

Assignment 4

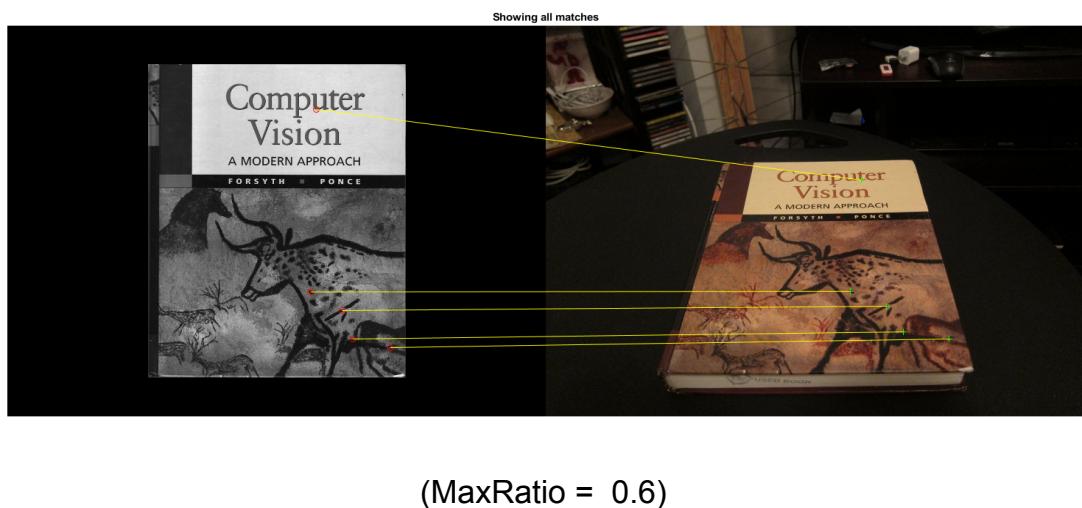
Name: Hanjie Liu

Student ID: 301404949

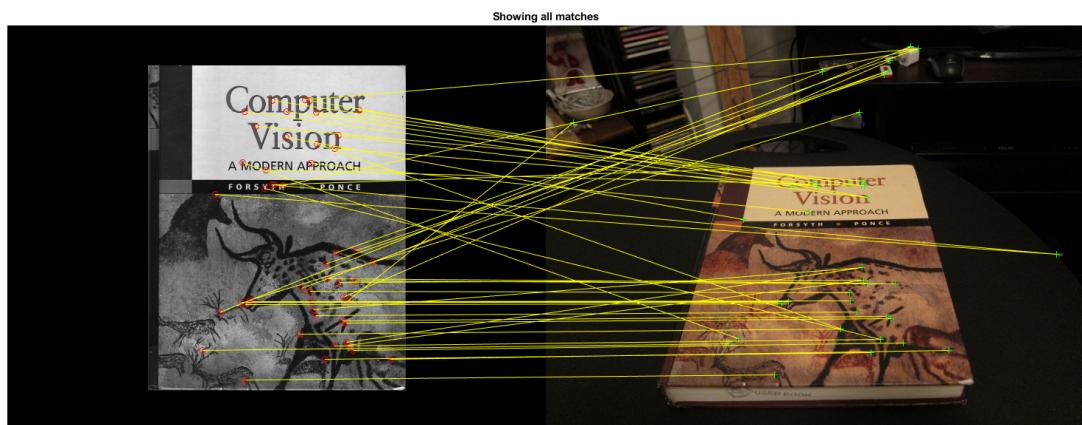
Late day: 0

Part 1:

The following image is from configuration with “`computeBrief`” and use the “`FAST`” detection. We set our initial MatchThreshold to 10, and we tried the “MaxRatio” by default value(0.6) and 0.8.



