Learning OpenCV

Image Processing, ch5

Smoothing, p113

Bilateral Filtering

The bilateral filter augments the gaussian filter by considering not only the

spacial distance between a pixel and its neighbors, but also the intensity

difference (averaged over RGB components).

The effect is to preserve edges (where the intensity difference is large),

whereas the gaussian filter blurs/blends edges.

The bilateral filter can aid in segmenting an image.

Other Blurring/Smoothing Operators

Gaussian (CV\_GAUSSIAN: needs further research),

Median (CV\_MEDIAN: center px = median of windowed pixels),

Simple (CV\_BLUR: center px = mean of windowed pixels),

Simple w/o Scaling (CV\_BLUR\_NO\_SCALING: center px = sum of windowed pixels)

Image Morphology, p118

dilation increases size, and can lead to the joining/merging, of disjoint

bright regions.

erosion reduces size of bright regions

“A morphological kernel, unlike a convolution kernel, doesn’t require any

numerical val- ues. e elements of the kernel simply indicate where the max

or min computations take place as the kernel moves around the image.”

Custom morphological kernels support different shapes (within a rectangular kernel array, the cells with zero values are not considered. nonzero values are considered.

Close and Open operations are combinations of dilate followed by erode, and erode followed by dilate, respectively. Opening connects nearby large regions. The combination of one followed by its opposite leads to the area of the bright being preserved (approximately).

Open exaggerates small cracks, local drops

Morphological gradient: bright areas where the intensity of the image is changing quickly (edges), dark areas where the intensity is changing slowly (similarly colored neighbors).

Top hat = src - open(src): isolates bright local peaks

Black hat = close(src - src: isolates dark holes (bright areas in dst were dark holes in src)