Supplementary Materials for Adaptive As-Natural-As-Possible Image Stitching

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A. Supplementary Stitching Results

We have conducted comparative experiments on a variety of datasets. To demonstrate the performance of the proposed method, another comparison from the existing datasets is shown here. Besides, we also provide three additional comparisons using our own datasets. Still, the compared methods include Microsoft Image Composite Editor (ICE) [1], APAP [9], SPHP with global homography [3], SPHP with local homographies computed with APAP (SPHP+APAP).

In each experiment, each row is a result of different methods. The results are in the following order: ICE, APAP, SPHP, SPHP+APAP, and our method. Red boxes show parallax errors in overlapping areas, and blue boxes show the perspective distortion in non-overlapping areas.

Figure 8 shows the experiments of the *Park* image pair, that is also shown in SPHP as well. In first row, extra red boxes highlight the parallax issues that cause the discontinuity of lines on the ground. The result of APAP shows good alignment on the ground, but the scene and people are tilted and expanded. The result of SPHP and SPHP+APAP shows parallax errors on the ground. The proposed method demonstrates good performance in dealing with parallax and distortion issues.

Figure 9 shows the experiments of the *Building* image pair. ICE and APAP produce un-natural shapes of bay windows. The windows are expanded upward. Minor parallax errors appear in the results of SPHP and SPHP+APAP. Our proposed method is able to provide a good result.

Figure 10 depicts the experiments of the *Fence* image pair. For ICE, an obvious misalignment at fence can be observed. Also, both right and left sides of the scenes are curved. In APAP result, the building is expanded. The result of SPHP shows parallax errors at the fence. Our result shows good alignment, and the building is not distorted or tilted.

Finally, the experiments of the *Intersection* image pair are shown in Figure 11. The challenge in this dataset is to deal with stripe alignment on the road. All other methods produce serious misalignment. Huge gaps of discontinuity can be observed in ICE and SPHP. Unnatural effects are shown in the results of APAP and SPHP+APAP. Our proposed method manages to align the images well with only minor errors.

Considering overall experiments, ICE generally shows good visual results, but still suffers from the parallax error and scene distortions in some challenging cases. APAP is robust in the alignment of overlapping areas, but might produce perspective distortion. SPHP is a very novel method to preserve the perspective in non-overlapping areas. However, the global similarity transformation generated by SPHP is not always provide the optimal view. With combination of SPHP and APAP, the issues of parallax errors and perspective distortion can be mitigated, but still remain in some experiments. Overall, our proposed method shows robust results in dealing with parallax errors in the overlapping areas and perspective issues in the non-overlapping areas. Also, it automatically provide the best perspective angle without distortion.

B. Data Used in the Experiments

The input images of each experiment are shown in this section. Figures 12, 13, 14 show the images from *Temple*, *Railtracks* and *Park* image pairs. These three images are also used by [3], [6], [9]. Our own *Building*, *Fence*, and *Intersection* image pairs are shown in Figure 15, 16, and 17.

