-sharpening Is high pass filter

-blurring is low pass filter

-edge detection is a high pass filter

High pass filter:

A high-pass filter can be used to make an image appear sharper. These filters emphasize fine details in the image – exactly the opposite of the low-pass filter. convolution kernel. In the example below, notice the minus signs for the adjacent pixels. If there is no change in intensity, nothing happens. But if one pixel is brighter than its immediate neighbors, it gets boosted.

0	-1/4	0
-1/4	+2	-1/4
0	-1/4	0

Unfortunately, while low-pass filtering smooths out noise, high-pass filtering does just the opposite: it *amplifies noise*.

Low pass filter:

A low-pass filter, also called a "blurring" or "smoothing" filter, averages out rapid changes in intensity. The simplest low-pass filter just calculates the average of a pixel and all of its eight immediate neighbors. The result replaces the original value of the pixel. The process is repeated for every pixel in the image.

0	+1/8	0
+1/8	+1/2	+1/8
0	+1/8	0

The center pixel contributes half of its value to the result, and each of the four pixels above, below, left, and right of the center contribute 1/8 each. This will have a more subtle effect. By choosing different low-pass filters, we can pick the one that has enough noise smoothing, without blurring the image too much.