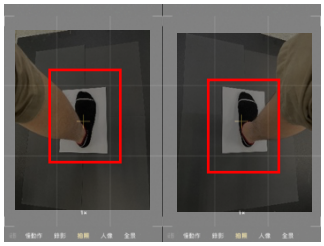
# Midterm Project

## Measure and compare your foot-prints by taking pictures

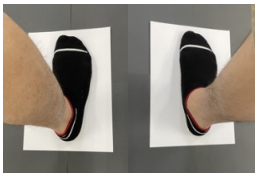
In order to do corn detection, there are some rules need to follow:

1. Put A4 sheet on a dark ground an don't put anything around the A4 sheet. This will be helpful for corn detection.
2. Take two pictures roughly from upper-right and upper-left directions.
3. The foot should be in the center of the A4 sheet, and the A4 sheet be in the middle of the image, which is taken by camera.



4. Four corners of A4 sheet should be taken in the picture.
5. If two angles of shot are very close, it will get the better result.

How to get the result:

step1. Crop and resize two photos. 

step2. Using cv2.cornerHarris() to find corners.

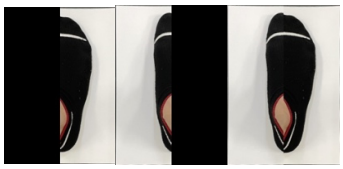
step3. Take out two corners which have the maximum y-axis value and the second maximum y-axis value as the A4 sheet lower corners.

Take out two corners which have the minimum y-axis value and the second minimum y-axis value as the A4 sheet upper corners.

step4. Calculate the homography from two images, and generate two foot images. The resolution of the image will become 210*297.

It means one pixel equals one mm.

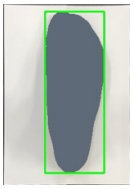
step5. Crop each image in half and merge them into an orthogonal view (a synthesized TOP view).



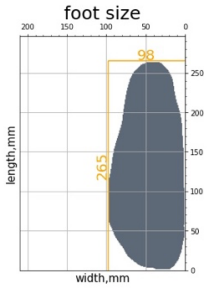
step6. Using cv2.Canny() to find the edge of the foot. 

step7. Using cv2. drawContours() to get the foot-print image. 

step8. Because one pixel equals one mm, so using cv2.boundingRect() to calculate the "width" and "length" of the foot.

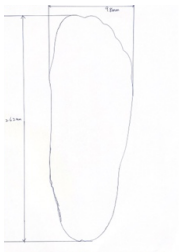


step9. Finally, estimate the foot size and print the result.




length:265mm, width:98mm

Ground truth (measurement size) by the ruler:



length:263mm, width:98mm