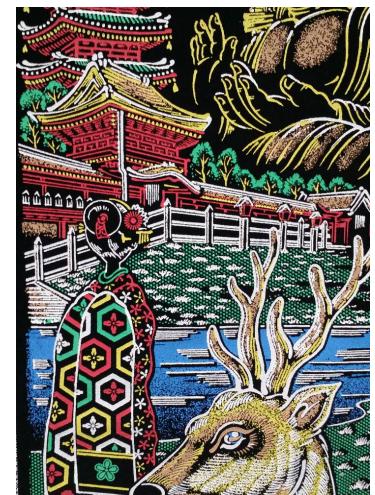


Computational Photography 6475
Assignment 7
Jacob Fund
Summer 2015

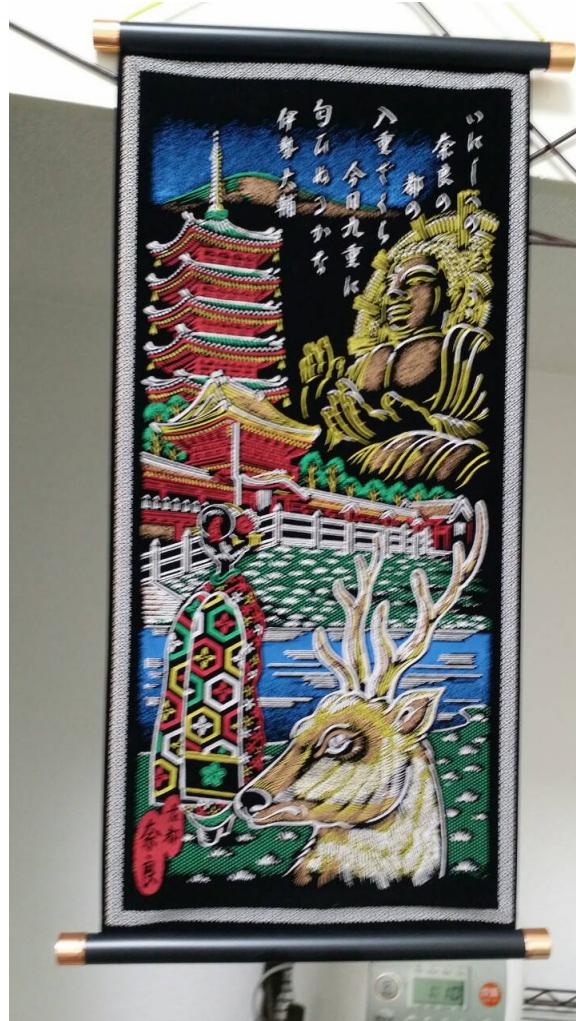
Input Images

all images were done on my camera phone –
Galaxy J.



Sample 1:

Wall scroll
from Nara,
Japan, the
ancient
capital with
a bunch of
temples and
deer.



Sample

For the sample I put the object near the “noisiest” part of my room.



Rotation

Manual 45 degree rotational action.