(MaxRatio = 0.6)



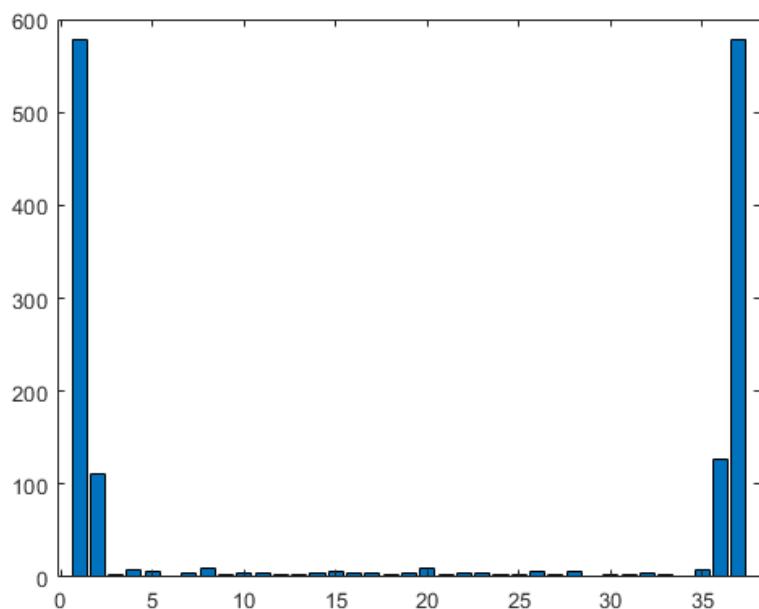
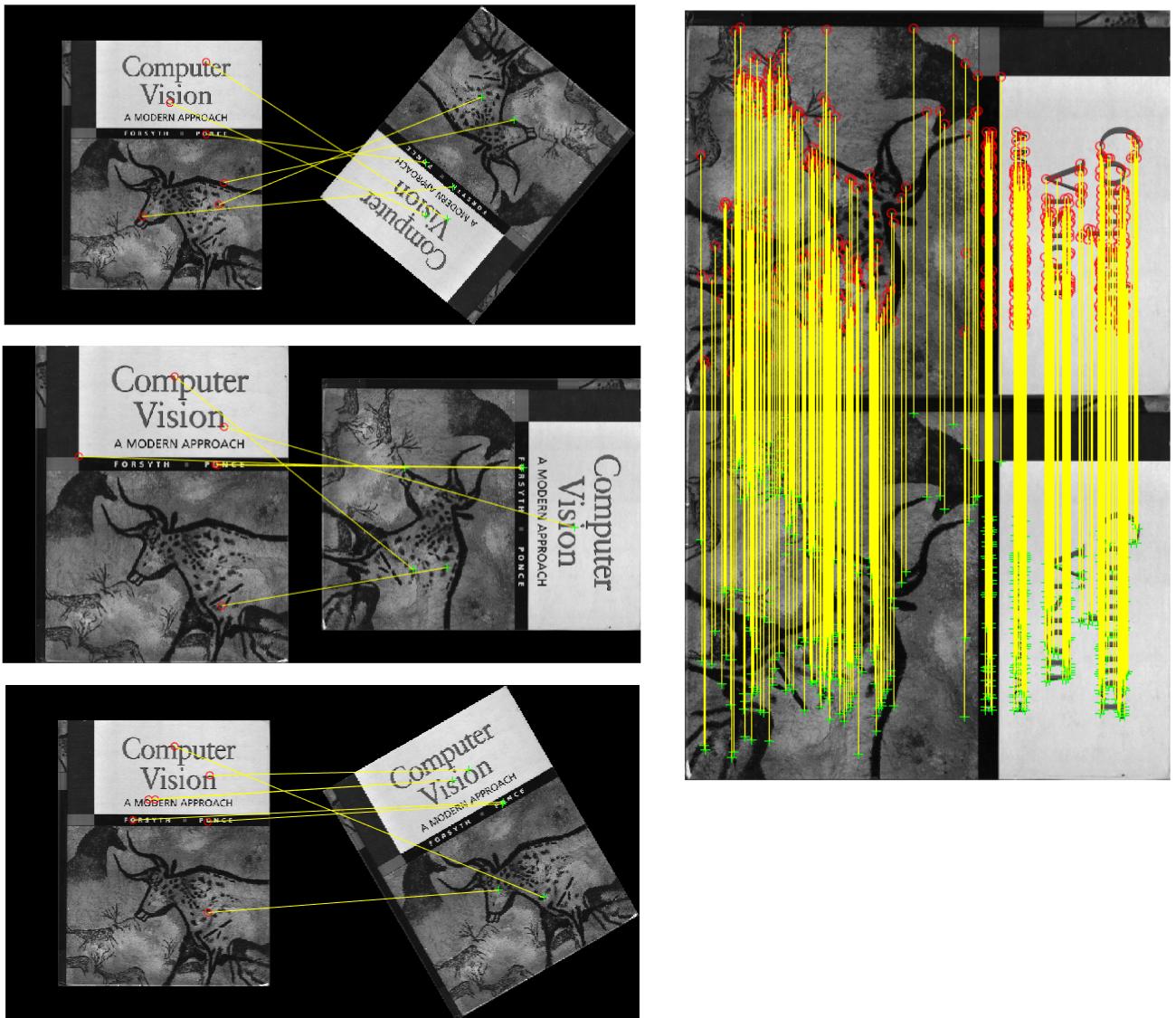
(MaxRatio = 0.8)

We can see that once we raise our MaxRatio, we got much more feature pair within two images.

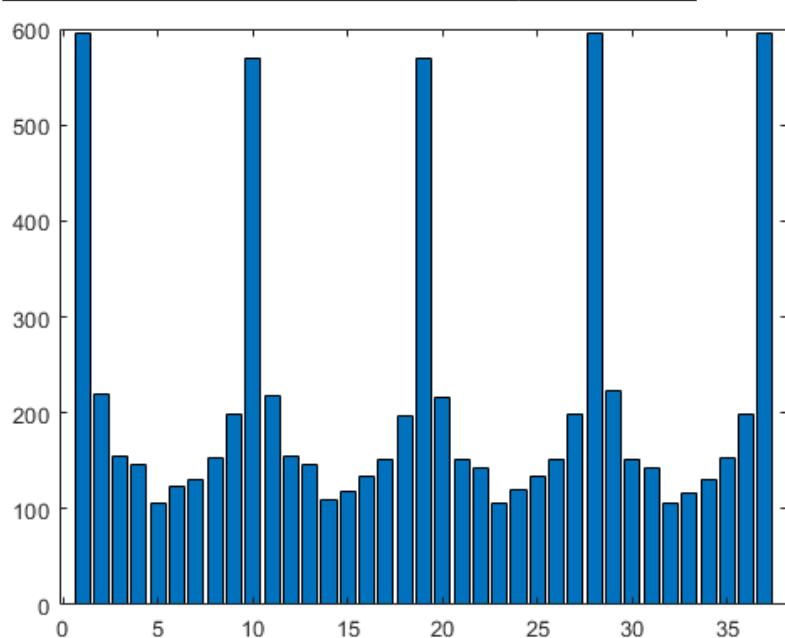
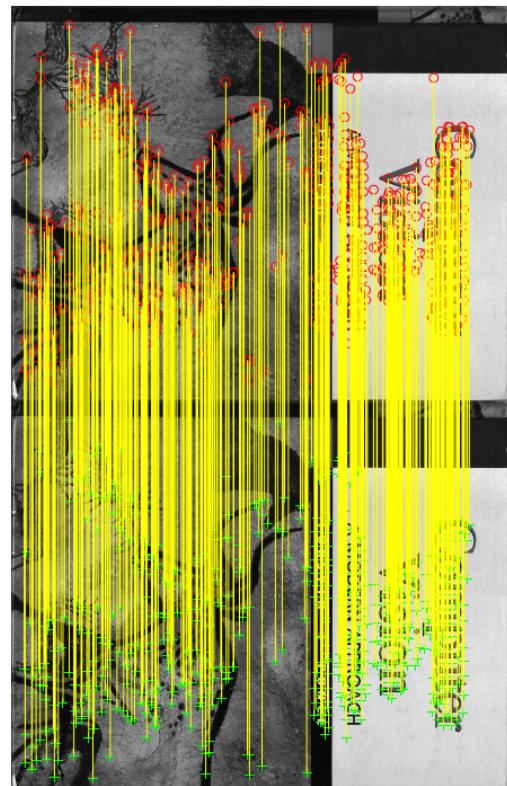
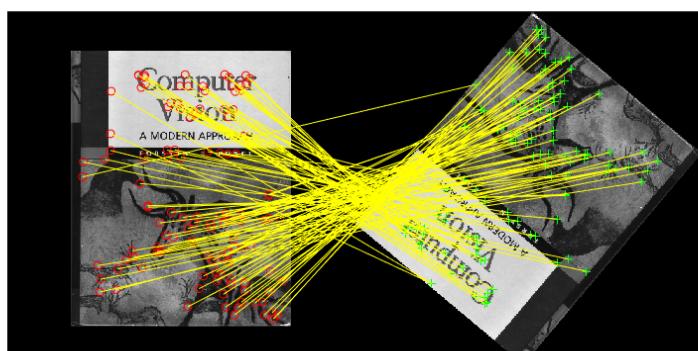
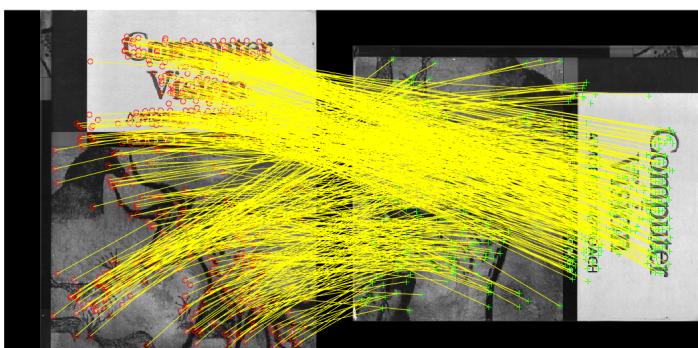
Part2:

