

## Color Conversion

(RGB to Grayscale)

$$\text{Gray Scaled} = \begin{bmatrix} 0.299 \\ 0.587 \\ 0.114 \end{bmatrix} \times \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$



## Gaussian Smoothing

$$\begin{bmatrix} \text{5x5} \\ \text{Smoothed} \\ \text{Output} \end{bmatrix} = \begin{bmatrix} \text{5x5} \\ \text{Gaussian} \\ \text{Coeff. (fp)} \end{bmatrix} \times \begin{bmatrix} \text{5x5} \\ \text{Image} \\ \text{Pixels} \end{bmatrix}$$



## Derivative Mask

(Gradient Calc. via Sobel)

$$I_x = \begin{bmatrix} \text{5x5} \\ \text{Sobel - x} \\ \text{Coeff.} \end{bmatrix} \times \begin{bmatrix} \text{5x5} \\ \text{Image} \\ \text{Pixels} \end{bmatrix}$$
$$I_y = \begin{bmatrix} \text{5x5} \\ \text{Sobel - y} \\ \text{Coeff.} \end{bmatrix} \times \begin{bmatrix} \text{5x5} \\ \text{Image} \\ \text{Pixels} \end{bmatrix}$$



## Struct Tensor and

Calc. Harris Response

$$\text{Auto - Correlation} = \begin{bmatrix} | \times | & | \times | \\ I_x & I_x & I_x & I_y \\ I_x & I_y & I_y & I_y \end{bmatrix}$$
$$R = \det(M) - k \times \text{trace}(M)^2$$



## Normalize Response

Dynamic-Max = Max (Scores)

$$\text{Normalized Score} = \frac{\text{Response}}{\text{Dynamic-Max}} \rightarrow (8\text{-}, 16\text{-}, 32\text{-bit})$$



Corner  
Selection Via  
Non-Maximum  
Suppression