(2)

Harris corner Detection Algorithm:-

1) compute x and y derivatives of image
2) Compute products of derivatives at every pixel.
3) Compute the sums of the products of derivatives at each pixel.

$$S_{x^2} = G_{\sigma'} * I_{x^2}$$
$$S_{y^2} = G_{\sigma} * I_{y^2}$$
$$S_{xy} = G_{\sigma'} * I_{xy}$$

4) Define at each pixel (x,y) the matrix

$$H(x,y) = \begin{bmatrix} S_{x^2}(x,y) & S_{xy}(x,y) \\ S_{xy}(x,y) & S_{y^2}(x,y) \end{bmatrix}$$

5) Compute the response of the detector at each pixel.

$$R = Det(H) - k(Trace(H))^2$$

6) Threshold on value of R

7) Compute nonmax supression.

A 5×5 patch from my Image {32, 16}

$$\begin{bmatrix} 219 & 218 & 223 & 225 & 212 \\ 223 & 217 & 218 & 217 & 196 \\ 239 & 233 & 228 & 216 & 182 \\ 235 & 235 & 232 & 219 & 177 \\ 237 & 233 & 222 & 205 & 159 \end{bmatrix}$$

$\lambda_1 \approx -42.16$

$\lambda_2 \approx -3.04$

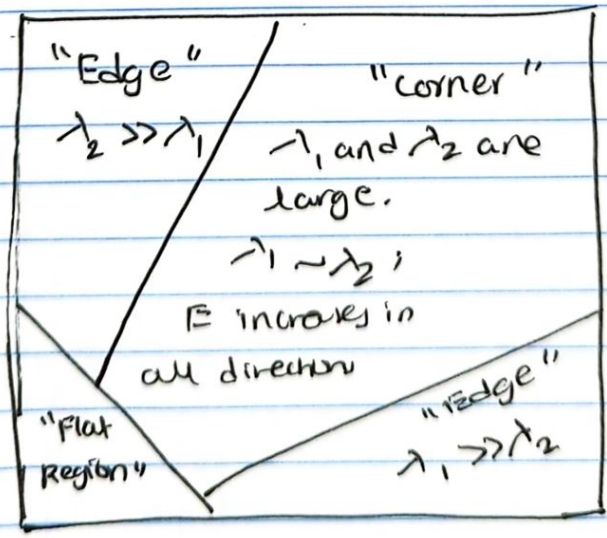
$\lambda_3 \approx 1084.9$

$\lambda_4 \approx 1.140 + 1.732 \cdot i$

$\lambda_5 \approx 1.140 - 1.732$

} Eigen values of patch

classification via Eigen values



In the above example,

$\lambda_2 >> \lambda_1$

So, it is an edge