We test the detection accuracy by both Brief descriptor and SURF descriptor. In the test we rotating the image and processed histogram for them.

Brief descriptor(MaxRatio = 0.75):



SURF descriptor:

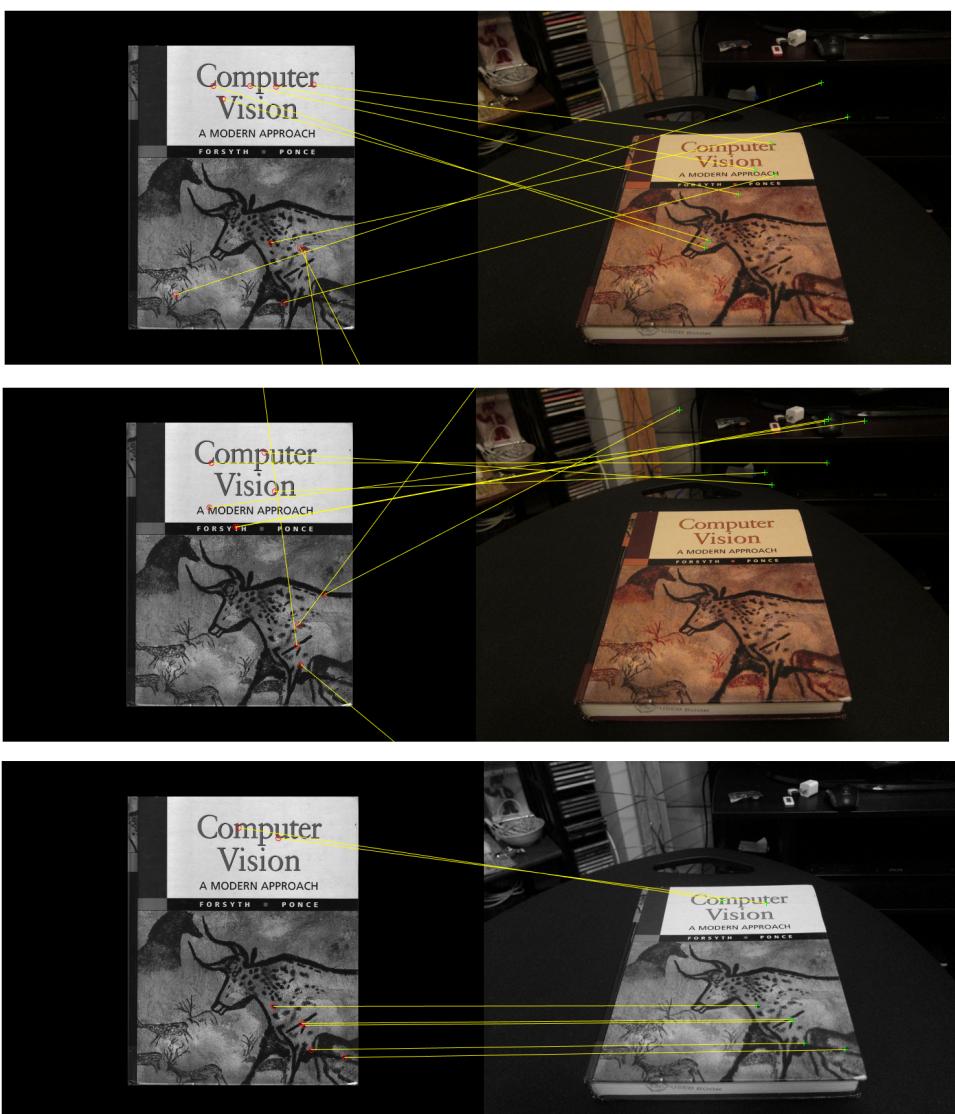


The results are clearly show the differences from brief descriptor and SURF descriptor. Except the original angle(no rotation),the plot changed significantly and the feature that