[99.92624550665171, 104.03624346792648, 86.59355624500529, 69.44395478041653]
[98.9529845932068, 86.64330788265305, 103.98611593958493, 70.41759158455523]
[[180, 60], [120, 75], [200, 105], [120, 135]]
[[199, 115], [168, 168], [245, 133], [210, 209]]

4.3) I implemented the linear least squares to get back the rotation and translation from transformed image w.r.t original image. It can be noted that, LLS optimization can give the rotation and translation relative to the correspondences. Therefore, recovering the actual transformation performed would be possible only if we did rotation first and then translation. However, the algorithm could still retrieve the angle well, but not the translation.
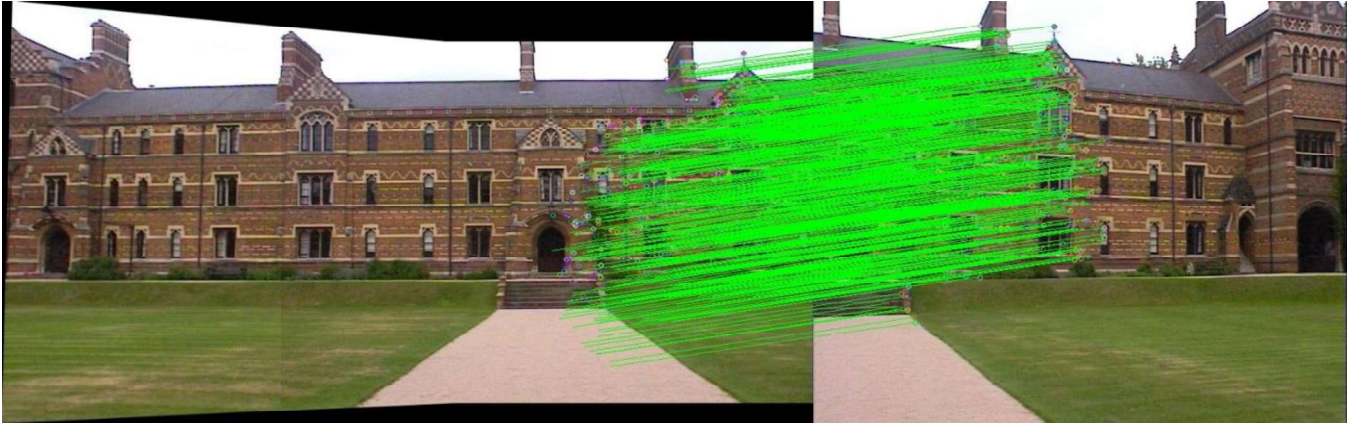
```
The rotation angle dervicd from Least Square optimization is  45.51210834563913
translation retained is [[410.47440267]
 [ 56.64011386]]
```

5) Image Stitching.

To derive the good matches or tentative matches, I first implemented KNN from scratch on the feature vector after performing SIFT detection operation. Then I used Lowe's ratio to eliminate matches that had the 2NN too close to the 1NN. This is done to make sure only the matches that has only 1 true correspondence is considered.
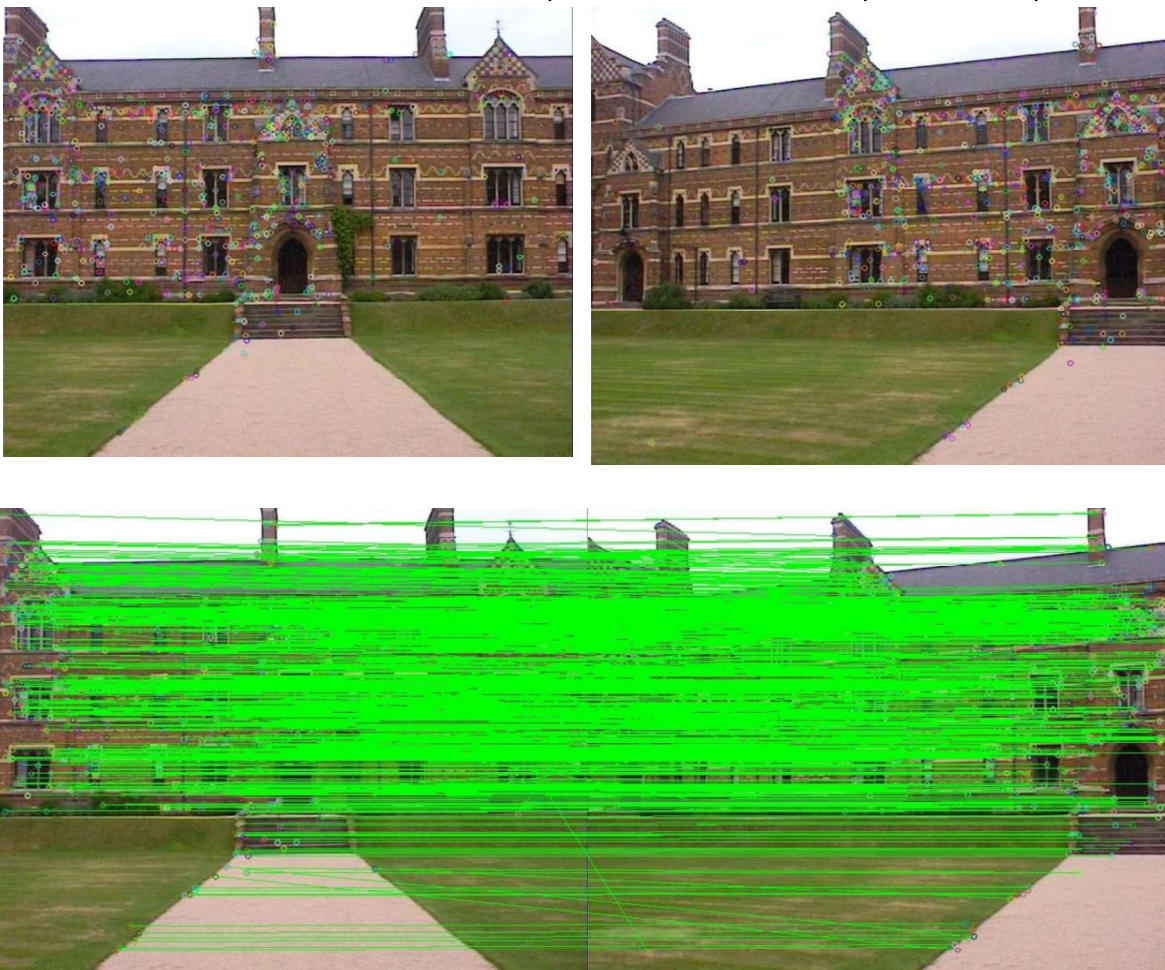
Then I implemented RANSAC using these good Matches to estimate Homography with the maximum inliers. By keeping the geometric distance threshold of 5 increasing the iterations to 10000, I could get a good 88% inlier accuracy for left and center and 68% when matching the below case. The inliers for the warped left and center image with respect to the right image is illustrated below.

Final Stitching: