

# Computer Vision homework 2

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## 1 Implement SIFT

In `sift_demo.ipynb`, I show the implementation of SIFT and put it into `sift_useful.py`, showing a demo in `main.py`. Here is the result of SIFT on the image "building2".

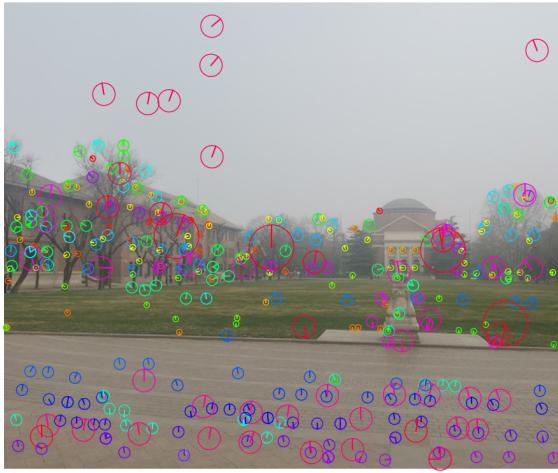


Figure 1: SIFT result on building2 (original)

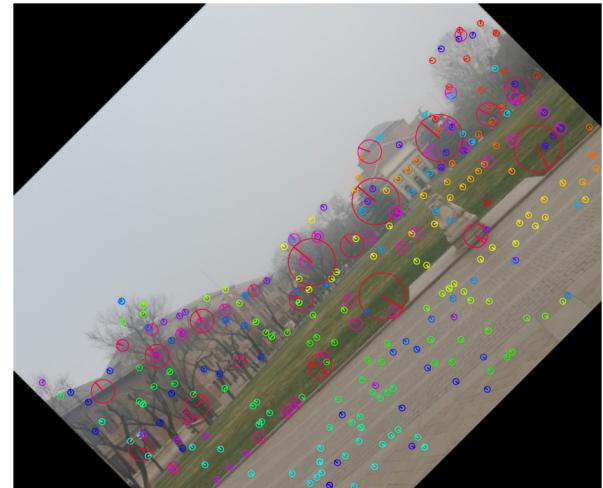


Figure 2: SIFT result on building2 (rotated)

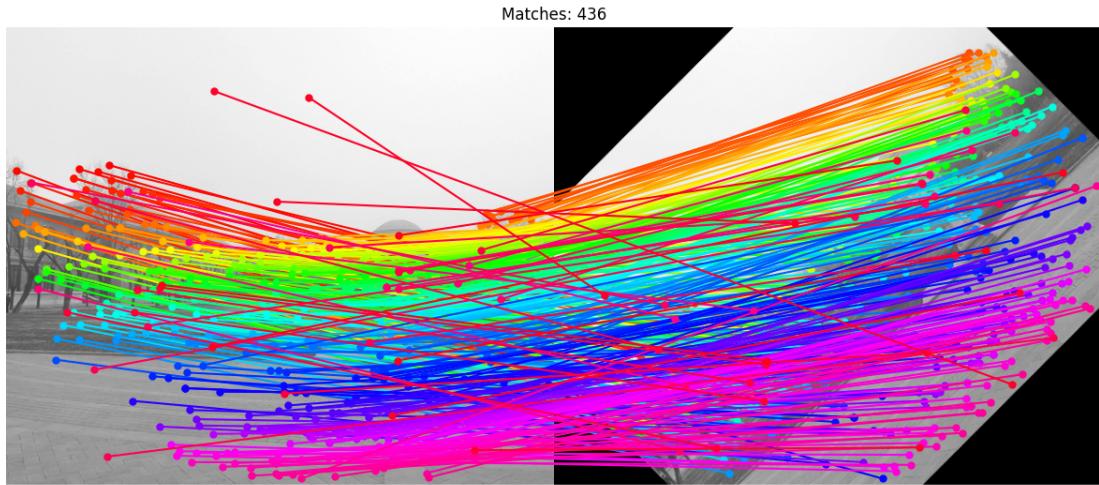


Figure 3: SIFT result on building2

## 2 Match With RANSAC

The effect of RANSAC is shown in the figure below. The left image is the original image, and the right image is the result after RANSAC.

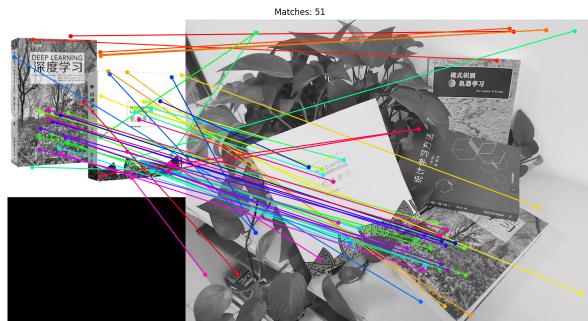


Figure 4: RANSAC before



Figure 5: RANSAC result

### 3 Homography

I use the Homography matrix to transform the image and get the result. And I obtain 3 distance: Using the homography transformation, I calculated the following real-world distances:

