Pair Shuffle Consistency for Semi-supervised Medical Image Segmentation (Supplementary Materials)

Jianjun He¹, Chenyu Cai¹, Qiong Li², and Andy J Ma^{1,3,4}(⊠)

¹ School of Computer Science and Engineering, Sun Yat-sen University, Guangzhou, China

{hejj56,caichy8}@mail2.sysu.edu.cn,

majh8@mail.sysu.edu.cn

 $^{2}\,$ Department of Radiology, Sun Yat-sen University Cancer Center, Guangzhou,

China

liqiong@sysucc.org.cn

³ Guangdong Province Key Laboratory of Information Security Technology, Guangzhou, China

⁴ Key Laboratory of Machine Intelligence and Advanced Computing, Ministry of Education, Guangzhou, China

1 Additional Visualization Results

In Fig. 1, we present a comprehensive visual comparison with recent approaches that are publicly available and reproducible, including DCNet [2], BCP [1], and MT [3]. The colorful curves represent the edge of ground truths. These methods have limitations in various segmentation tasks including prostate, cardiac and tumor segmentation tasks, as they may mistakenly identify non-target regions as objects or fail to fully segment objects of interest. In contrast, PSC achieves superior results, demonstrating the benefit of utilizing ground truth labels of labeled images to guide the training of unlabeled images. Additionally, pair shuffle operation effectively enhances the model's ability to harness local information for better segmentation performance.

References

- Bai, Y., Chen, D., Li, Q., Shen, W., Wang, Y.: Bidirectional copy-paste for semisupervised medical image segmentation. In: IEEE Conference on Computer Vision and Pattern Recognition. pp. 11514–11524 (2023)
- Chen, F., Fei, J., Chen, Y., Huang, C.: Decoupled consistency for semi-supervised medical image segmentation. In: International Conference on Medical Image Computing and Computer-Assisted Intervention. pp. 551–561 (2023)
- Tarvainen, A., Valpola, H.: Mean teachers are better role models: Weight-averaged consistency targets improve semi-supervised deep learning results. In: Advances in Neural Information Processing Systems. pp. 1195–1204 (2017)



Fig. 1: Qualitative results. From left to right: Input Image, Ground truth, PSC (Ours), DCNet, BCP, MT. From top to down: Promise12, ACDC and MLT.