SURF detected are much more than brief. Both of them will lose some points when rotating, but SURF is better than brief a lot. One reason that could cause it is SURF use a more complex algorithm to detect and describe feature, is has better capability to make a direct comparison. Whats more, SURF is less impacted by noise.

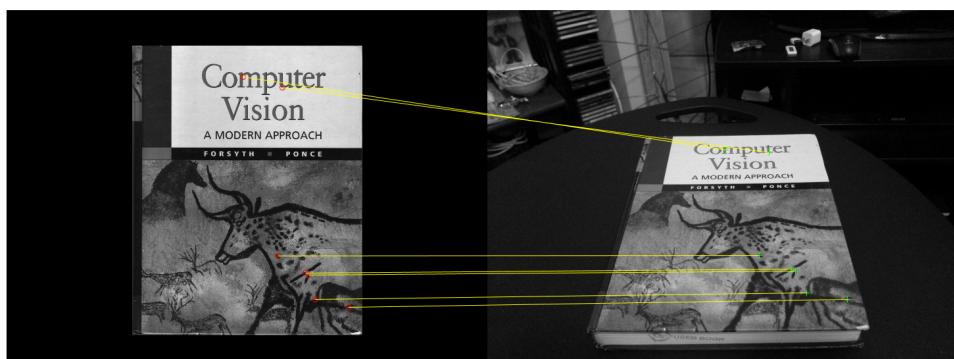
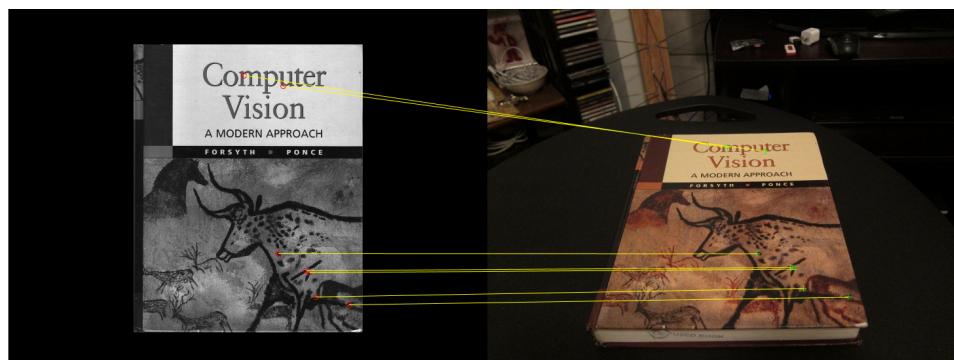
Part3(4.3 - 4.5):

