Comp Photography (Sp 2015)
HW 7

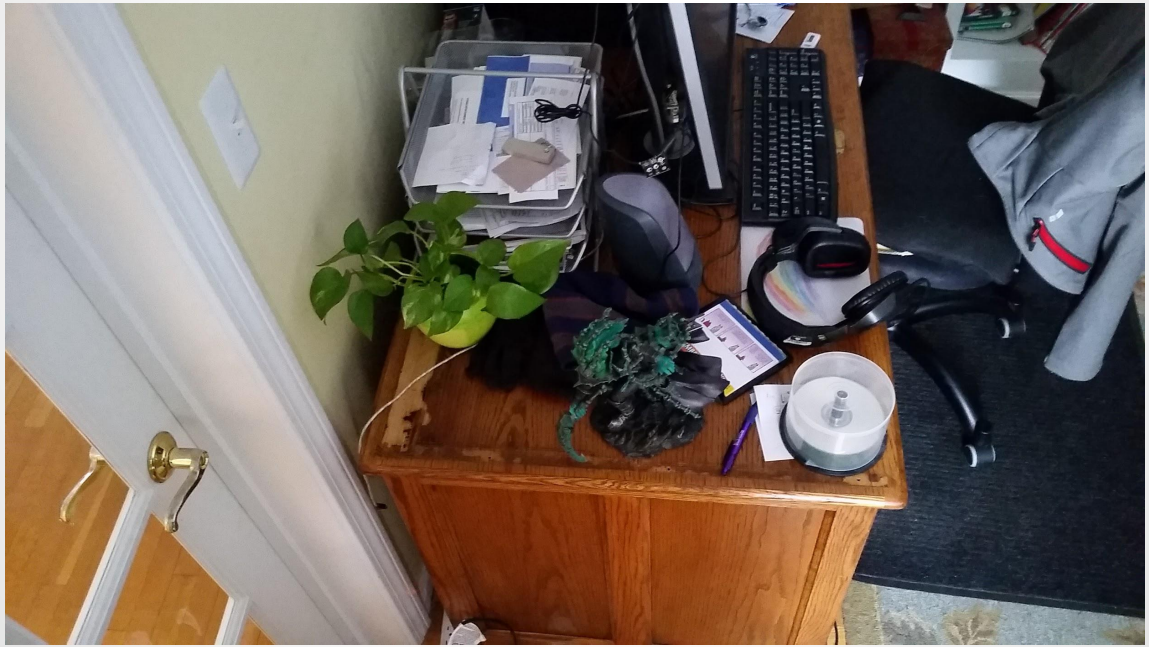
Jonathan Hudgins (jhudgins8)

Template Image

I took this photo with white poster board background. I cropped the image to include just the model. The model is “Thresh”, a character from the game “League of Legends”

Sample Image

I took this photo with lots of clutter and the model about the same distance and angle.



Lighting Image

I took this photo with bright sunlight at a steep angle (soon after sunrise) about the same distance and angle as the template. Then I cropped the image to be the same size as the template.

Scale Image

I took this photo by place the camera about 1/3rd the distance of the original template image. I tried to keep the same lighting and position.

