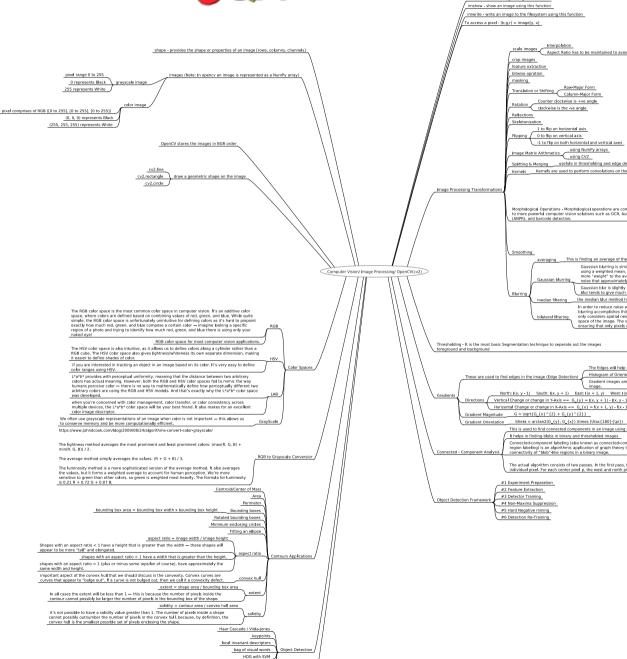


Deep Learning with Pyramids
The two most important parameters to consider in our HOG descriptor are pixels\_per\_cell and



```
imread - read an image using this function
                                scale images Aspect Ratio has to be maintained to avoid skewness and distortion
                                Splitting & Merging usefule in thresholding and edge detection
                                 Kernels Kernels are used to perform convolutions on the image matrix
                                                                                                                                                                                   Used to increase or decrease the size of objects in images
                                                                                                                                                                                   Used to close and open gaps between objects
                                                                                                                                                                                    Erosion useful for removing small blobs from an image or disconnected two connected components
                                                                                                                                                                                                     Dilations increase the size of foreground object and are especially useful for joining broken parts of
                                                                                                                                                                                    Dilation Dilations increase an image together.
                                Morphological Operations - Morphological operations are commonly used as pre-processing steps 
to more powerful computer vision solutions such as OCR, Automatic Number Plate Recognition 
(ANPR), and barcode detection.
                                                                                                                                                                                    Opening An opening is an erosion followed by a dilation.
                                                                                                                                                                                    Closing The exact opposite to an opening would be a closing. A closing is a dilation followed by an erosion.
                                                                                                                                                                                    Morphological Gradient morphological gradient is the difference between the dilation and erosion. It is useful for determining the outline of a particular object of an image
                                                                                                                                                                                  Black Hat
                                                                      This is finding an average of the matrix data
                                                                                   Soussian blurring is similar to average blurring, but instead of using a simple mean, we are now 
using a weighted mean, where neighborhood pixels that are closer to the central pixel contribute 
more "weight" to the average. And as the name suggests, Gaussian smoothing is used to remove 
noise that approximately follows a Gaussian distribution.
                                                                                 Gaussian blur is slightly slower than a simple average blur (and only by a tiny fraction), a Gaussian blur tends to give much nicer results, especially when applied to natural images.
                                                                              the median blur method has been most effective when removing salt-and-pepper noise
                                                                              me measur aur memora nas been most emercure when removing sale-and-pepper noise. 
In order to reduce noise while still mentalnating edges, we can use blatteral blurring. Bilateral 
blurring accomplishes this by introducing two Gaussian distributions. The first Gaussian function 
only considers spatial neighbors. That is, pixels that appear close together in the kr, yt-coordinate 
space of the image. The second Gaussian then models the pixel intensity of the neighborhood, 
ensuring that only pixels with similar intensity are included in the actual computation of the blur.
                                                                                                                             Otsus Thresholding - Dynamic and automatically compute the optimal threshold value based on
                                                                                                                            input image
                                                                                                                            Adaptive Thresholding - Instead of trying to apply thersholding globally this technique will apply
                                                                                                                        the thresholding at each pixel level.
                                                                                         The Edges will help us to create contours and outlies of the objects
                                                                                       Histogram of Oriented Gradients and SIFT are built upon image gradient representations
                                                                                       Gradient images are even used to construct saliency maps, which highlight the subjects of an image.
                       North: I(x, y-1) South: I(x, y+1) East: I(x+1, y) West: I(x-1, y)
              Vertical Change or change in Y-Axis == G {y} = I(x, y + 1) - I(x, y - 1) Note: I is the image
               Horizontal Change or change in X-Axis == G_{x} = I(x + 1, y) \cdot I(x \cdot 1, y) Note: I is the image
                             This is used to find connected components in an image using graph theory.
                              Connected-component labeling (also known as connected-component analysis, blob extra region labeling) is an algorithmic application of graph theory that is used to determine the connectivity of "babb"-like regions in a binary image.
                                                                                                                                                                                    A-connectivity (left). Reced on the west and north pivel labels, a label is assigned to the current
                             The actual algorithm consists of two passes. In the first pass, the algorithm loops over each individual pixel. For each center pixel p, the west and north pixels are checked
                                                                                                                                                                               8-connectivity can also be performed by checking the west, north-west, north, and north-east pixels (right).
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