

A Quick Primer on Sharpening Concepts

@2010 by Godfrey DiGiorgi

Derived from the work of Bruce Fraser et al, available from the Adobe website.

Sharpening in digital image processing should be looked upon as having three separate components, or phases, or contexts.

1 - Digital capture sensors typically have an antialiasing filter in front of the sensor which help to eliminate moire artifacts as edges come into conjunction at the resolution of the photosite array. That's a complicated way to say that if you have a thin straight line and you rotate it on the sensor so that it is almost in alignment with a line of photosites, there will come a point where the thin straight line will randomly register on one side or the other of a boundary between photosites. The antialiasing filter blurs and widens the line to minimize the moire effect that this causes. In doing so, some resolution is lost.

Capture sharpening is the operation of setting edge boundary contrasts to recover the perception of resolution to reduce this problem.

2 - In the course of rendering an image, there are times when it is valuable to decrease the perceptual sharpness in some areas relative to other areas, and increase the perceptual sharpness in some areas relative to other areas, in order to guide the viewers' eyes to what and where you want their attention focused.

This is called **Creative sharpening**. It is implemented by selective application of sharpening and blurring operations on parts of the image.

3 - When outputting an image for display, either to a computer monitor or to a printer, you have to take into account the size (in pixels) and resolution of the device, and scale the image according to your presentation desires/needs. The process of scaling the image for the device will cause a certain amount of resolution loss since you are interpolating values from the original resolution to a lower resolution device.

Output sharpening is performed to correct for resolution losses and restore the perceptual sharpness so the image looks as you intend.

When it comes to doing my image processing work, I tend to use

- as little **capture sharpening** as possible to recover from antialiased capture softness,
- as much or as little **creative sharpening** that the aesthetic needs of the image demand, and
- a standard level of **output sharpening** for most prints I make and web resolution images I render.

When I deliver images for clients to use for editing in their publication projects, I apply **NO** output sharpening so that their production staff can apply the appropriate amount of output sharpening required by the production and printing process they use.

:: Book reference: *Real World Image Sharpening* by Bruce Fraser and Jeff Schewe. ::