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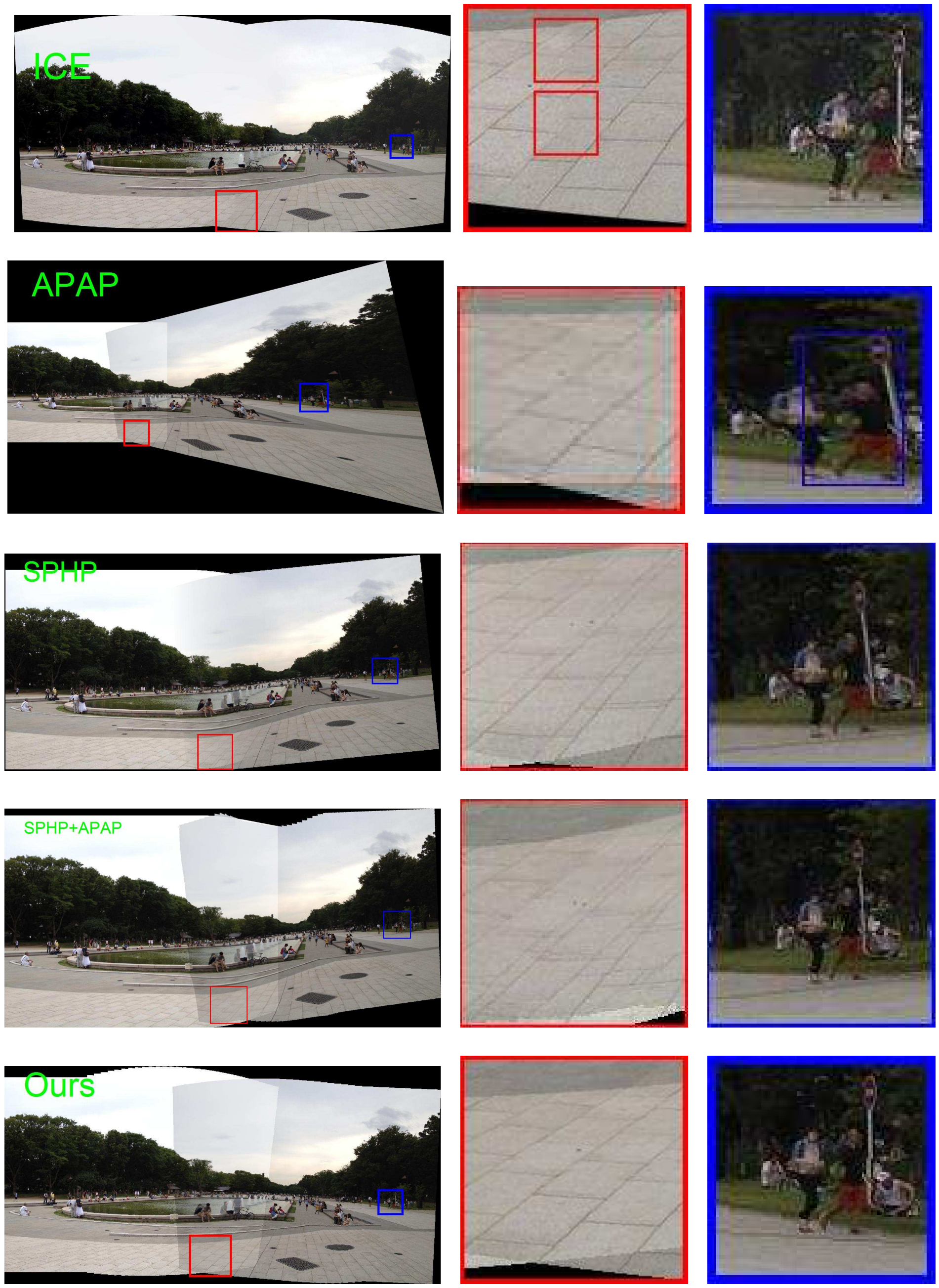

Figure 8: Comparisons with state-of-the-art image stitching techniques on the *Park* image dataset.

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Figure 9: Comparisons with state-of-the-art image stitching techniques on the *Building* image dataset.

