BCI: Breast Cancer Immunohistochemical Image Generation through Pyramid Pix2pix Supplementary Material

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1. Overview

In this supplementary material, we first show more whole slice image (WSI) paires (Section 2). Then, we provide more HE-IHC pairs in our BCI dataset for preview, in order to better show the details of the dataset (Section 3). Finally, we show more visualization results of different image translation algorithmss on BCI dataset (Section 4).

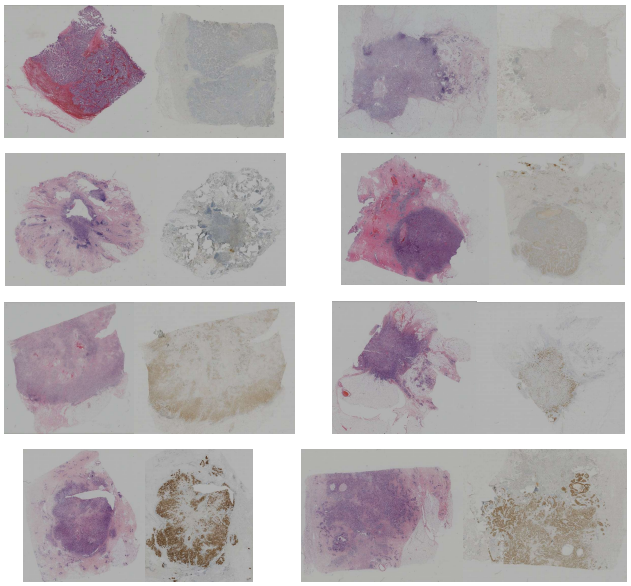

Figure 1. More visualizations of WSI. From these image pairs, we can see the diversity of morphological differences between the two domains, which brings great difficulty to the subsequent registration.

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2. Pathology Slices Visualization

In the main paper, we display a WSI pair. However, only a pair of WSI cannot show the full picture of our source data. Therefore, we use more examples to show the difference between the WSI of the two domains caused during the slice preparation process (Fig. 1).

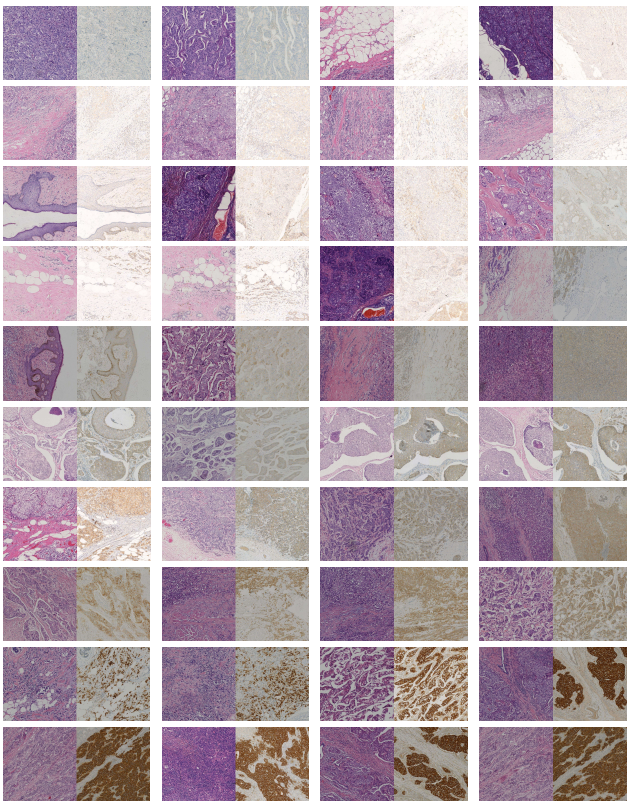
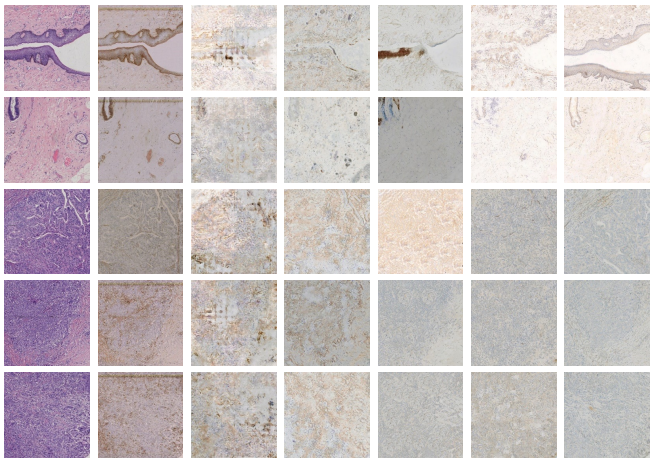


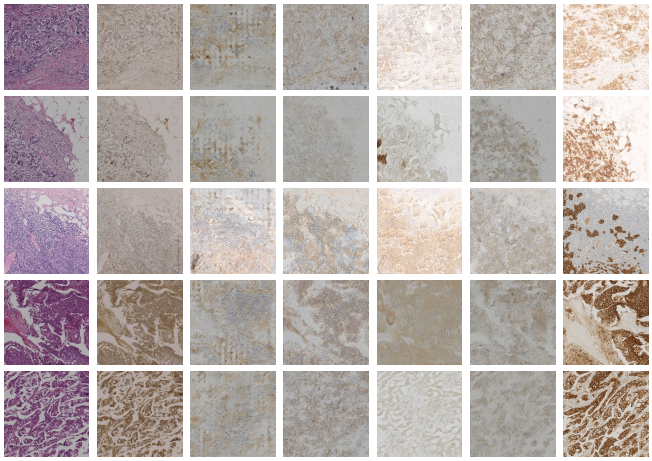
Figure 2. Preview of our BCI dataset. It contains a variety of expression levels of HER2.



(a) Visualization of different methods on IHC 0 images. The image we generated is very close to the ground truth.

(b) Visualization of different methods on IHC 1+ images. The image we generated is very close to the ground truth.

(c) Visualization of different methods on IHC 2+ images. In general, our generated image has a lighter color than ground truth, however, it is still better than other methods.



(d) Visualization of different methods on IHC 3+ images. In this case, all methods are difficult to accurately identify the cancer area, which is a huge challenge.

Figure 3. Visualization of different methods on different HER2 expressions.

3. BCI Dataset Visualization

In the main paper, we show a small part of the BCI dataset. In this section, we show more HE-IHC image pairs to show more details (Fig. 2).

4. More Visualizations of Results

In this section, we show more results of different methods [1–3] to support our discussion in the main paper (Fig. 3).

References

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[2] Ting-Chun Wang, Ming-Yu Liu, Jun-Yan Zhu, Andrew Tao, Jan Kautz, and Bryan Catanzaro. High-resolution image synthesis and semantic manipulation with conditional gans. In *Proceedings of the IEEE conference on computer vision and pattern recognition*, pages 8798–8807, 2018. 2

[3] Jun-Yan Zhu, Taesung Park, Phillip Isola, and Alexei A Efros. Unpaired image-to-image translation using cycle-consistent adversarial networks. In *Proceedings of the IEEE international conference on computer vision*, pages 2223–2232, 2017. 2