









Computer Vision HW1 Report

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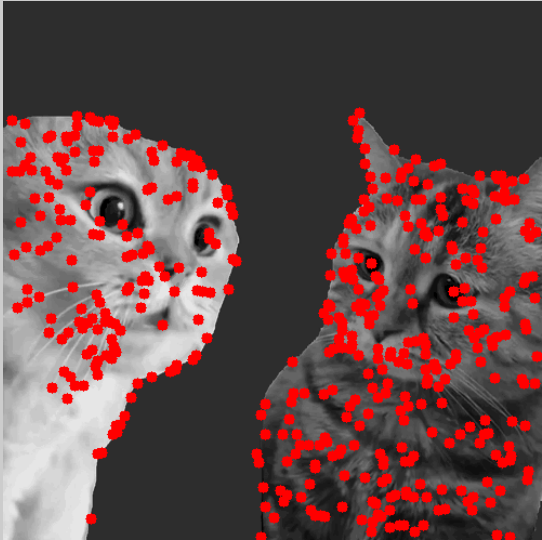
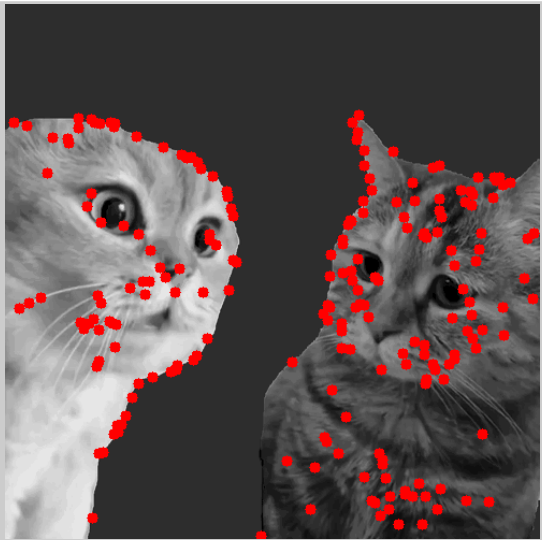

Name: 周奕節

Part 1.

- Visualize the DoG images of 1.png.

	DoG Image (threshold = 3)		DoG Image (threshold = 3)
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 (1,2,3) on 2.png and describe the difference.

Threshold	Image with detected keypoints on 2.png		
1			
2			
3			

Discuss:






The value of thresholds matters, too high will get fewer feature points, and too low will get too many. For example, the image from threshold=1 has too many keypoints, thus, a threshold of about 2-3 is a more proper value.

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

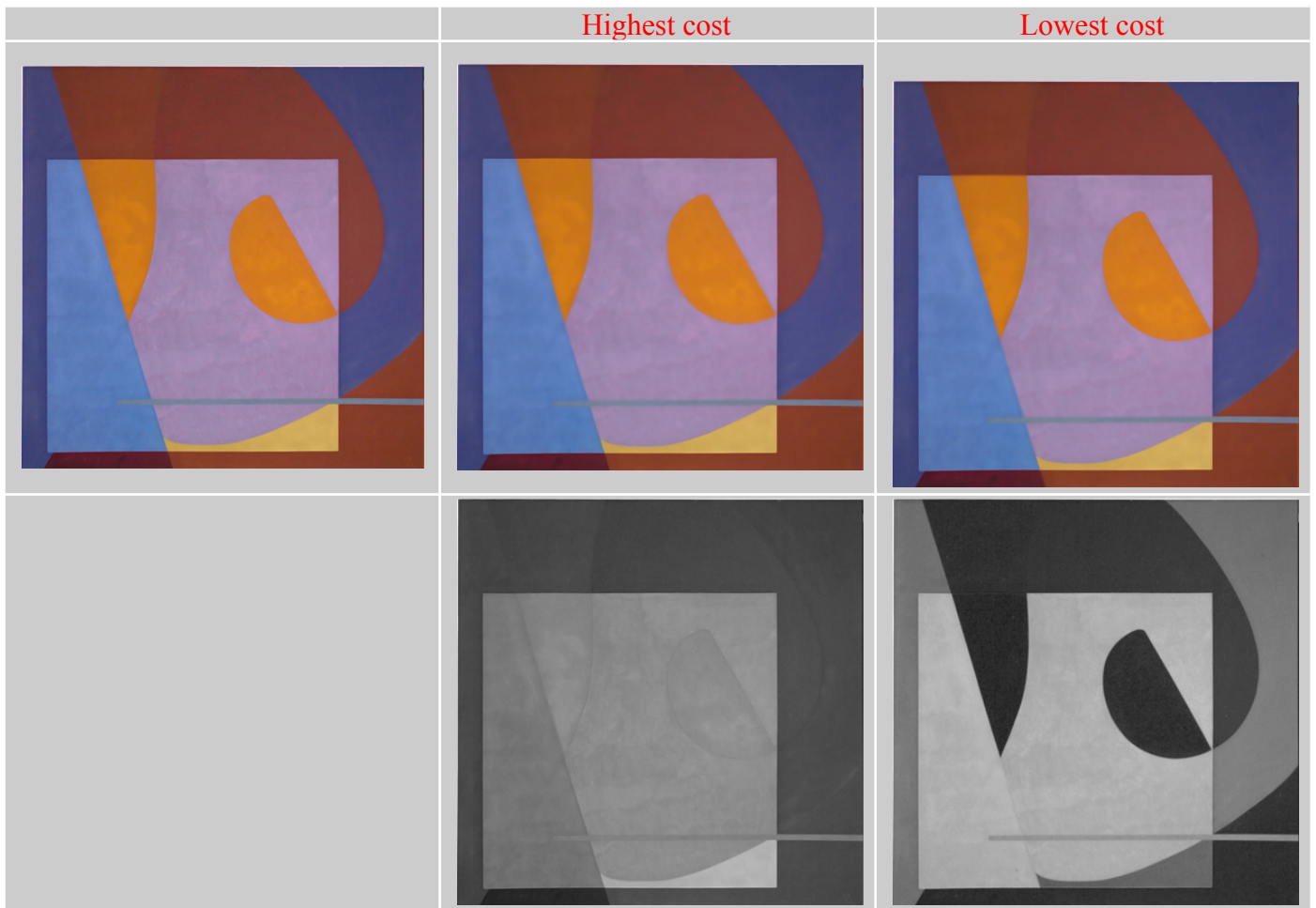
- Show original RGB image / two filtered RGB images and two grayscale images with highest and lowest cost.

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 image with the highest cost has a dark leaf and bright background, and the image with the lowest cost has a lighter leaf and dark background. Both of them have similar costs.

Original RGB image (2.png)	Filtered <u>RGB image</u> and <u>Grayscale image</u> of	Filtered <u>RGB image</u> and <u>Grayscale image</u> of
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Describe:

The image with the highest cost clearly distinguishes the original shape, and the image with the lowest cost makes all the colors too close to gray, which is hard to distinguish.

Describe how to speed up the implementation of bilateral filter.

- Use a look-up-table for both spatial and range gaussian kernels to reduce the repeating calculation.
- Reduce the usage of for-loop from 4 to 2 to enhance parallel processing.