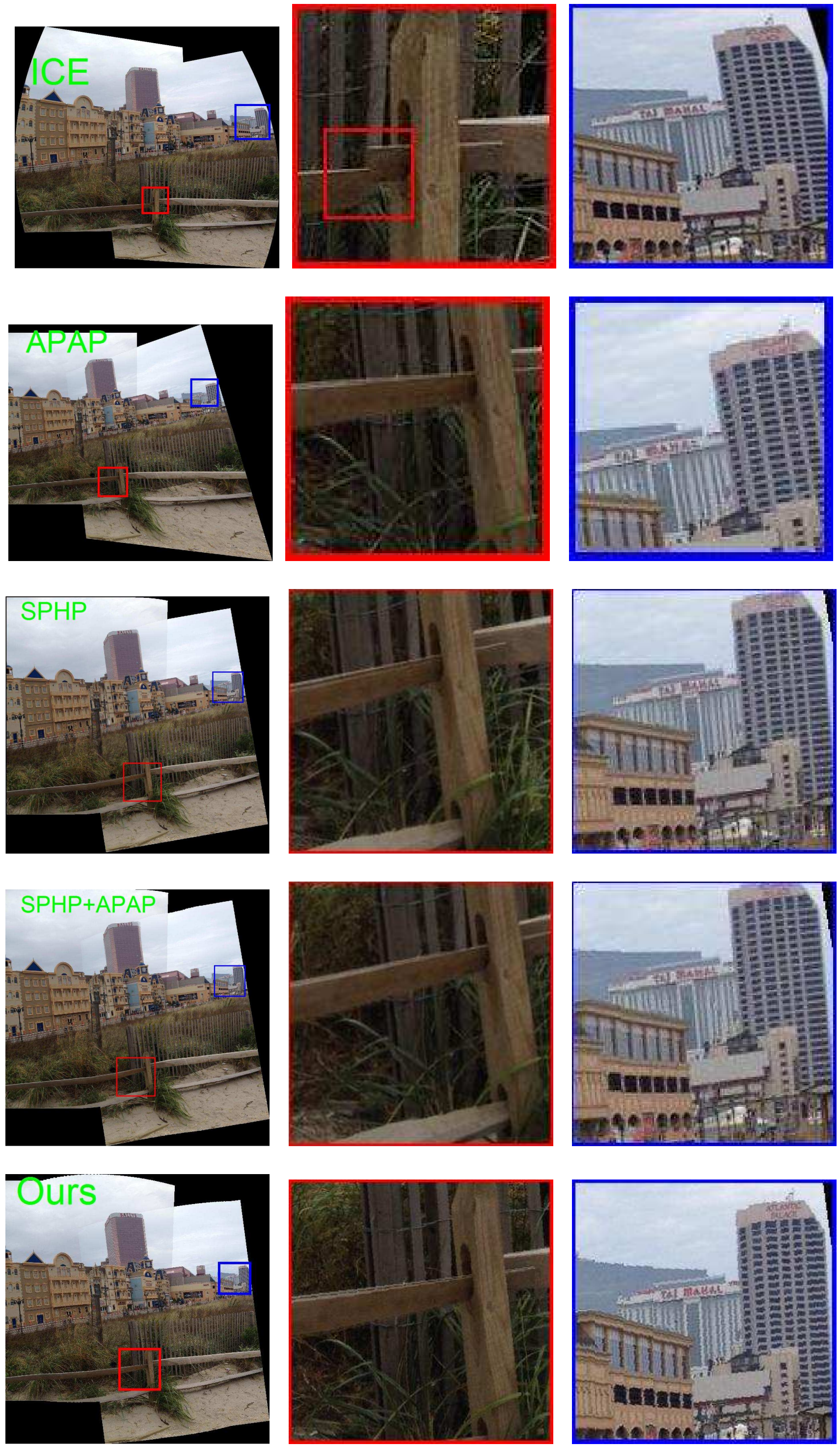

Figure 10: Comparisons with state-of-the-art image stitching techniques on the *Fence* image dataset.

