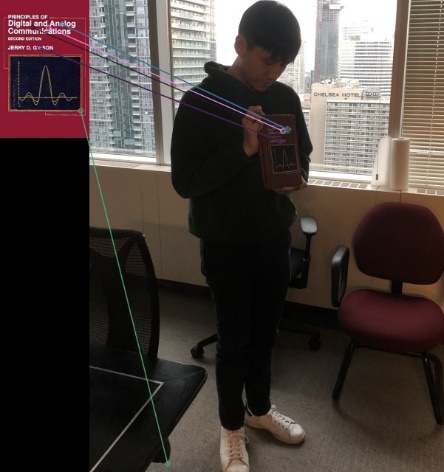
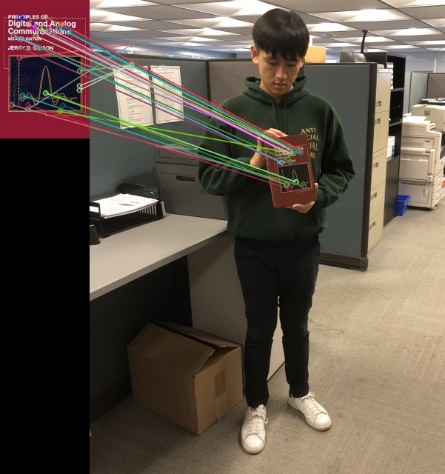
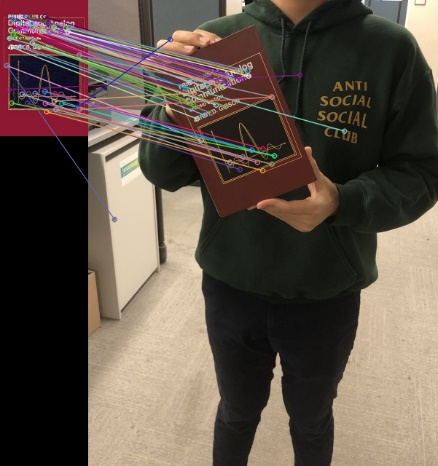
1. I transform the door along with letter sized paper to the scale of an actual letter sized paper. i.e. one pixel is 1 milimeter. Then I took 3 points(corners) of the door in the original photo apply with transformation matrix. After it is done, I can calculate the distances pairwise by using Euclidean distance and the distances I got are the actual width and height because the scale after transformation is the actual scale in millimeter. The width is 905.54mm and height is 2125.51mm.



1. A.

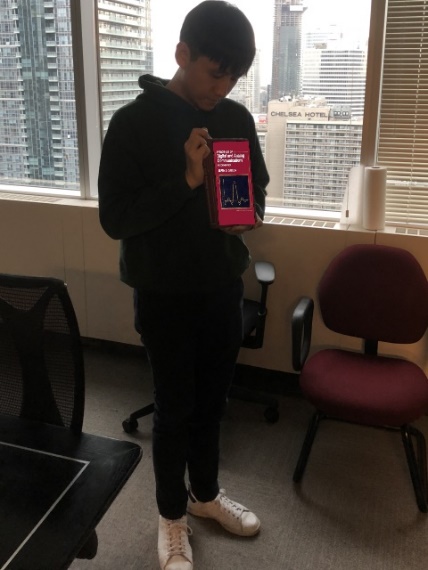
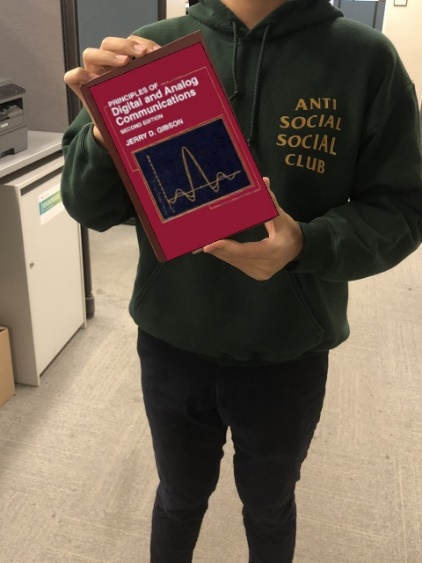


