HW #2

Q6) Harris corner detection is invariant to rotation due to the fact that after image has been rotated corner Response R remains same because eigen values remain unchanged of Conic

$$= \begin{bmatrix} A & C \\ C & B \end{bmatrix} (x, y)^T$$

where $A = f_x^2 \times G(u,v)$

$B = f_y^2 \times G(u,v)$

$C = f_x f_y \times G(u,v)$

while on other hand Harris Corner Detection is non-invariant to image scale, its Due to the fact that if Sliding window to Calculate intensity remains unchanged after scaling, all corners points ~~will~~ will be classified as edges rather ~~that~~ than corners. to Solve this, we have to find sliding window length according to the valor of image Scaled.

Furthermore Harris Detection is partial invariance to additive and multiplicative intensity changes [intensity shift, intensity Scaling]

Intensity shift is invariant because $I \rightarrow I + b$ [adding Constant Value to image] will still remain invariant because the derivatives calculated on x and y axis will remain Unchanged, as the difference between adjacent pixels remains same.

on the other hand Intensity ~~shift~~ scaling is non Variant : $I \rightarrow aI$ because the difference between pixel is changed, and the threshold to Compare R will not be satisfied to qualify Some points as Corners if points are scaled. to handle the following problem we will need to fine tune the threshold value.

Region of an image is Considered salient when Corner Response (R) is Very high. [Patch entropy and rate of Change in gradient]