CIS580 Project2 Milestone 2

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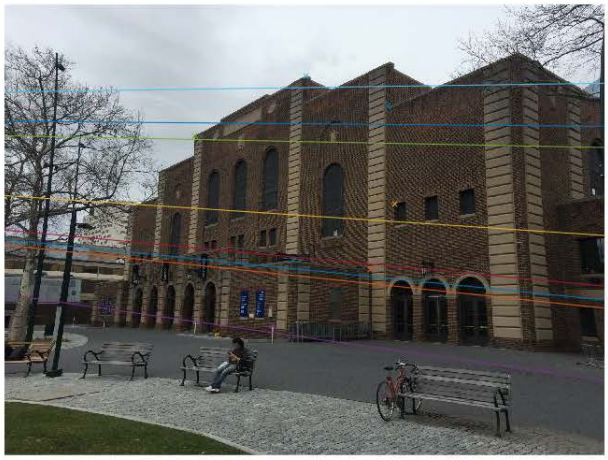
2.1



1. From plots above, epipoles are basically where they should be, but some of them are several pixels off. This may result from human errors in clicking correspondence and camera calibration as well as outlier correspondence.

2. If I don’t enforce rank 2 constraint on F, epipolar lines don’t intersect at the same point. If I don’t enforce rank 2 constraint on E, epipolar lines may be vulnerable to noisy correspondences and try to pass through all of them.

3. Reconstructing F from camera pose involves the second clean-up on E, which make epipolar lines more robust to noisy correspondences. In other word, some epipolar lines may not necessarily pass through correspondences.

4. The case 2, when two cameraman stand in front and back, looks the best. I think it is because correspondences are well defined in this case, but at the same time they are all in a planar surface.

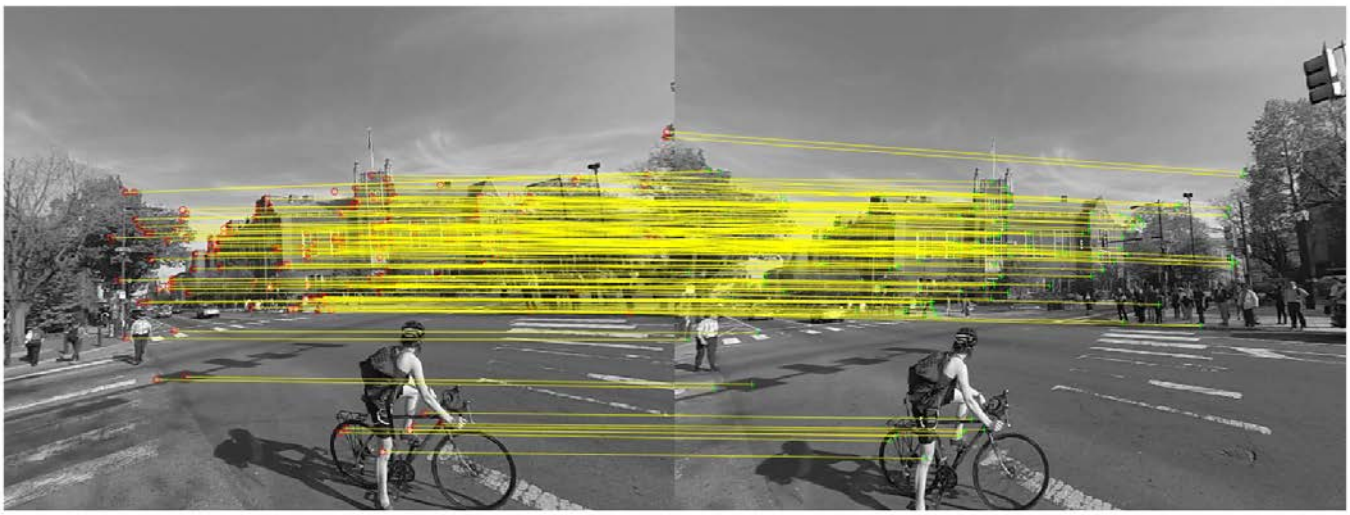
2.3

1. The automatic algorithm fails to find correspondence when RANSAC threshold is too high, or images don't have obvious correspondences (filtered by feature detector property like 'Minimum Contrast' or 'Minimum Quality').