The following images is generated by 10 randomly feature points, but I still change the ratio for comparing our result. The way we used are Homography, Homography + normalize, Homography + normalize + ransac, in order.

(MaxRatio = 0.8 for 10 randomly points)



(MaxRatio = 0.66)

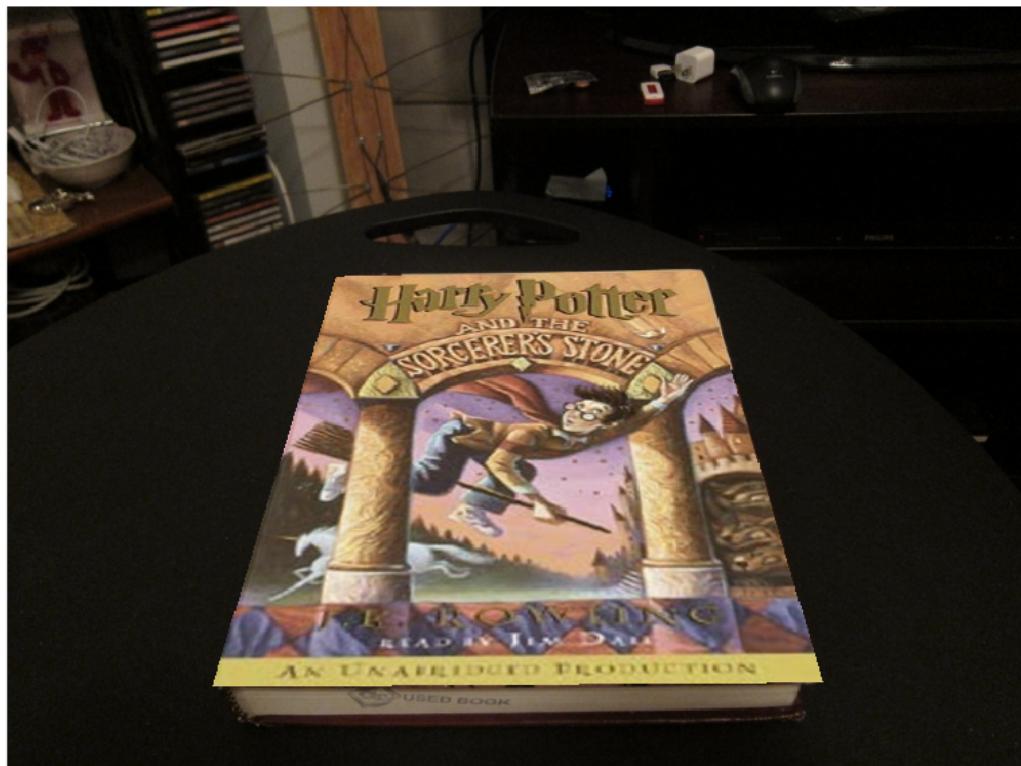


We can see that ransac is way more better than others in larger MaxRatio. The reason is ransac will eliminate the outlier which could significantly worsen our accuracy of homograph. This will make our homograph much better.

Best 4 points pair for RANSAC:



Part 4.6:



The configuration is following:

```
num_random_points = 4;  
total_iter = 10000;
```

At beginning I tried 500 iteration, this will still cause some black line and wrong transformation, so I increase it to 10000

Part 5:

The video for this part has been generated to ".../result/movie.avi", as well as all other results image are in that folder. The video has replace the book cover into a clips of movies.