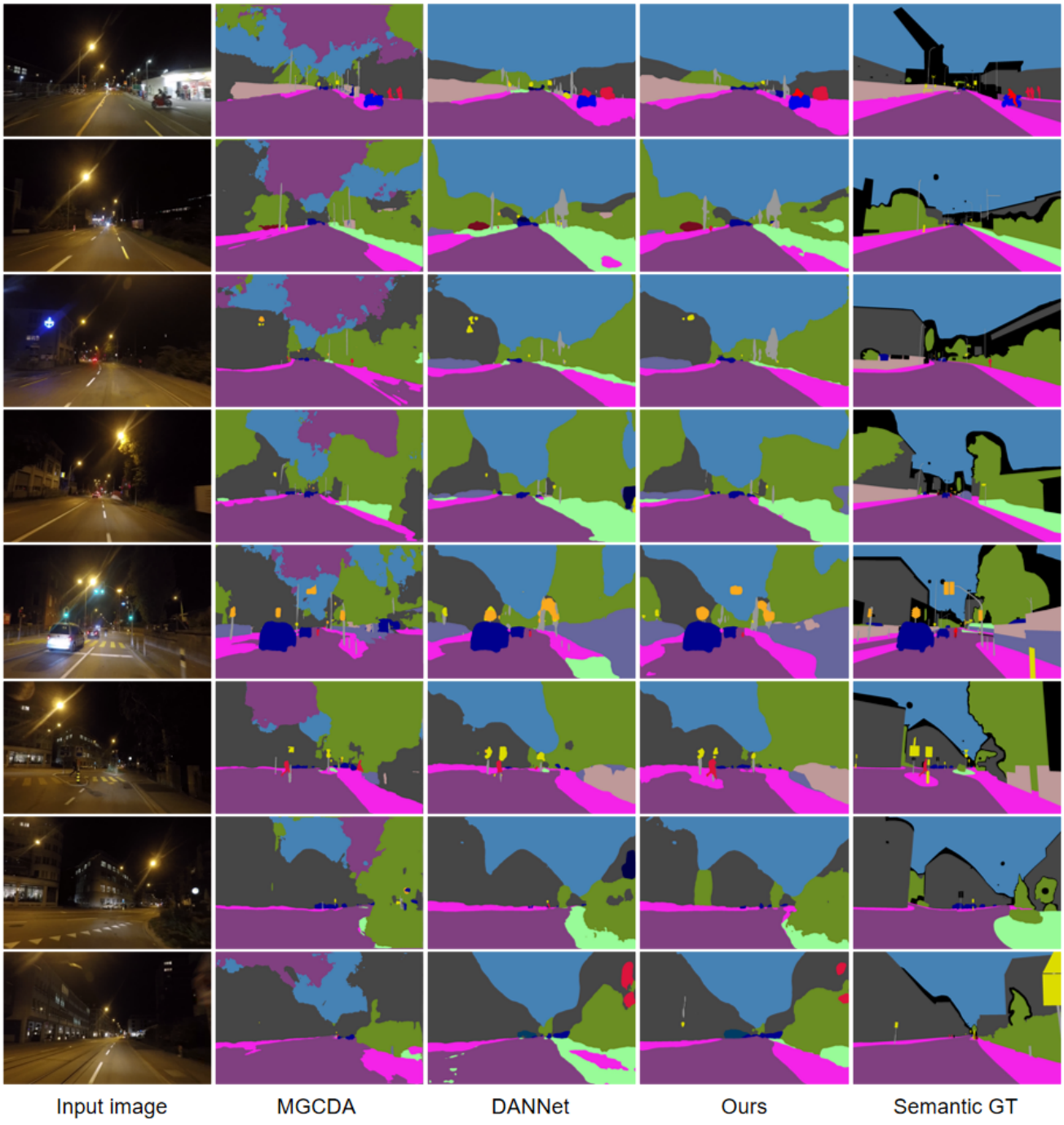

Figure 1. The qualitative comparison between our approach and some existing state-of-the-art methods on the Dark Zurich-val set.