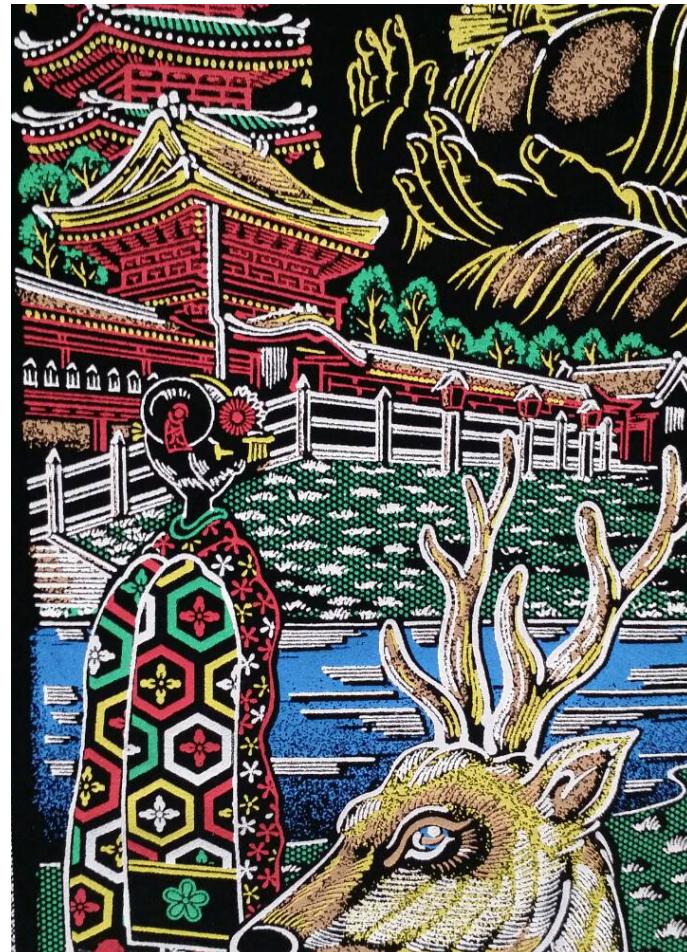
Lightning

Just simply dimmed my light to the lowest setting and tried to capture the picture from the same distance as the first sample.



Scale

Took a couple steps forward. We now notice the more felt like quality of the scroll.



Implantation

I used a very similar approach to what the lectures gave us. I used the ORB algorithm to detect and compute. Then use the brute force match to find the most the features with the most similar hamming distance. Finally sorted the matches by its distance and then took the first 10 matches.

Code

```
orb = cv2.ORB()
```

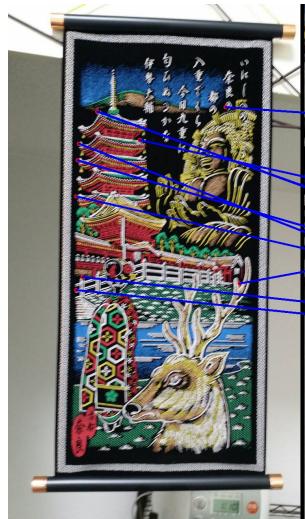
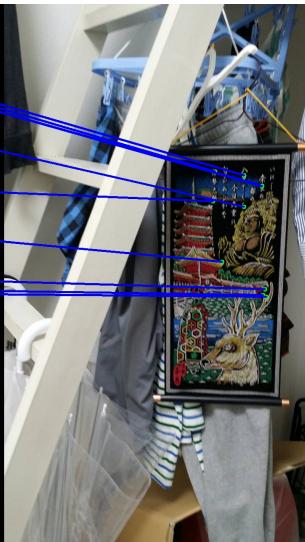
```
image_1_kp, image_1_desc = orb.detectAndCompute(image_1,None)
image_2_kp, image_2_desc = orb.detectAndCompute(image_2,None)
```

```
bf = cv2.BFMatcher(cv2.NORM_HAMMING, crossCheck=True)
```

```
matches = bf.match(image_1_desc,image_2_desc)
matches = sorted(matches, key = lambda x:x.distance)[:10]
```

