Chapter 5 – HOG Descriptor

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1. Feature descriptors

We need feature descriptors since they tell us if two patches are similar, even though there are translation, rotation and scale transformations.

We can simply use the pixel values of the patch, but this would highly depend on the intensities values. In fact, we could use a vector of X derivatives which tell us the intensity variation between the pixels.

We can also use the color histogram in the image, invariant to changes in scale and rotation. -> Better solution is to compute histograms over spatial cells of the image, thus then comparing both histograms for image A and image B through some distance function such as Intersection, Euclidean Distance or Chi-square.

2. HOG Descriptor

In the HOG Descriptor, we have 4 big steps:

- Preprocessing: Patch aspect ratio of 1:2. This patch is cropped out of an image and resized to 64×128
- Calculate the horizontal and vertical gradients
- Find the magnitude and direction of gradient (from 0 and 180 degrees).
- The image, then, is divided into 8×8 cells and a histogram of gradients is calculated for each 8×8 cells.