- Ball to gate: 23.84 m
- Left foot to gatepost: 4.74 m
- Referee to ball: 7.49 m

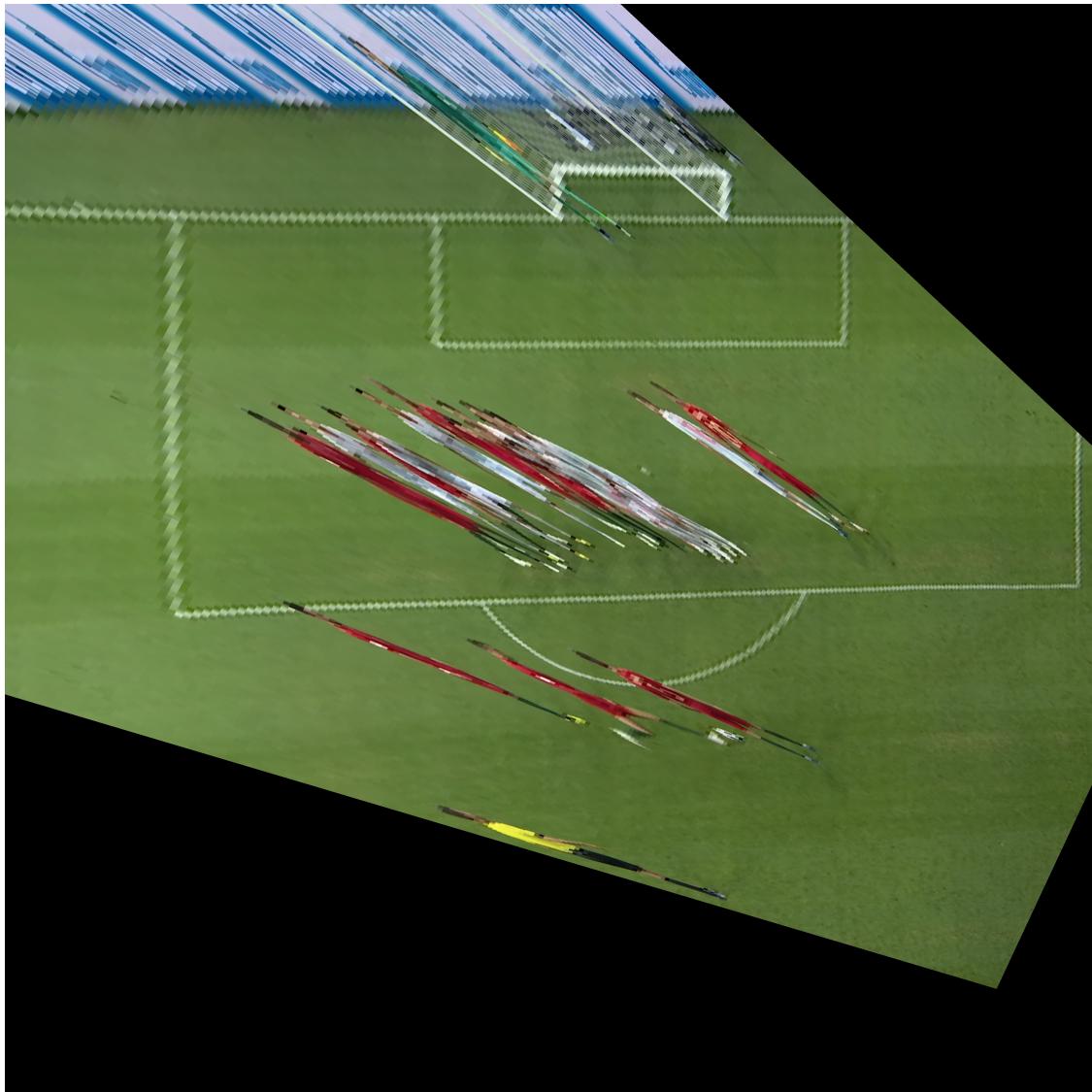


Figure 6: Homography result on football

## 4 stitch

I use the SIFT to match the image and do the RANSAC to get the homography matrix. Then I use the homography matrix to transform the image and get the result. putting building1 and building2 together into blend1., building3 and building4 together into blend2. Then put blend1 and blend2 together into final.



Figure 7: Stitching result on building1 and building2



Figure 8: Stitching result on building3 and building4

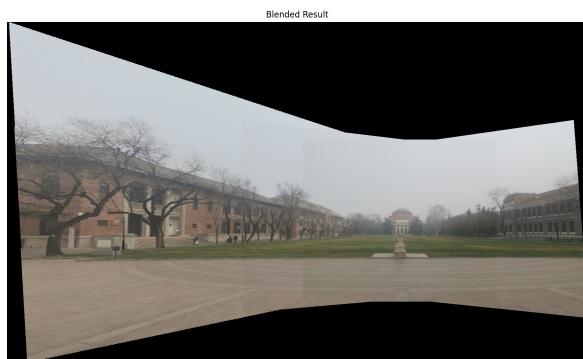


Figure 9: Stitching result on building1, building2, building3 and building4