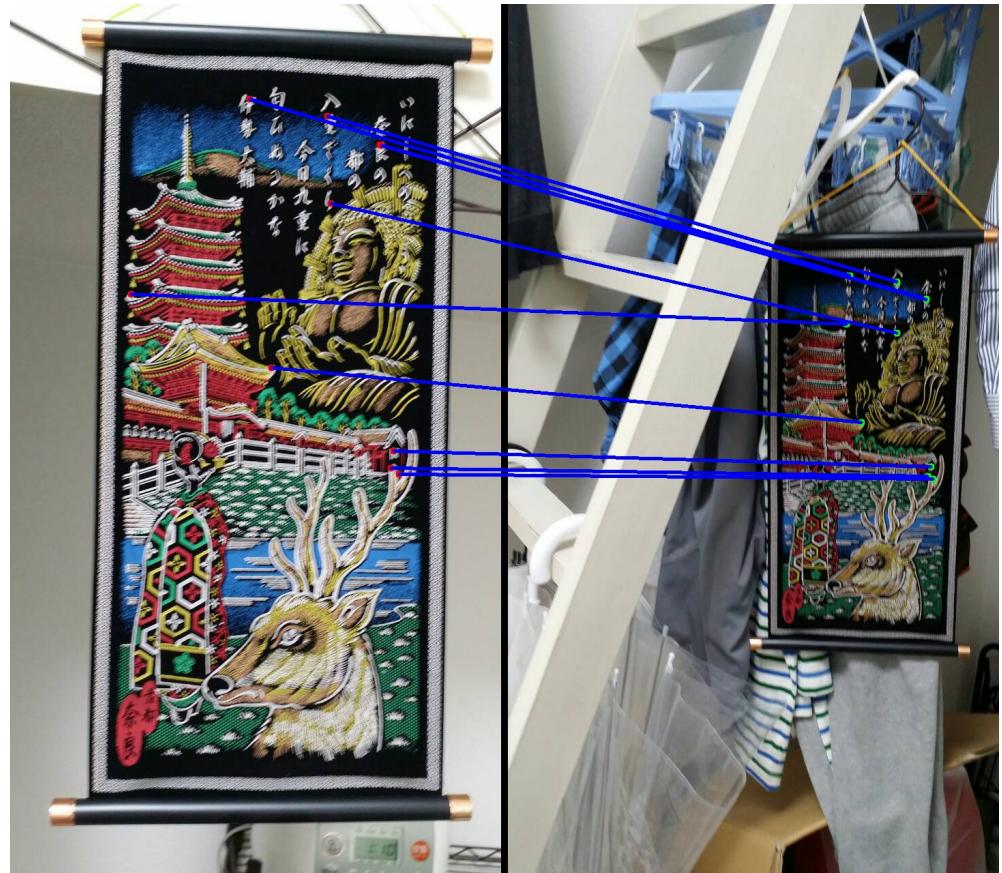
```
return image_1_kp, image_2_kp, matches
```

Outputs



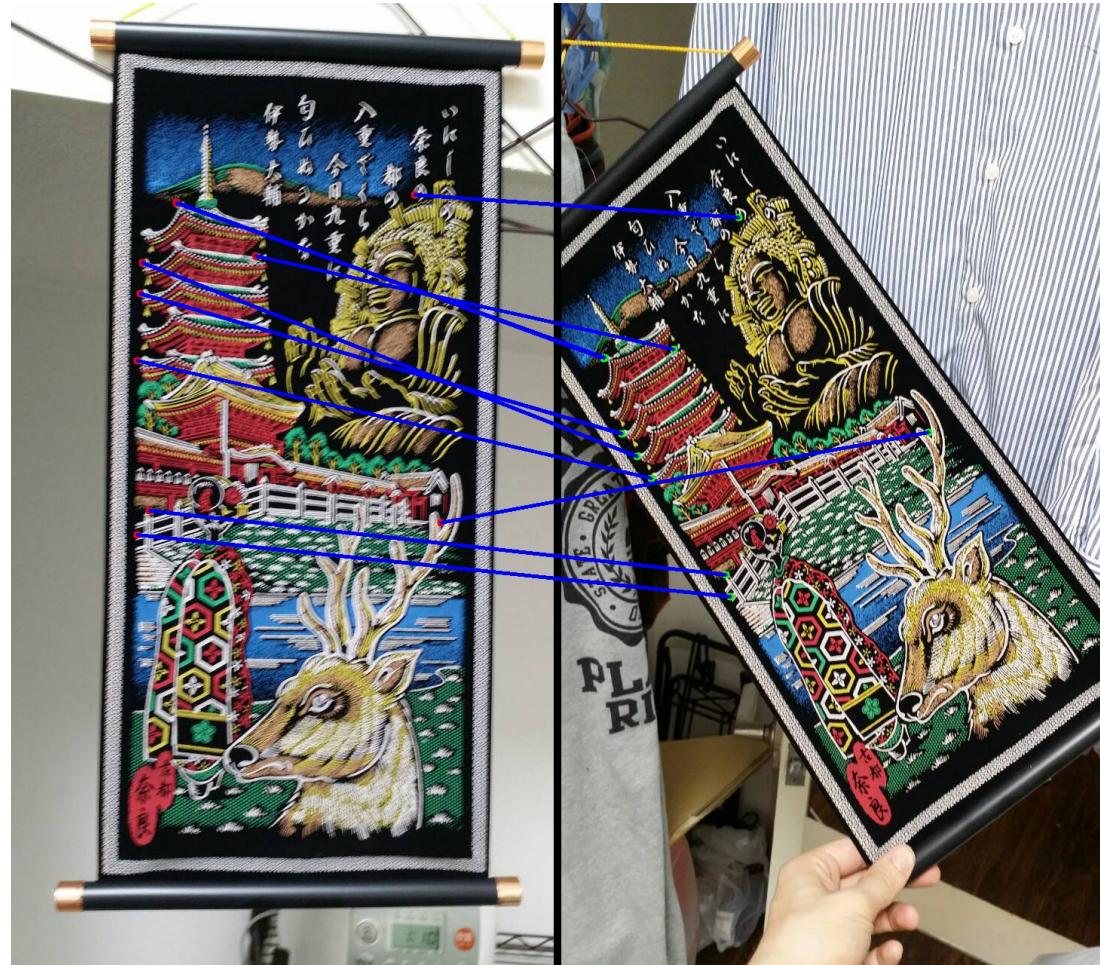
8 out of the 9 features were correctly labeled, yet, the mismatch features seem very similar. Perhaps I should have moved the object closer to mimic sample 1, but I didn't do that.

