computer vision project 2

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1. How can we improve the edge detection performance? Explain it by using the parameters given in the provided program,'OpenCV–Canny–Edge–Detection.

in finding edges in canny edge detection, this program follows major 4 steps :

gaussian filtering , finding gradients, suppression and thresholding. I thought of ways to improve edge detection in each steps. 1) gaussian filtering. Firstly, I corrected filter value 2 to 4, at (1,4). In lecture, we learned increasing the kernel size do better smoothing. So I tried increasing the filter size by 7x7, and detector found more correct edges. 2) Finding gradient. In this code, we use sobel's filter to get x – derivatives and y – derivatives. Instead, I used filter which I found last month that gets diagonal derivatives. (➚direction).

-2	-1	0
-1	0	1
0	1	2

I thought by using this filter, I could get better edge because input picture has a lot of edges that are diagonal, not in x ,y directions. And it found more accurate edges. 3) In threshold, I changed 'lo', 'hi' values by changing constants(0.1 , 0.8). I reduced 'hi' value ,0.8 to 0.4 and gained much better result. And increasing 'lo' value little bit increased the result.

2. How can we improve the key point matching performance? Explain it by using the parameters given in the provided program, 'Harris–Corner–Detector.'

I thought I could improve corner detecting program by changing the value of 'k' and 'thresh'. at function 'create_corner_response_matrix', 'k' and 'thresh' parameters are passed and used to calculate 'R' value at 36page of pdf chap 7.

 In this code, 'corner_resp = det_corner - k * (trace_corner**2)', represents 'R' value. And thresh value is used to filter values in corner_resp like this, 'corner_pts[np.where(corner_resp > thresh * avg)] = 255'

 If this 'R' value is positive, it means that this point is corner. From this perspective, if current corner detecting can't find enough corners, than we can decrease 'k' values and find more corners. In same way, if current corner detector finds points that are not corners too, we can increase 'k' values, making number of positive 'R' to decrease.

 Similarly, changing thresh values can make corner detection result to change cus it limits the amount of points to be selected. If current corner detector can't find enough corners, than we can reduce 'thresh' value so that more points will be colored.
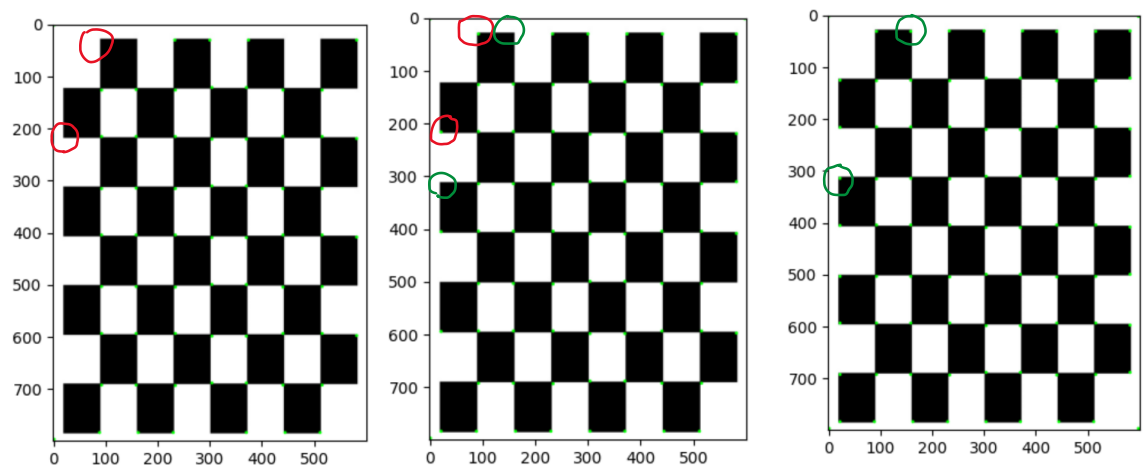
following each steps, I checked that correct corners were detected more. (I colored the changes.)