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Filter:

A filter is a matrix or “window” that slides across the pixels of an image. The filter can be different sizes such as 2x2 or 3x3, and will be smaller than the dimensions of the image. The filter is looking for a specific feature as it slides across the pixels.

Feature:

A feature is something in the image that the filter is looking for. At lower layers the feature is basic, most likely a line that has a particular orientation or an edge. In the middle layers the feature can be more complex shapes such as circles, and finally in the highest layers the feature can be very complex like a wheel on a car.

Feature map:

The feature map shows in what location of the image did the filter find the feature it was looking for. The feature map will have values in it, and the higher the value the more it found exactly the feature it wanted to find. If the filter found a feature close to what it was looking for, but not quite, the value will be lower, and if it did not find what it was looking for at all the value can even be negative.

Pooling:

Pooling then takes these values from the feature map into account. For max pooling, it takes the highest value from sections of the feature map. What results is a smaller layer than the feature map, just including the highest (i.e. most important) features of the image. This reduces the dimensionality of data and also helps to reduce overfitting by making the model less dependent on learning the specific location of features in a given image. Instead, the model learns that the feature is what is important, not necessarily the position it is in.