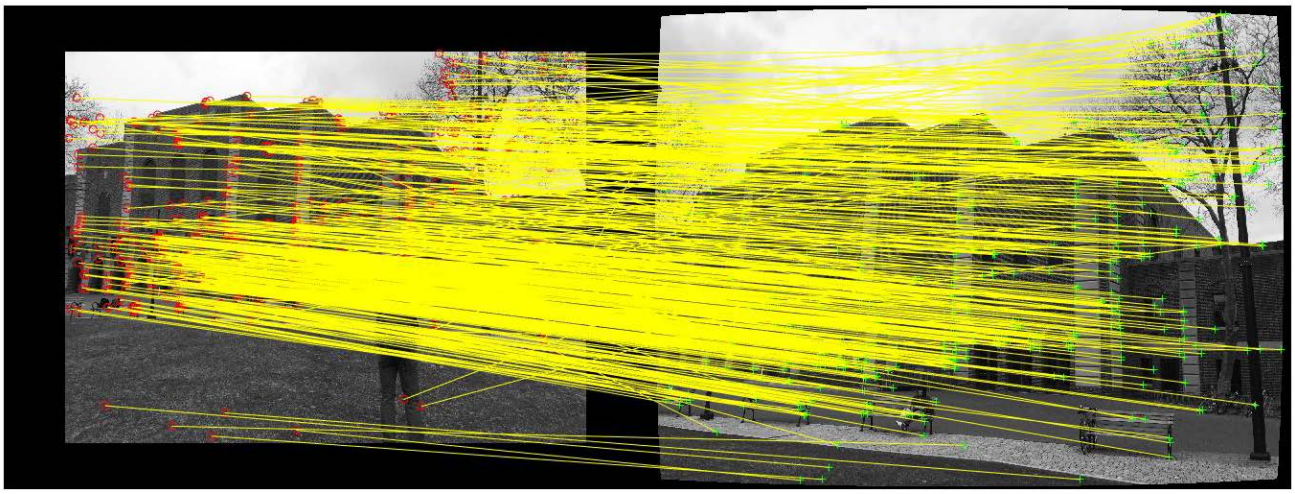
2.

Before

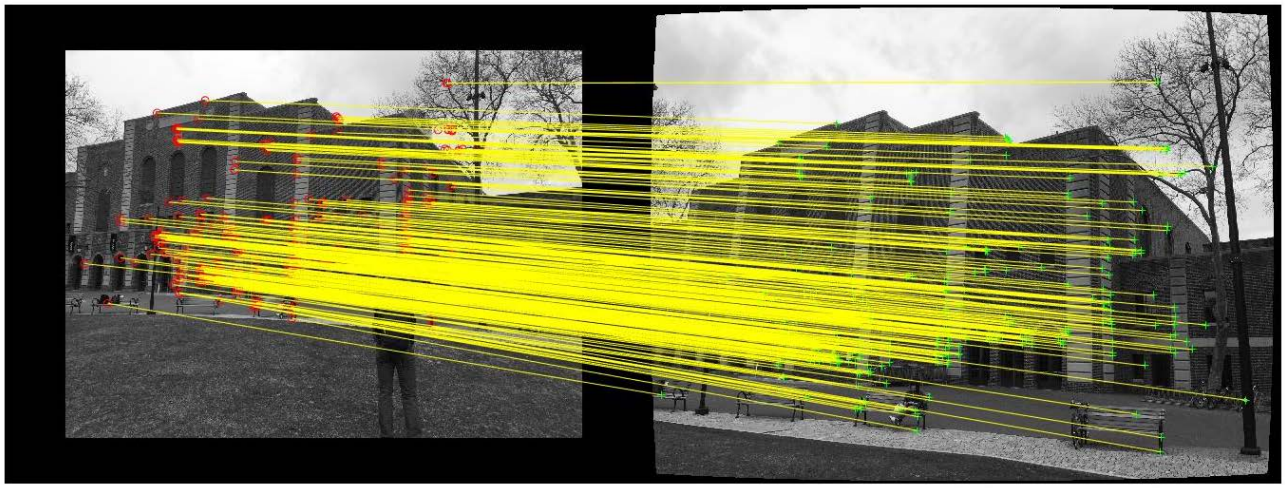
After



Before



After



RANSAC is always able to remove outliers with right threshold, good estimate of inliners ratio and necessary iteration. If the error threshold is too low, some outliers won't be removed. If the threshold is too high, it's likely that outliers with certain pattern or points in one planar surface will dominate. Both two situation above cause noisy result.