B. The estimated minimum number of iterations is shown below:

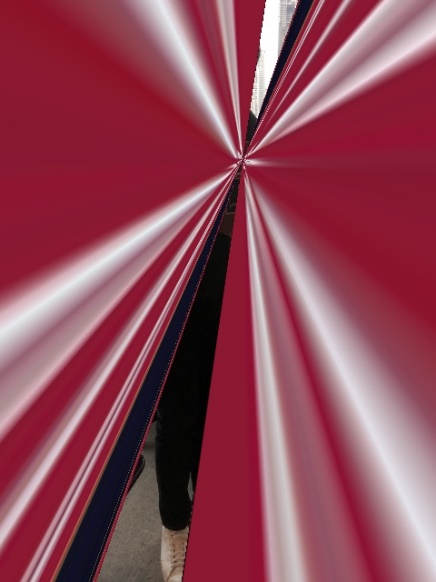
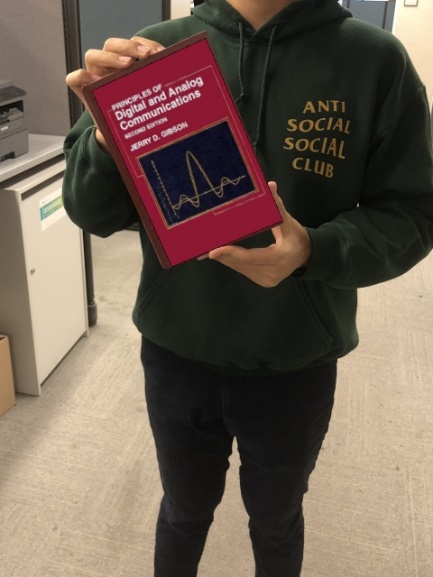
|  |  |  |  |
| --- | --- | --- | --- |
|  | Image1 | Image2 | Image3 |
| Affine | 11 | 11 | 4 |
| Homography | 17 | 17 | 5 |

C and D. Use the above estimated minimum number of iterations to run the algorithm, the result is very bad.

Affine:

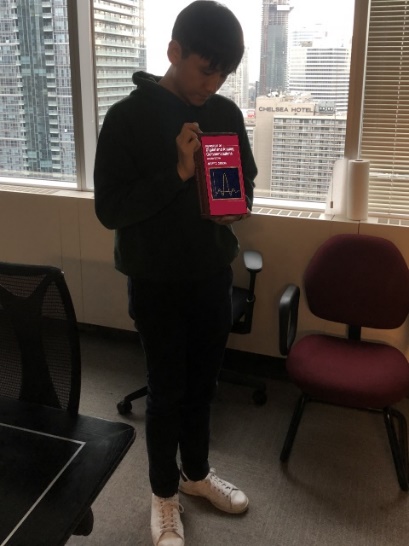
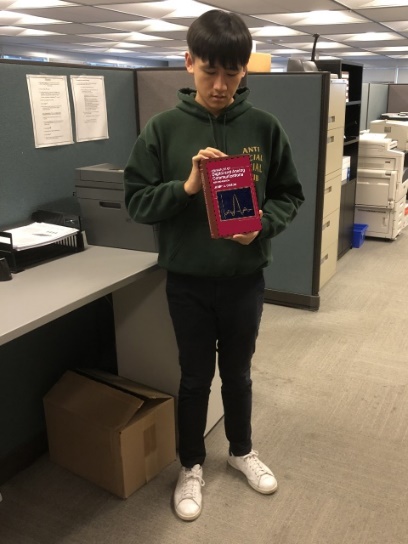
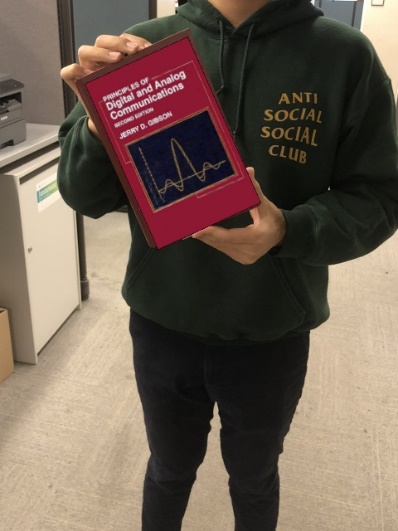