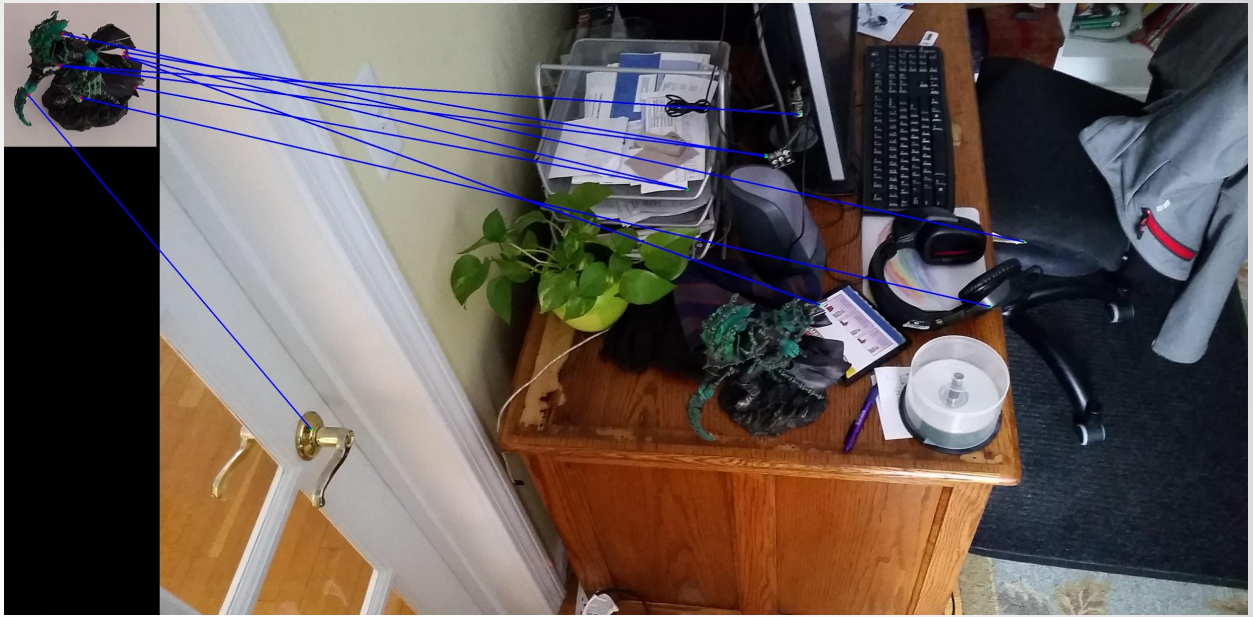
Rotation Image

I took this photo by rotating the camera about the point-of-view axis. I tried to keep all other variables identical.

Algorithm

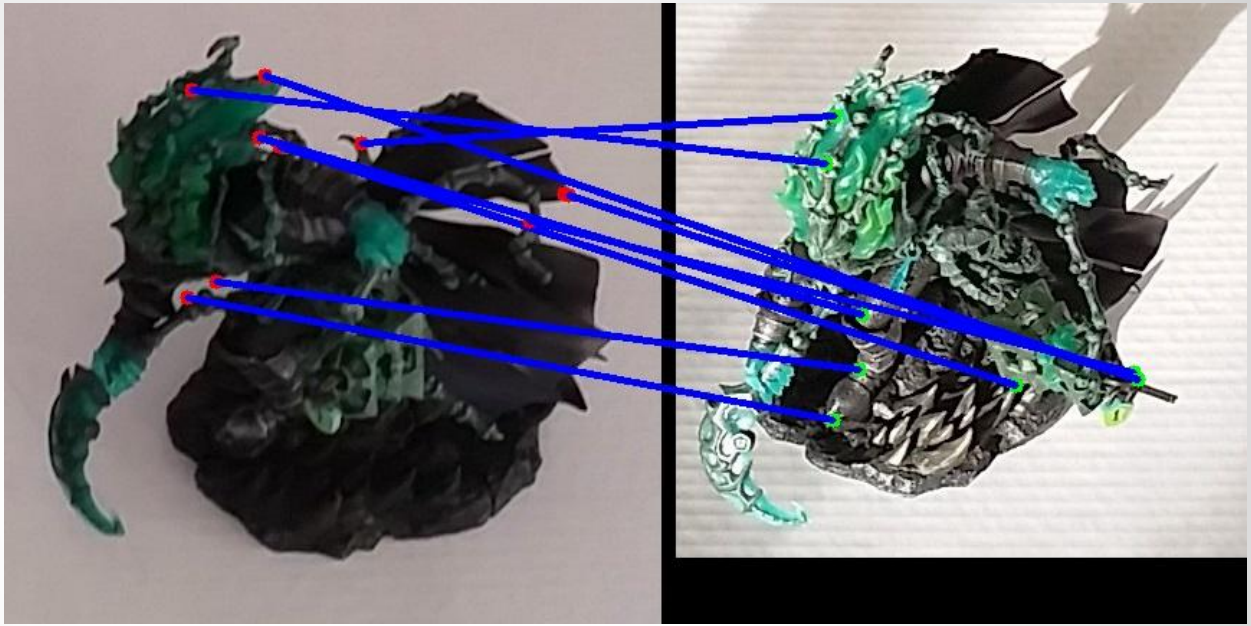
I used the OpenCV ORB module to “detectAndCompute” the keypoints and descriptions. Then I ran the Brute Force matcher (“BFMatcher”) with “NORM_HAMMING” option and sorted the matches based on distance returning the top 10.