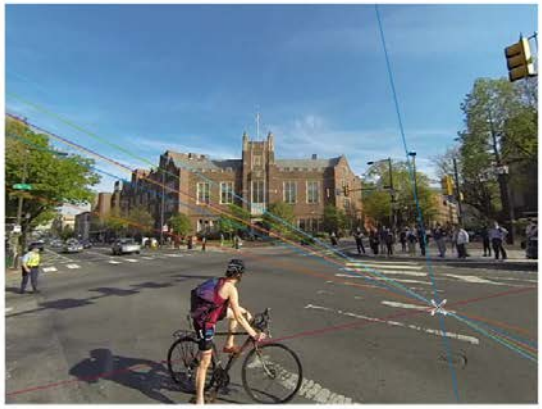
In this milestone, I set error threshold as 0.005, inliners ratio as 0.5 and iteration as the minimum iteration for 0.99 success rate. The result turns to be satisfying.

3.

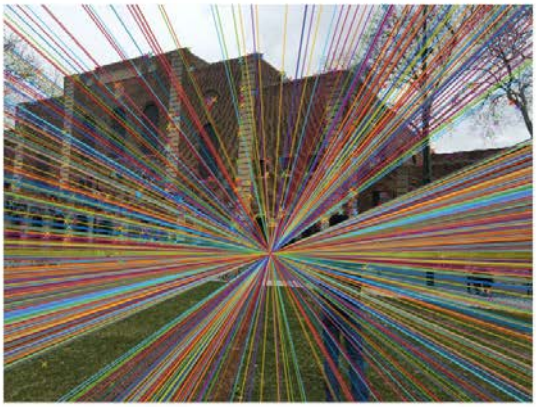
Before RANSAC

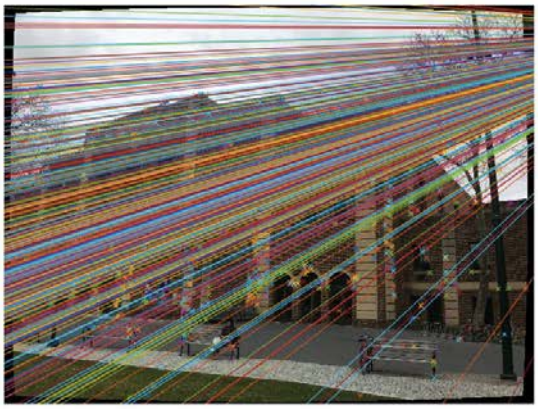

After RANSAC


Manually Clicked Correspondence

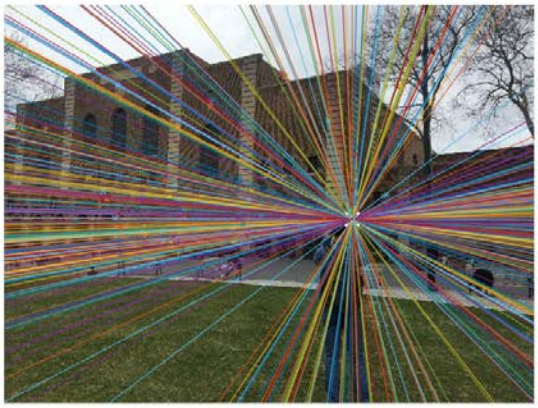



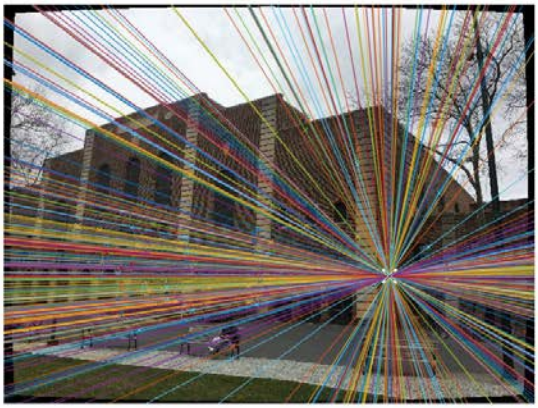
Before RANSAC





After RANSAC





Manually Clicked Correspondence

The automatic algorithm is better due to two reasons. First, manual clicking induces human error and results in several pixels error at the beginning. Second, people tend to choose correspondences in one planar surface because it is easier, but later they introduce large errors.