

電腦視覺 作業4

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Implement the Harris corner detector and experiment with at least one of the following settings:

1. Different ways of computing the derivative I_x, I_y
2. Different window sizes
3. Different thresholds for f

1.分別使用一階中心化微分和一階向前微分，以下模型有三種選擇：

(1) 一階中心化微分

$$\frac{\partial f(x, y)}{\partial x} = \frac{f(x + 1, y) - f(x - 1, y)}{2}$$
$$\frac{\partial f(x, y)}{\partial y} = \frac{f(x, y + 1) - f(x, y - 1)}{2}$$

(2)一階後向微分

$$\frac{\partial f(x, y)}{\partial x} = f(x + 1, y) - f(x, y)$$
$$\frac{\partial f(x, y)}{\partial y} = f(x, y + 1) - f(x, y)$$

(3)一階向前微分

$$\frac{\partial f(x, y)}{\partial x} = f(x, y) - f(x - 1, y)$$
$$\frac{\partial f(x, y)}{\partial y} = f(x, y) - f(x, y - 1)$$

2.針對window sizes 採取5和7

3.針對thresholds 採取1200和1800

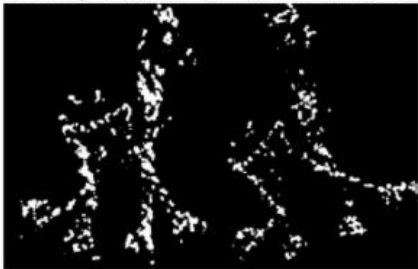
實驗結果如下：

Different way	Window size	Threshold
一階中心化微分	5	1200
一階中心化微分	5	1800
一階中心化微分	7	1200
一階中心化微分	7	1800
一階向前微分	5	1200
一階向前微分	5	1800
一階向前微分	7	1200
一階向前微分	7	1800

Original Image



Different way = central, window size = 5, threshold =1200



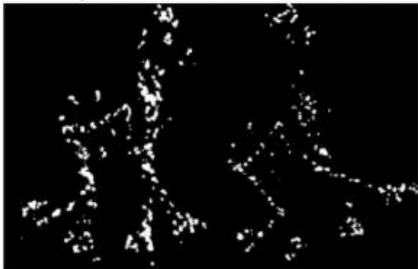
Features in Image



Original Image



Different way = central, window size = 5, threshold =1800



Features in Image



Original Image



Different way = central, window size = 7, threshold =1200



Features in Image



Original Image



Different way = central, window size = 7, threshold =1800



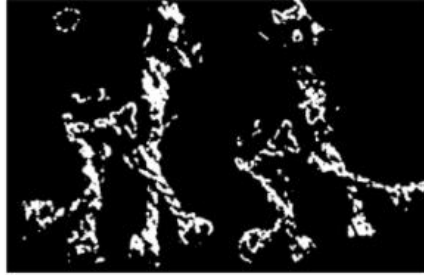
Features in Image



Original Image



Different way = forward, window size = 5, threshold =1200



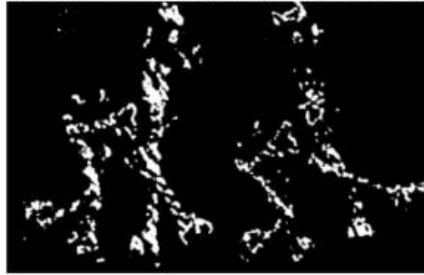
Features in Image



Original Image



Different way = forward, window size = 5, threshold =1800



Features in Image



Original Image



Different way = forward, window size = 7, threshold =1200



Features in Image



Original Image



Different way = forward, window size = 7, threshold =1800



Features in Image



結論：由實驗發現當threshold變大時，能捕捉到的特徵點會變少，此外，當window size 變大時，捕捉到的特徵點也會增加，其可能的原因是在增加window size時，亦會增加H總和，讓超越threshold的點增加。