

Sparse-to-Dense Hypercolumn Matching for Long-Term Visual Localization Supplementary Material

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Qualitative Results

In this supplementary material, we show additional qualitative results. In Figure 1, we display examples of local correspondences obtained using sparse-to-sparse SuperPoint detection and descriptors against our sparse-to-dense approach. Figure 2 shows correlation maps obtained for a sparse 3D descriptor, on both datasets. Lastly, Figure 3 displays inlier correspondences after running PnP + RANSAC, using our sparse-to-dense approach.

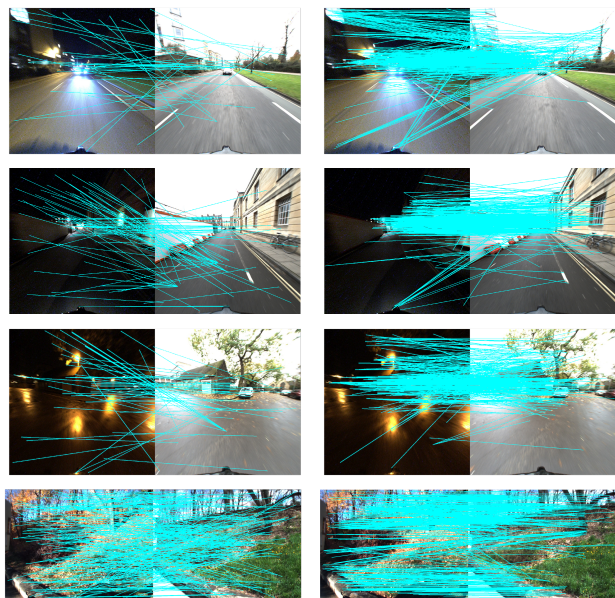


Figure 1: **Sparse-to-sparse and sparse-to-dense local feature matching.** Left column: Sparse-to-sparse feature matching obtained using SuperPoint detections and SuperPoint descriptors. Right column: Sparse-to-dense feature matching using hypercolumns. Both correspondences are displayed after applying a ratio test. Our approach tends to provide a lot more matches, which are overall more robust thanks to the hypercolumn descriptors.

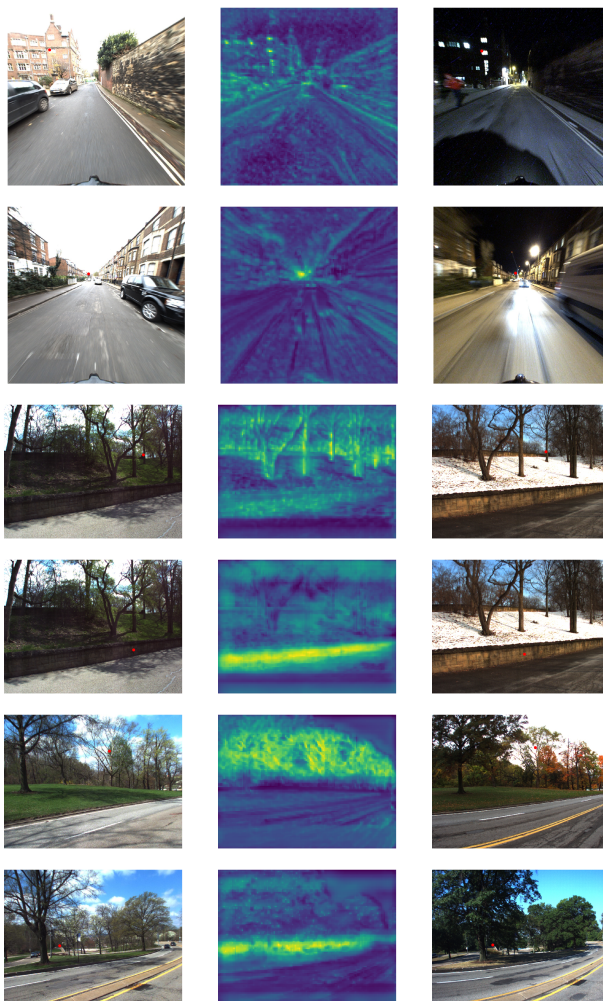


Figure 2: **Correlation maps visualization.** Left column: Retrieved database image with a reprojected 3D point from the local point cloud. Middle column: Correlation map obtained for the sparse descriptor. Right column: Query image. The bottom-three triplets show cases where matching is ambiguous. Such cases are usually dismissed thanks to the ratio test.