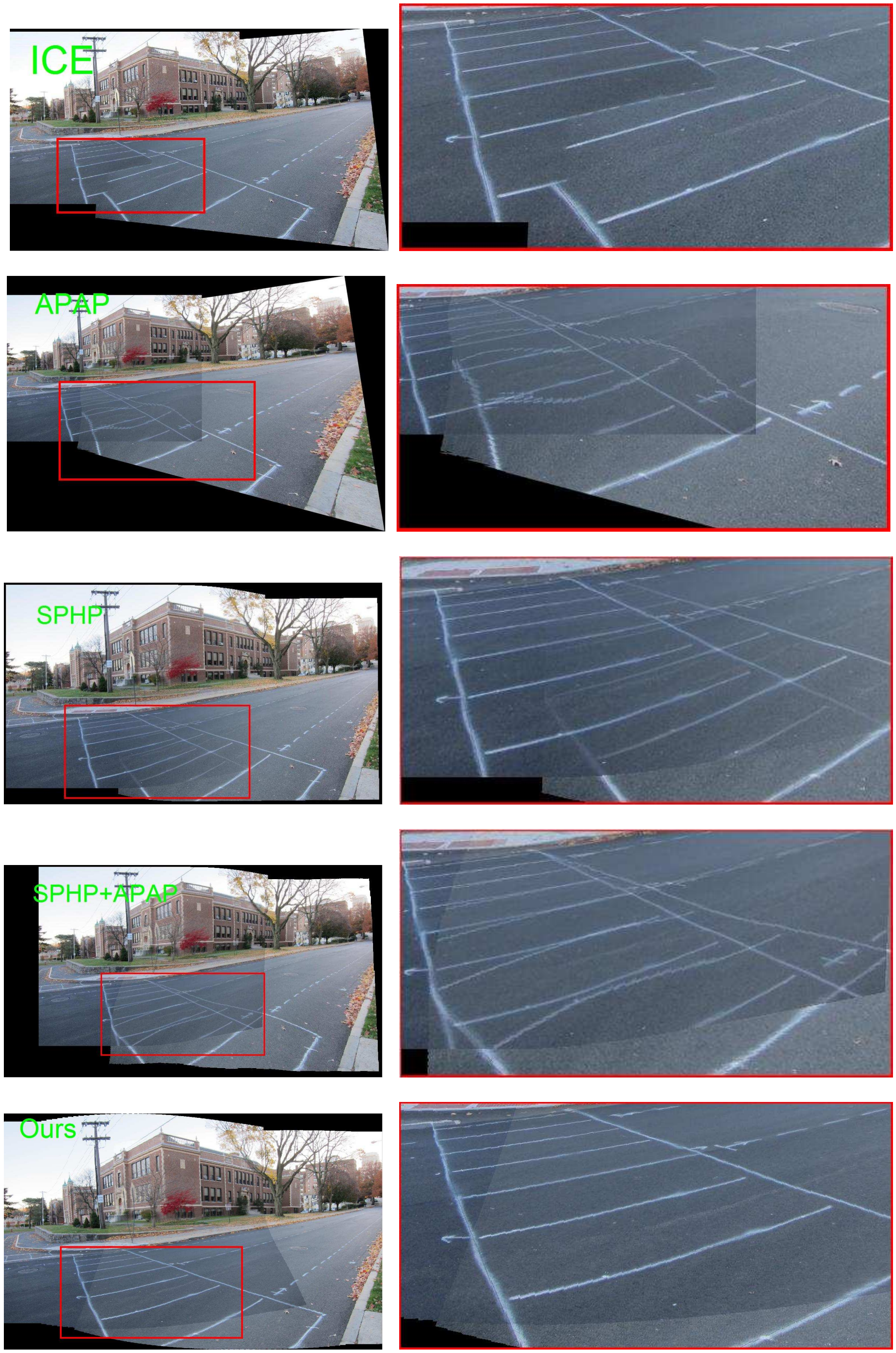

Figure 11: Comparisons with state-of-the-art image stitching techniques on the *Intersection* image dataset.

Figure 12: Temple image pair from APAP[9].

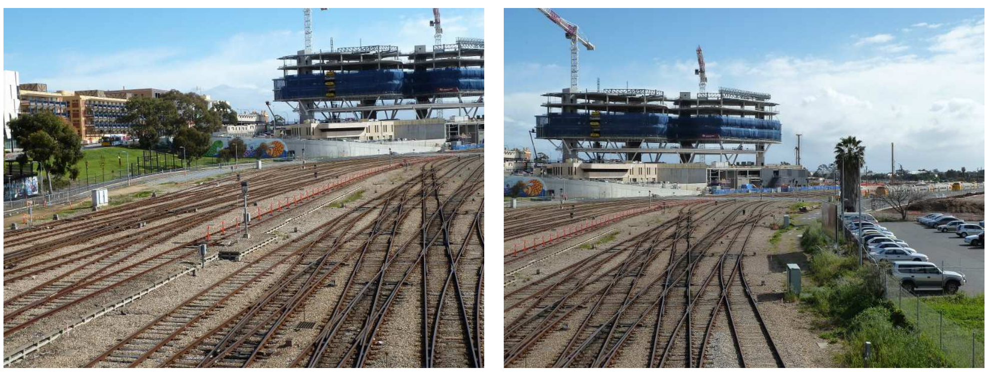

Figure 13: *Railtracks* image pair from APAP[9].

Figure 14: *Park* image pair from SPHP[3].

Figure 15: *Building* image pair.

Figure 16: *Fence* image pair.

Figure 17: *Intersection* image pair.