

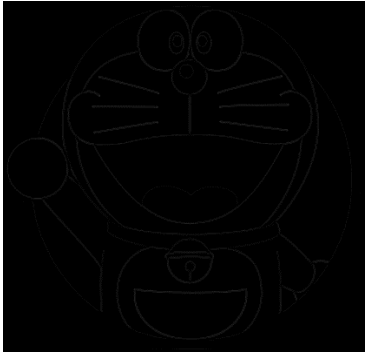
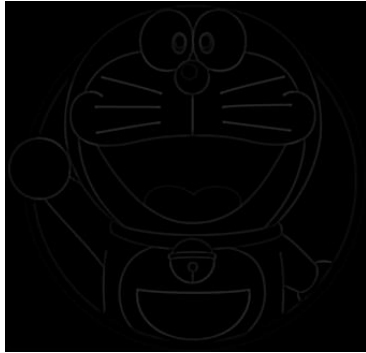


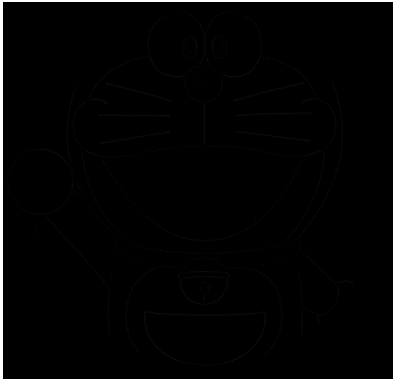

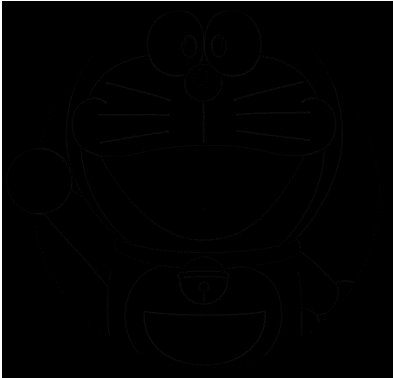

Computer Vision HW1 Report

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Part 1.

- Visualize the DoG images of 1.png.

	DoG Image (threshold = 5)		DoG Image (threshold = 5)
DoG1-1.png		DoG2-1.png	
DoG1-2.png		DoG2-2.png	
DoG1-3.png		DoG2-3.png	
DoG1-4.png		DoG2-4.png	

- Use three thresholds (2, 5, 7) on 2.png and describe the difference.

Threshold	Image with detected keypoints on 2.png		
2			
5			
7			

(describe the difference)

As you can see the figures above, the bigger threshold you use, the less extremum you can detect. It is not hard to imagine, because if the value is small enough to pass the threshold and it is also the extremum, then it will be classified into key points.




Part 2.

- Report the cost for each filtered image.

Gray Scale Setting	Cost (1.png)
cv2.COLOR_BGR2GRAY	1207799
$R*0.0+G*0.0+B*1.0$	1439568
$R*0.0+G*1.0+B*0.0$	1305961
$R*0.1+G*0.0+B*0.9$	1393620
$R*0.1+G*0.4+B*0.5$	1279697
$R*0.8+G*0.2+B*0.0$	1127913


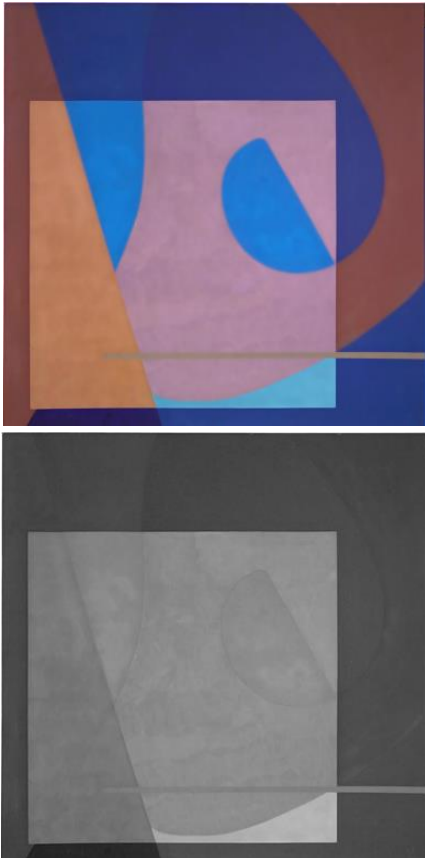
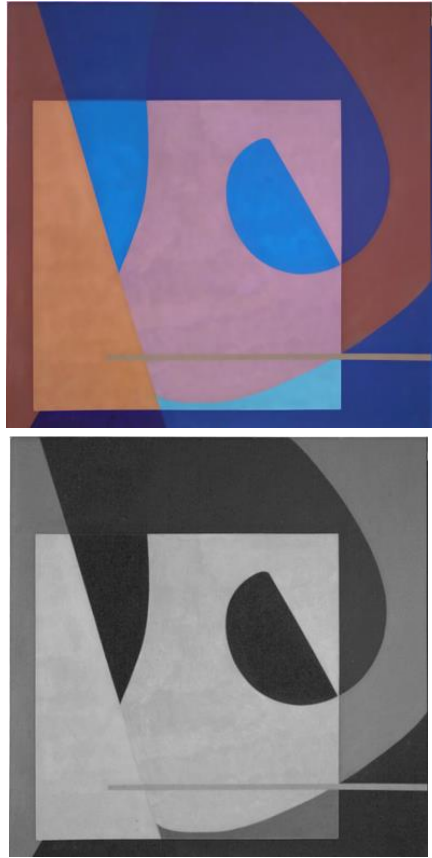
Gray Scale Setting	Cost (2.png)
cv2.COLOR_BGR2GRAY	183850
$R*0.1+G*0.0+B*0.9$	77882
$R*0.2+G*0.0+B*0.8$	86023
$R*0.2+G*0.8+B*0.0$	188019
$R*0.4+G*0.0+B*0.6$	128341
$R*1.0+G*0.0+B*0.0$	110862

- Show original RGB image / two filtered RGB images and two grayscale images with highest and lowest cost.

Original RGB image (1.png)	Filtered <u>RGB image</u> and <u>Grayscale image</u> of Highest cost	Filtered <u>RGB image</u> and <u>Grayscale image</u> of Lowest cost
		

(Describe the difference between those two grayscale images)

The main reason causing the difference between those two-grayscale image is that the different weight of the R, G, B channels. Take the first picture as an example, the highest cost of the image is the filter with only B channel can pass; however, you can nearly see blue in the picture. On the opposite, the lowest cost of image is the filter with blocking blue channel and red channel can pass more.

Original RGB image (2.png)	Filtered <u>RGB image</u> and <u>Grayscale image</u> of Highest cost	Filtered <u>RGB image</u> and <u>Grayscale image</u> of Lowest cost
		

(Describe the difference between those two grayscale images)

The main reason causing the difference between those two-grayscale image is that the different weight of the R, G, B channels. Take the first picture as an example, the highest cost of the image is the filter with only B channel is blocked; however, you can nearly see green which is the heaviest weight in the picture. On the opposite, the lowest cost of image is the filter with blocking green channel and blue channel can pass more.

- **Describe how to speed up the implementation of bilateral filter.**

The way I use to speed up the implementation of bilateral filter is I will reshape the kernel into a one-dimension matrix, then I can do dot between the matrixes to do convolution.