

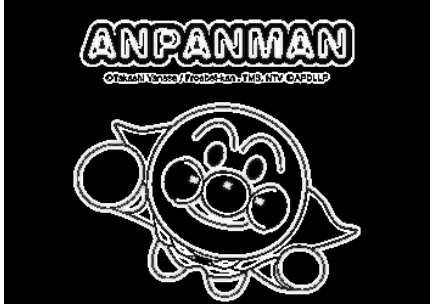







# Computer Vision HW1 Report

Student ID: B10705034

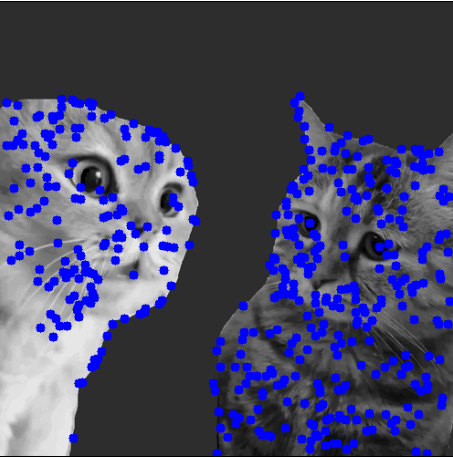
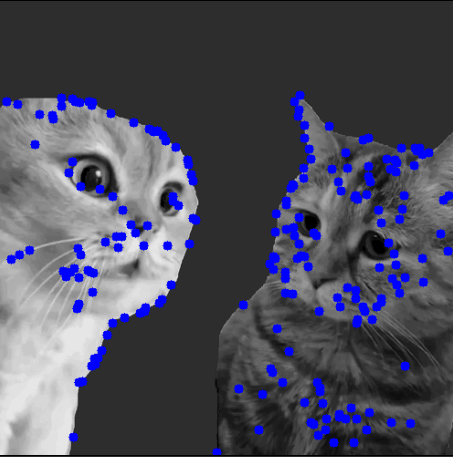

Name: 許文鑫

## 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		

(describe the difference)

當 threshold 低的時候，可以看到除了貓咪邊界有 key points 以外，貓咪身上的花紋以及鬍鬚上也有，但是當 threshold 調高後，邊界以外的區域 key points 都減少了。






## Part 2.

- Report the cost for each filtered image.

Gray Scale Setting	Cost (1.png)
cv2.COLOR_BGR2GRAY	1207800
$R*0.0+G*0.0+B*1.0$	1439568
$R*0.0+G*1.0+B*0.0$	1305962
$R*0.1+G*0.0+B*0.9$	1386155
$R*0.1+G*0.4+B*0.5$	1277423
$R*0.8+G*0.2+B*0.0$	1127895





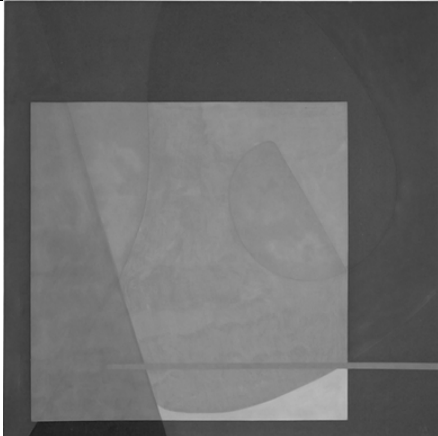
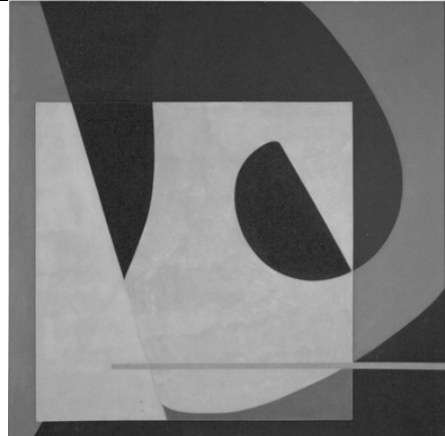
Gray Scale Setting	Cost (2.png)
cv2.COLOR_BGR2GRAY	183852
$R*0.1+G*0.0+B*0.9$	78490
$R*0.2+G*0.0+B*0.8$	86425
$R*0.2+G*0.8+B*0.0$	187521
$R*0.4+G*0.0+B*0.6$	128826
$R*1.0+G*0.0+B*0.0$	110861

- 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)

在 low cost 的灰階圖中，紅色葉子和草地的 intensity 的差距比較明顯，而 high cost 的灰階圖中，葉子和草地的差距不大，葉子就比較不明顯。

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)

Low cost 的灰階圖可以比較明顯的看出原圖各個顏色的邊界，high cost 的就很不明顯。

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

因為計算的過程會將兩個 kernel 相乘，所以我把  $\exp(a) * \exp(b)$  的部分都用  $\exp(a + b)$  處理，不果也只有快一點點。