

Custom convolution plug-in filter

The Adobe Photoshop Custom filter is a powerful tool for applying a wide variety of convolution filters to images, and an excellent way to learn about those filters by modifying the coefficients and observing the results. It has several limitations which are overcome in the freely downloadable Custom plug-in from Reindeer Graphics, from the extensive Fovea Pro set of plug-ins for serious image processing and analysis.

Photoshop Custom Filter

part of Adobe Photoshop
recordable in Actions
scrollable preview window
only 8 bit per channel grey and RGB images
works on individual R, G, B channels

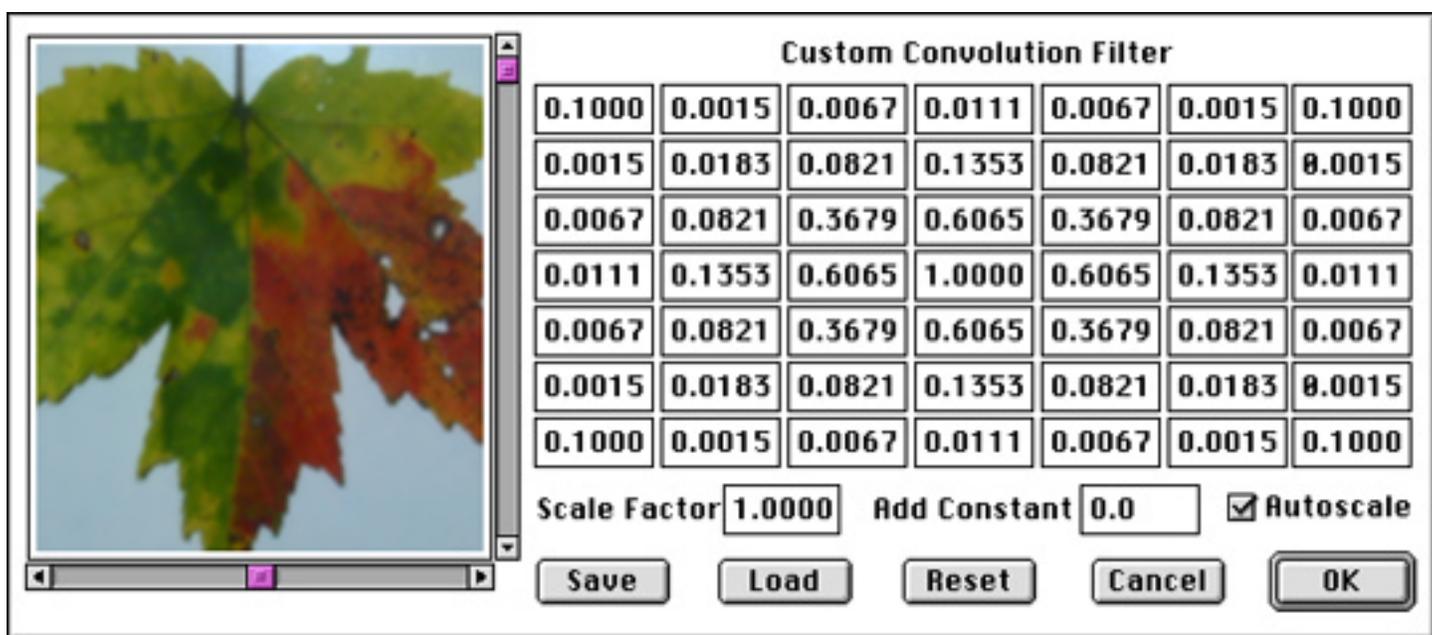
limited 5x5 array
integer coefficients only
fixed scaling with integer

can load and save files (special format)

Reindeer Custom Plug-in

works with all Photoshop-compatible programs
recordable in Actions
scrollable preview window
both 8 and 16 bit per channel grey and RGB images
works on intensity channel leaving hue and saturation unchanged

7x7 array handles larger filters
accepts real (floating point) numbers for much greater precision
real numbers give much better control, plus automatic scaling for maximum unclipped contrast
reads Photoshop format files AND reads and writes plain ascii text files (create filters with a spreadsheet or other program)



The appearance of the dialog is similar to the Photoshop filter. Real numbers can be entered as filter weights, scale factor or offset constant. The Tab key moves from cell to cell in the array. The Autoscale check box bypasses the scale factor and offset constant and forces the values to fit into the 0..255 dynamic range of the image. Reset clears the array of coefficients. The Save button saves the filter values in a standard tab-delimited text file. The Load button will load these files or the standard Photoshop *.acf files.

After downloading and decompressing the plug-in, place it in the same folder with your other Photoshop filters. For programs other than Photoshop (e.g., Image-Pro Plus, NIH-Image, Paint Shop Pro, etc.) refer to your program manual for the correct location for plug-in files. The next time the program is launched it will add the IP*Process->Custom item to the Filter menu. The downloadable archive also includes several filters (all of type *.txt) that perform common convolution operations such as Gaussian smoothing, low pass averaging, bandpass (difference of Gaussians), sharpening (Laplacian) and directional derivative (embossing) operations.