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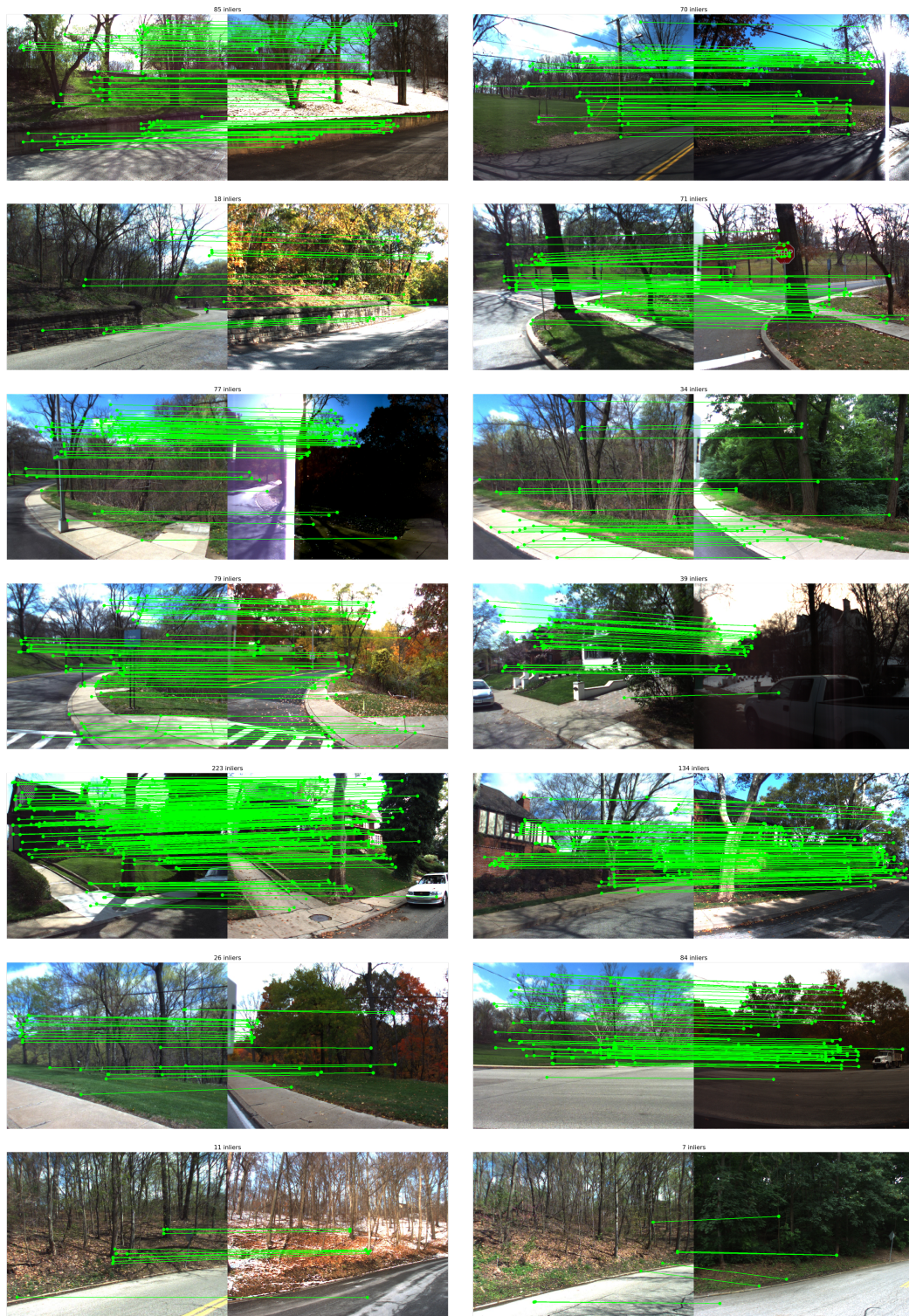


Figure 3: **Inlier correspondences obtained using RANSAC+PnP.** We show correspondences obtained with our ‘Sparse-to-Dense Hypercolumn Matching’ method, on difficult vegetation scenes from Extended CMU Seasons. The bottom row shows failure cases due to a failed global image retrieval.