Sample Matching



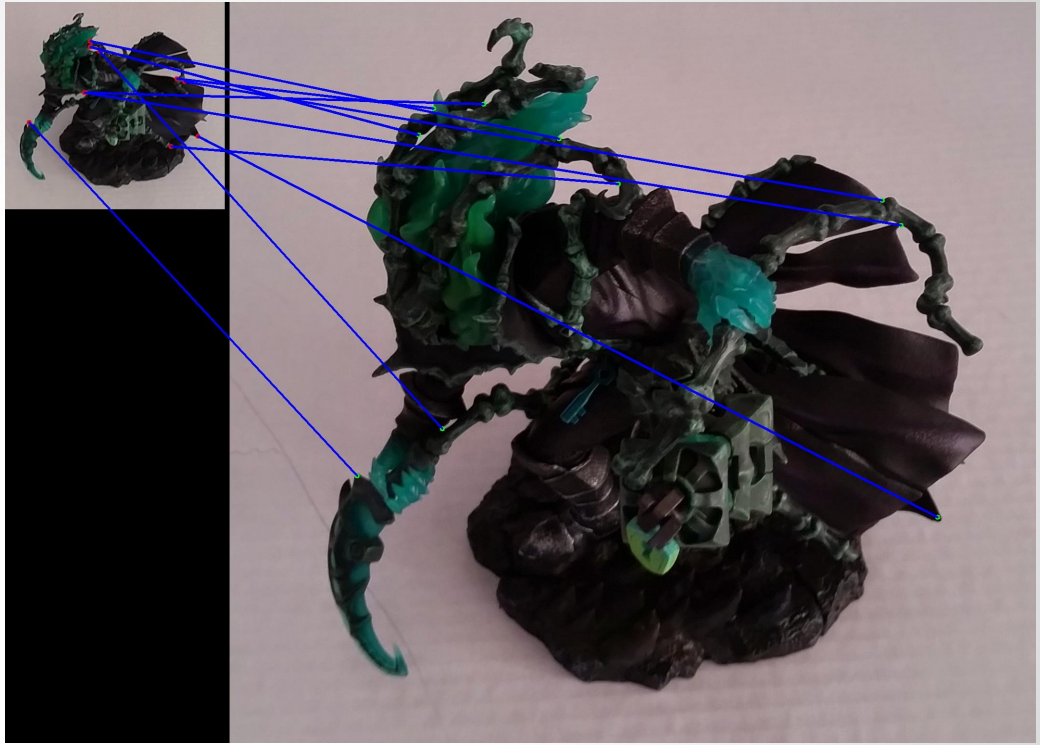
The clutter in this picture confuse the algorithm and there are 0 correct matches. The black objects with similar white background or the reflection off the headphones look very similar to some features on the original. There are simply too many other potential matches for such a high detailed model to perform well.

Lighting Matches



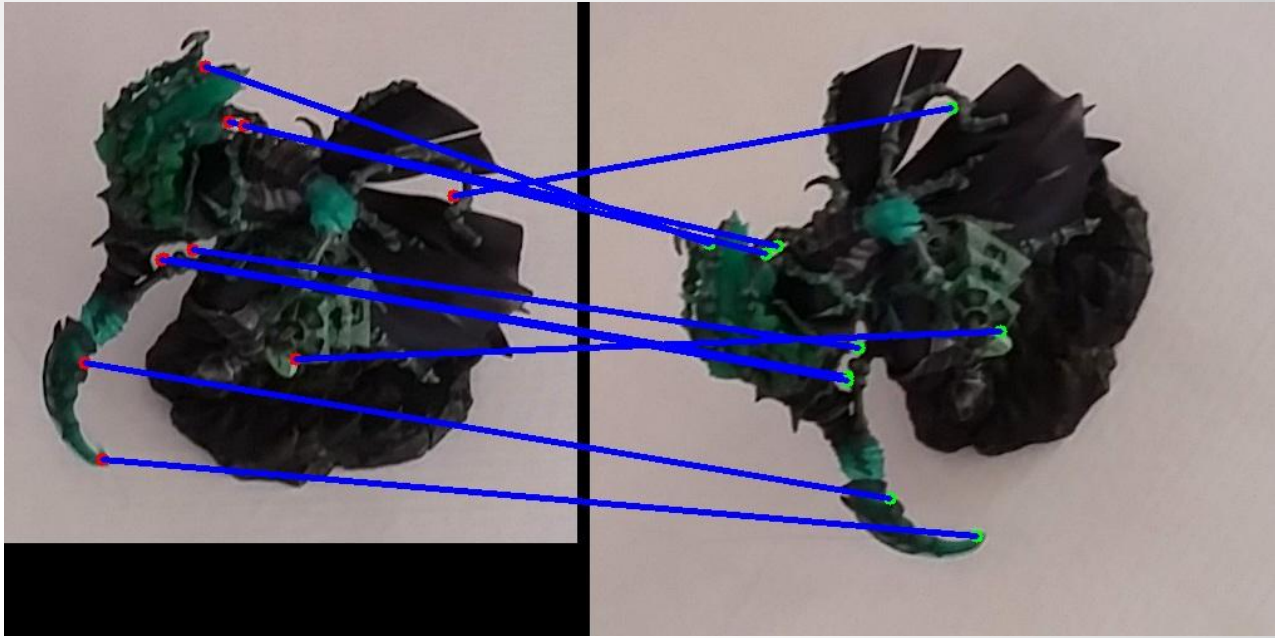
I thought with all other variables the similar that lighting changes would not make a significant difference. I was hoping for many more correct matchers, but it looks like only the knob on the head is close (and then I think it is matching similar knobs, not the actual knob). The lighting causes specular highlights to match other features.

Scale Matches



Since the ORB algorithm uses laplacian’s I thought that scale variety would match pretty good. But in the end only 3 points match.

Rotation Matches



The rotation performed the best 10 out of 10 matches! The minor changes of distance, temporal lighting did not skew the results. And the algorithm handles rotation robustly! This is promising for our uses in panorama stitching, but probably not acceptable for something like facial detection.

Results

The pictures analyzed here are second takes staged to isolate the particular variance in question. Rotation is the only variance that performed well enough to work in practice.

I also attempted to improve the results by changing the laplacian levels, scale, patch-size, and WTA_K parameters. There was some small improvement with increased levels and closer to 1 scale. But the improvement was quite minor and not worth detailing in the report.