CSE 344: Computer Vision

Homework 6 ; Arka Sarkar 2018222

Question 1

Matlab Code :

```
a = [1 1 9 9 9 ;
1 1 9 9 9 ;
1 1 9 9 9 ;
1 1 1 1 1 ;
1 1 1 1 1 ] %symmetric padded matrix

I_x = conv2(a,[1 -1], "same");
I_x = I_x(2:4,2:4)
I_y = conv2(a,[1 ;-1], "same");
I_y = I_y(2:4,2:4)
M = [sum(sum(I_x.^2)), sum(sum(I_x.*I_y));sum(sum(I_x.*I_y)), sum(sum(I_y.^2))]
det_M = det(M)
```

Covariance Matrix (M) :

```
  128     0
    0   128
```

Determinant **:** 16384

Question 2

Eigen values for M are : 128,128

Sum = 256

Question 3

R using harris method = 128*128 - 0.04(128+128)**2 = 13763

Question 4

R using Shi-Thomsi = min(128, 128) =128

Question 5

As we apply gaussian filters on a image 3 times on multiple scales the , the number of keypoints will decrease hence the numeric values of the pixels would be closer. Hence the variance of the resultant image will decrease.

Question 6

DoGs stands for Difference of Gaussians which is difference of consecutive gaussians having different scales, it is used to find key points using SIFT method.