Sample



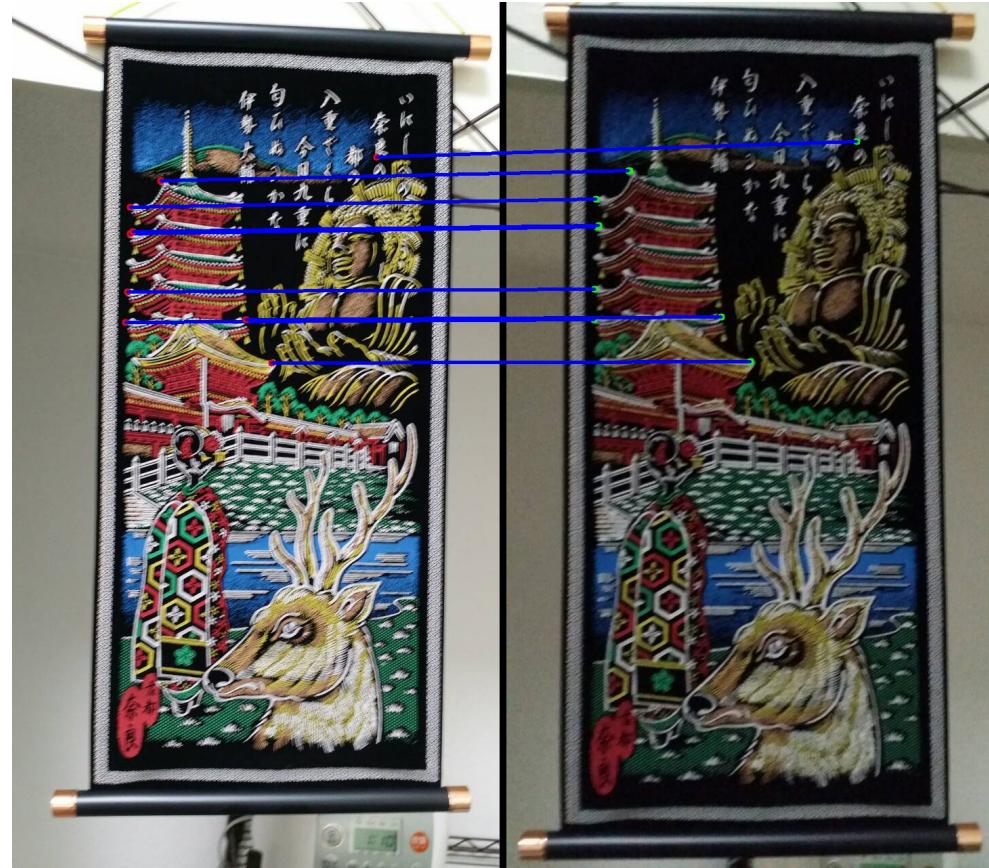
Rotation

Perfect matches in this one, but only 9 were found. This makes me think that the ORB algorithm is more sensitive to scaling than rotation. No retakes for this had to be made.



