ML01 – Lab07 – Assignment07

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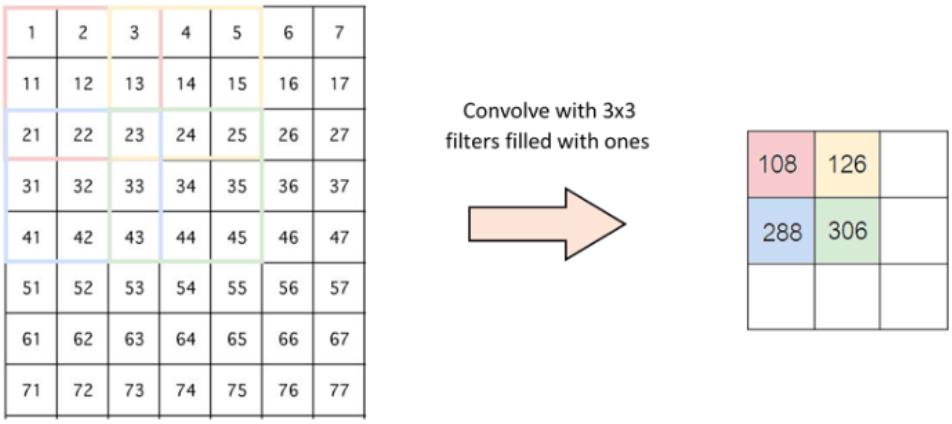
Question 2

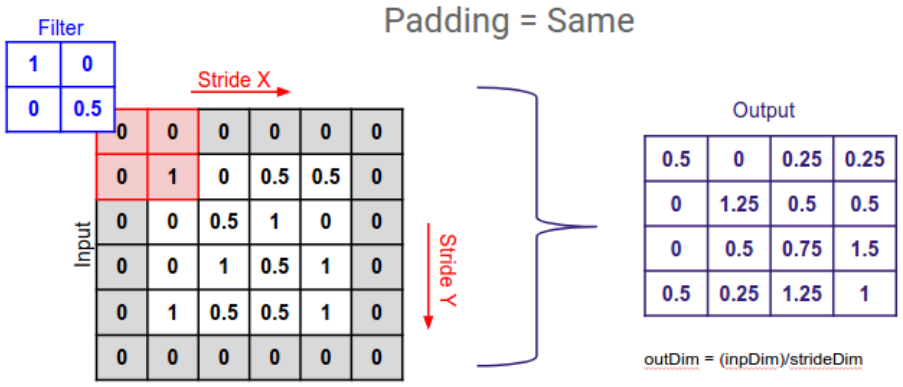
What is Stride, Padding & Pooling? Explain with an example.

Stride is the number of pixels shifts over the input matrix. When the stride is 1 then we move the filters to 1 pixel at a time. When the stride is 2 then we move the filters to 2 pixels at a time and so on. The below figure shows convolution would work with a stride of 2.



Reference: Link

Padding basically extends the area of an image in which a convolutional neural network process. The kernel/filter which moves across the image scans each pixel and converts the image into a smaller image. In order to work the kernel with processing in the image, padding is added to the outer frame of the image to allow for more space for the filter to cover in the image. Adding padding to an image processed by a CNN allows for a more accurate analysis of images.



Reference: Link

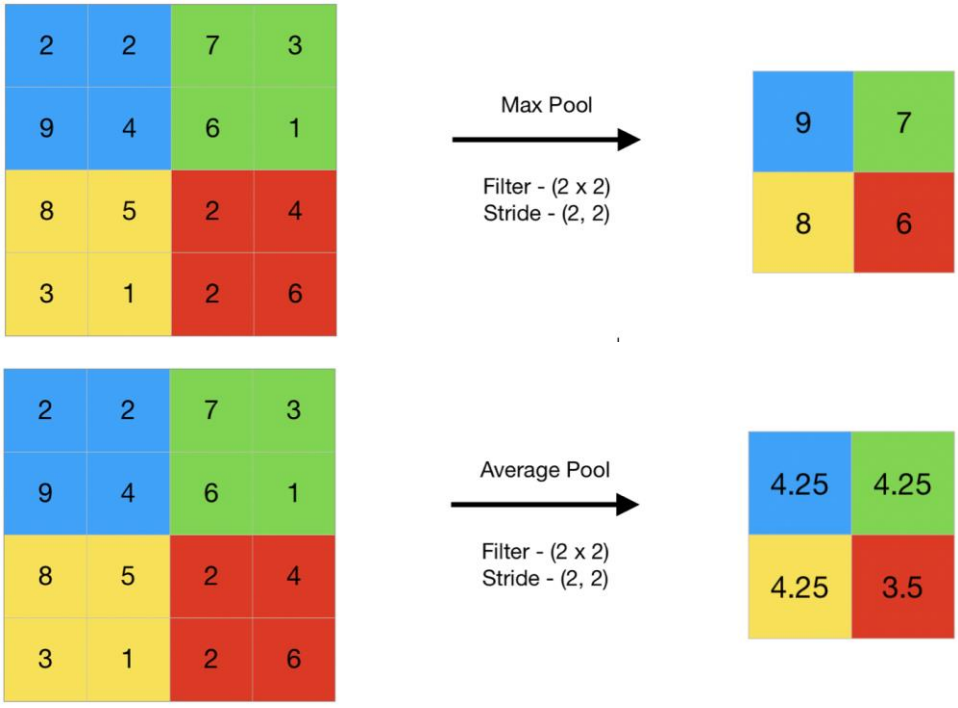
The pooling operation involves sliding a two-dimensional filter over each channel of feature map and summarizing the features lying within the region covered by the filter.

For a feature map having dimensions nh x nw x nc, the dimensions of output obtained after a pooling layer is

(nh - f + 1) / s x (nw - f + 1)/s x nc

where,

- -> nh - height of feature map
- -> nw - width of feature map
- -> nc - number of channels in the feature map
- -> f - size of filter
- -> s - stride length



Reference: Link

Question 4

What is overfitting? How to overcome overfitting in an ML model?

Overfitting occurs when you achieve a good fit of your model on the training data, while it does not generalize well on new, unseen data. In other words, the model learned patterns specific to the training data, which are irrelevant in other data.

Handling Overfitting

- Reduce the network's capacity by removing layers or reducing the number of elements in the hidden layers
- Apply regularization, which comes down to adding a cost to the loss function for large weights
- Use Dropout layers, which will randomly remove certain features by setting them to zero

Reference: Link