

## Roberts Cross Edge Detector

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The Robert's Cross edge detector is a fast and simple convolution-based operator for extracting edges in a digital image. Robert's Cross consists of two 2x2 kernels run over an image separately to find gradient edges.

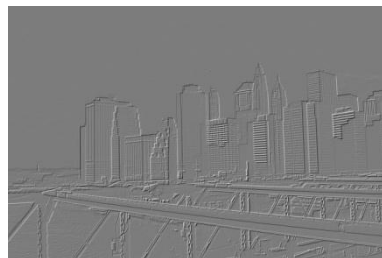
The two kernels are:

$$\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix} \quad \text{and} \quad \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

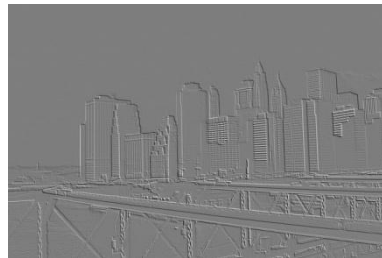
Convolving the image with the first kernel finds the gradient edges at  $-45^\circ$  and the second at  $45^\circ$ . The images below show a test image and the results of the Robert's Cross operator.



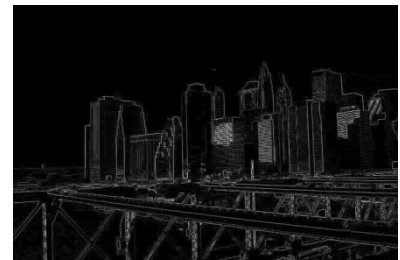
Original Image



Convolution Result 1



Convolution Result 2



Gradient Magnitude Image

The middle two images are the results of the separate convolution operations. The rightmost image is the magnitude image, created by taking the RSS of the two convolved images.