Homography:

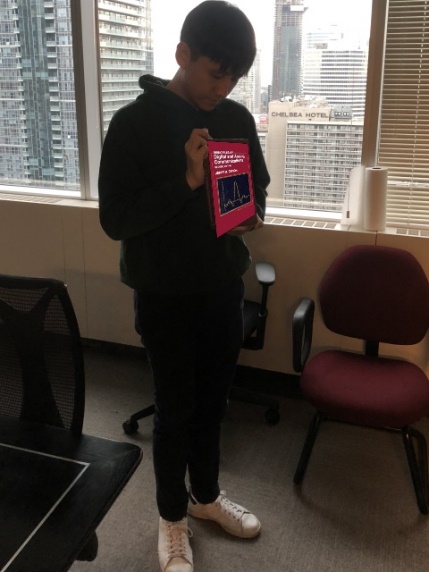
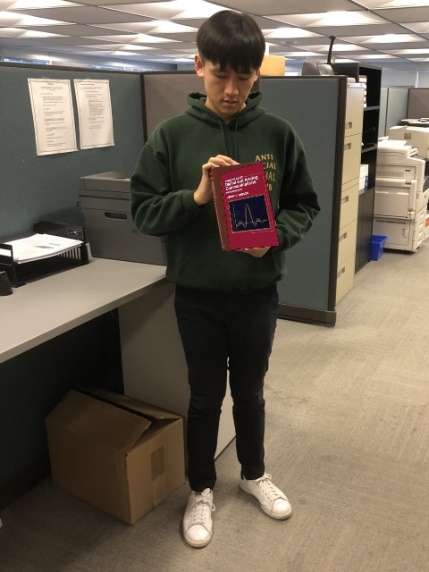
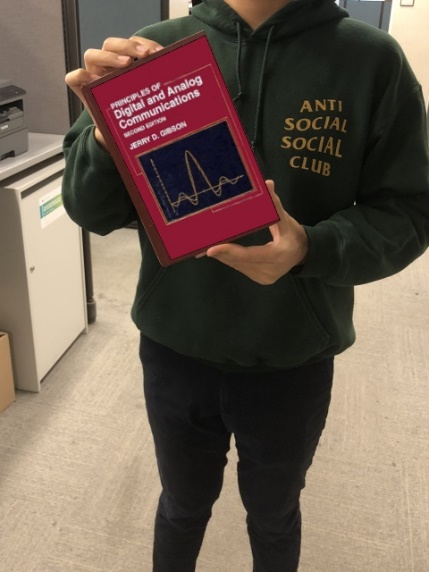


So, I manually set the percent of inliers to 50% for all three, this might be more accurate because visual might be deceiving. A lot of point should not be counted as inlier, but I accidentally counted them as inliers because they are parallel and seem to match the right place. However, when the matches are more crowded, even one-pixel scale matters a lot. Here are the results when I set all of them 50% inliers.

Affine:



Homography:



Conclusion for C and D:

RANSAC is more likely to success when you have a lot of data points and run enough iterations. The more data points, the more stable of the algorithm. Just like flip a coin 10 times, you may not get 50% of time of heads and 50% of time of tails, but when you increase number of trials to 100000, the chance would get close to 50:50. Enough iterations ensure we can find the best model among the trials. The difference between Affine and Homography is that Affine only requires 3 pairs of point to determine the transformation matrix but Homography requires 4 pairs. Generally, Homography would require more iterations than Affine to find the best matrix in the same condition (i.e. P=0.99,p=0.5)

E.



Without Blending.



With Blending