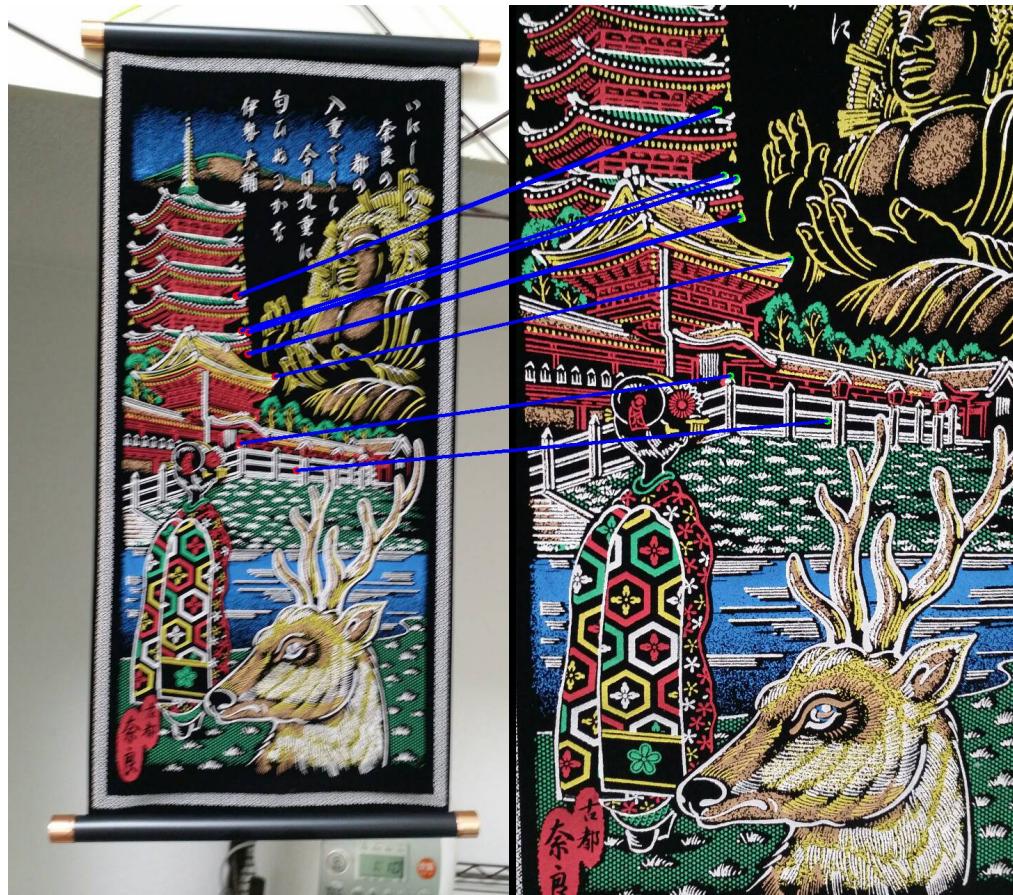
Lighting

There were only 7 features found, mainly on the pagoda. It appears that the darker features are not as sensitive to lighting. but they were all correct. No other shots had to be done for this photo. Looks pretty good the way it is.



Scale

Once again there were only 9 features found and they were found correctly. It appears the algorithm does well with enlarging the scale rather than shrinking like the sample image.



Conclusion

It appears that I have a small bug or that for some reason I found only 9 features even though they varied image to image. The ORB algorithm had an easy time making many matches probably due to the detail of the picture and its granulated look. They almost look like pixels. It may prove interesting to rotating the image on its vertical axis to push the image away and forward and see how the algorithm runs on that.