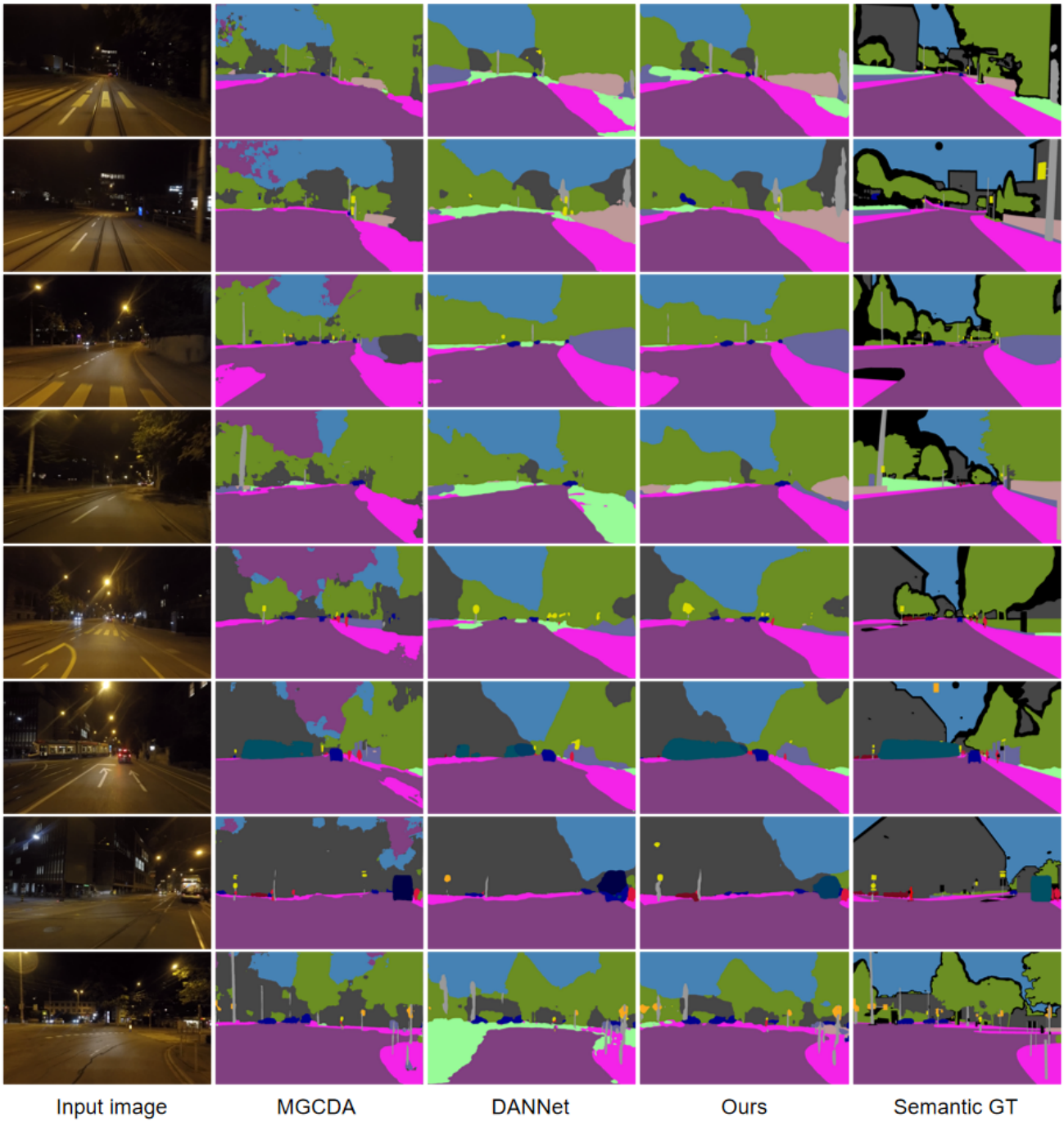

Figure 2. The qualitative comparison between our approach and some existing state-of-the-art methods on the ACDC-night-val set.

Figure 3. The qualitative comparison between our approach and some existing state-of-the-art methods on the BDD100K-night set.