The Reindeer Custom plug-in is part of the Fovea Pro plug-in set. This collection of nearly 200 plug-in routines provides a comprehensive set of tools for image processing (including extensive Fourier transform functionality) and measurement (including stereological techniques appropriate for microscopy applications) on 8- and 16-bit per channel grey scale and RGB images. Full information on Fovea Pro, and the Image Processing Tool Kit, which has similar capabilities for 8-bit per channel images and is intended primarily for educational use, can be found at <http://ReindeerGraphics.com>, where there is a substantial on-line tutorial and an active bulletin board for user support.

Convolution filters provided as text files

Smoothing filters: Average3 and Average7 simply average the pixels in different size neighborhoods. Gauss05,10,14,20 are Gaussian smoothing filters with standard deviations of 0.5, 1.0,1.4 and 2.0 pixels, respectively.

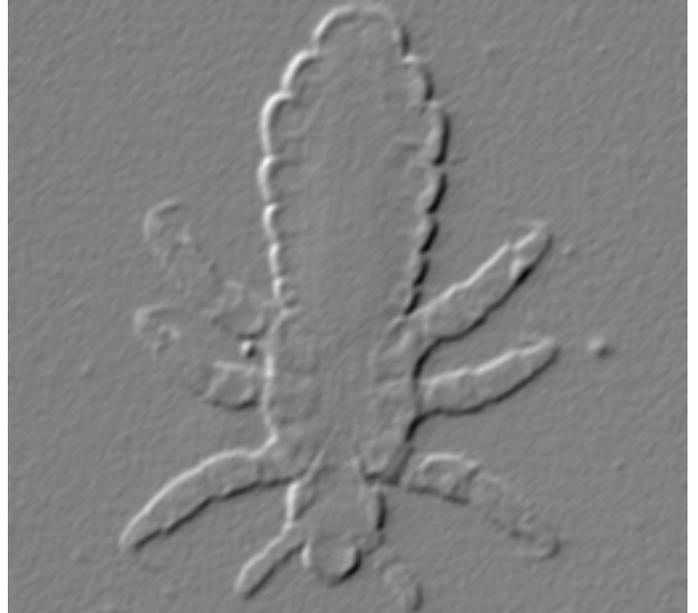
Derivative filters: Deriv_horz,vert,ne,nw are derivative or embossing filters in each of four directions.

High Pass filters: Laplac3 and Sharp3 are classical high pass and sharpening filters. Laplac5 is similar on a larger spatial scale. Laplacian and Sharpen use real numbers to reduce anisotropy.

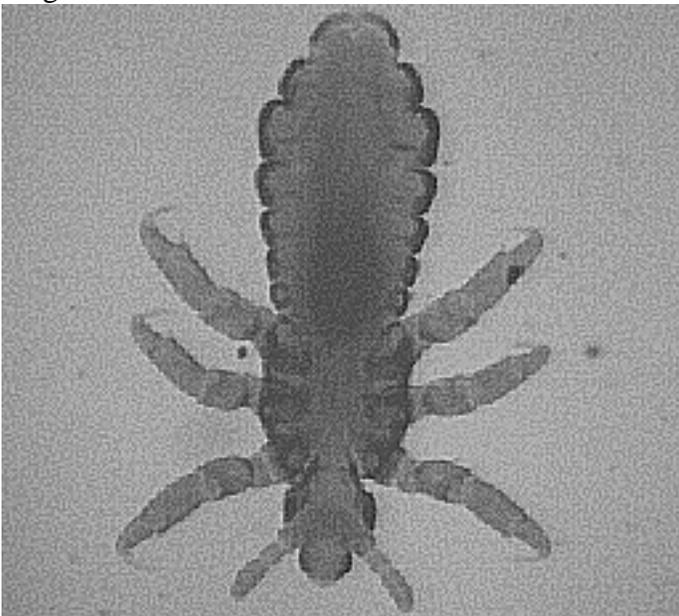
Bandpass: Dog2 and Dog4 are difference of Gaussian filters that enhance edges while averaging noise, on two different spatial scales.



Original



Deriv_NW



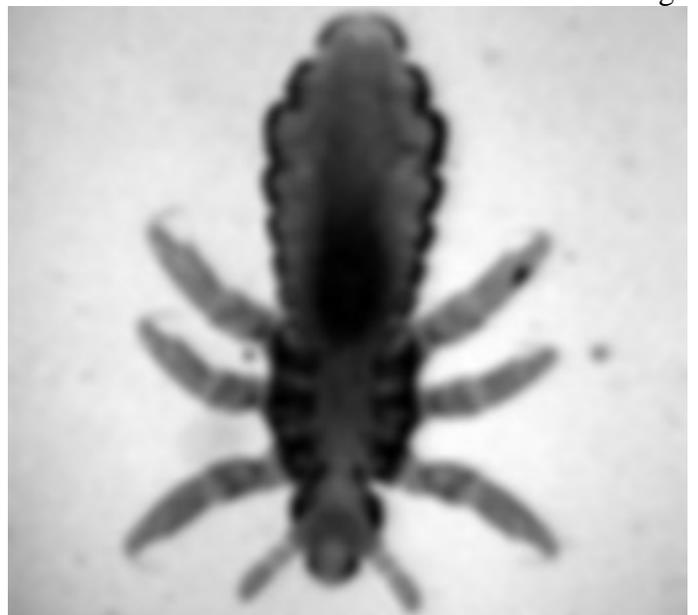
Sharpen



Dog4



Gauss05



Gauss20