

ImageEdgeDetection

```
AutoPositionWindow/M=0/R=comp1
End
Function RemoveAlphaChannel()           // Remove the alpha channel from imageA
Wave imageA
Duplicate/R=[][] [0,2] imageA, imageA_rgb
NewImage/S=0 imageA_rgb
End
```

References

T. Porter & T. Duff - Compositing Digital Images. Computer Graphics Volume 18, Number 3, July 1984 pp 253-259.

See Also

ImageBlend

ImageEdgeDetection

ImageEdgeDetection [*flags*] **Method** *imageMatrix*

The ImageEdgeDetection operation performs one of several standard image edge detection operations on the source wave *imageMatrix*.

Unless the /O flag is specified, the resulting image is saved in the wave M_ImageEdges.

The edge detection methods produce binary images on output; the background is set to 0 and the edges to 255. This is due, in most cases to a thresholding performed in the final stage.

Except for the case of marr and shen detectors, you can use the /M flag to specify a method for automatic thresholding; see the **ImageThreshold** /M flag.

Parameters

Method selects type of edge detection. *Method* is one of the following names:

canny	Canny edge detector uses smoothing before edge detection and thresholding. You can optionally specify the threshold using the /T flag and the smoothing factor using /S.
frei	Calculates the Frei-Chen edge operator (see Pratt p. 503) using only the row and column filters.
kirsch	Kirsch edge detector (see Pratt p. 509). Performs convolution with 8 masks calculating gradients.
marr	Marr-Hildreth edge detector. Performs two convolutions with Laplacian of Gaussian and then detects zero crossings. Use the /S flag to define the width of the convolution kernel.
prewitt	Calculates the Prewitt compass gradient filters. Returns the result for the largest filter response.
roberts	Calculates the square root of the magnitude squared of the convolution with the Robert's row and column edge detectors.
shen	Shen-Castan optimized edge detector. Supposed to be effective in the presence of noise. The flags that modify this operation are: /F for the threshold ratio (0.9 by default), /S for smoothness factor (0.9 by default), /W for window width (default is 10), /H for thinning factor which by default is 1.
sobel	Sobel edge detector using convolutions with row and column edge gradient masks (see Pratt p. 501).

Flags

/F= <i>fraction</i>	Determines the threshold value for the shen algorithm by starting from the histogram of the image and choosing a threshold such that <i>fraction</i> specifies the portion of the image pixels whose values are below the threshold. Valid values are in the interval ($0 < fraction < 1$).
/H= <i>thinning</i>	Thins edges when used with shen edge detector. By default the thinning value is 1. Higher values produce thinner edges.
/I	Inverts the output, i.e., sets the edges to 255 and the background to 0.

<i>/M=threshMethod</i>	See the ImageThreshold automatic methods for obtaining a threshold value. Methods 1, 2, 4 and 5 are supported in this operation. If you use <i>threshMethod</i> = -1, threshold is not applied. If you want to apply your own thresholding algorithm, use <i>/M=6</i> to bypass the thresholding completely. The wave <i>M_RawCanny</i> contains the result regardless of any other flags you may have used.
<i>/N</i>	Sets the background level to 64 (i.e., NaN)
<i>/O</i>	Overwrites the source image with the output image.
<i>/P=layer</i>	Applies the operation to the specified layer of a 3D wave. <i>/P</i> is incompatible with <i>/O</i> . <i>/P</i> was added in Igor Pro 7.00.
<i>/R=roiSpec</i>	Specifies a region of interest (ROI). The ROI is defined by a wave of type unsigned byte (/b/u). The ROI wave must have the same number of rows and columns as the image wave. The ROI itself is defined by entries/pixels whose values are 0. Pixels outside the ROI can be any nonzero value. The ROI does not have to be contiguous and can be any arbitrary shape. See ImageGenerateROIMask for more information on creating ROI waves. In general, the <i>roiSpec</i> has the form { <i>roiWaveName</i> , <i>roiFlag</i> }, where <i>roiFlag</i> can take the following values: <i>roiFlag</i> =0: Set pixels outside the ROI to 0. <i>roiFlag</i> =1: Set pixels outside the ROI as in original image. <i>roiFlag</i> =2: Set pixels outside the ROI to NaN (=64). By default <i>roiFlag</i> is set to 1 and it is then possible to use the <i>/R</i> flag using the abbreviated form <i>/R=roiWave</i> .
<i>/S=smoothVal</i>	Specifies the standard deviation or the width of the smoothing filter. By default the operation uses 1. Larger values require longer computation time. In the shen operation the default value is 0.9 and the valid range is (0 < <i>smoothVal</i> < 1).
<i>/T=thresh</i>	Sets a manual threshold for any method above that uses a single threshold. This is faster than using <i>/M</i> .
<i>/W=width</i>	Specifies window width when used in the shen operation. By default width is set to 10 and it is clipped to 49.

See Also

The **ImageGenerateROIMask** operation for creating ROIs and the **ImageThreshold** operation.

Edge Detectors on page III-365 for a number of examples.

References

Pratt, William K., *Digital Image Processing*, John Wiley, New York, 1991.