Large Scale Machine Learning and Deep Learning
Review Questions 6

1. Consider a CNN composed of three convolutional layers, each with 3×3 filters, a stride of 2, and `SAME` padding. The lowest layer outputs 100 feature maps, the middle one outputs 200, and the top one outputs 400. The input images are RGB images of 200×300 pixels. What is the total number of parameters `w` in the CNN?

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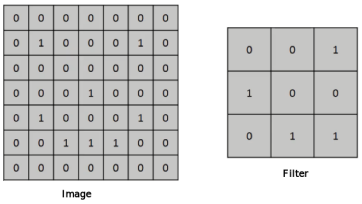
2. Consider a CNN with one convolutional layer, in which it has a 3×3 filter (as shown below) and a stride of 2. Please write the output of this layer for the given input image (the left image in the following figure)?



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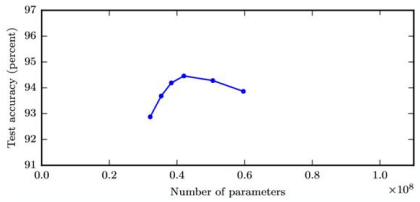
3. The below graph shows the accuracy of a trained 3-layer convolutional neural network vs. the number of parameters (i.e., the number of kernels). The trend suggests that as you increase the width of a neural network, the accuracy increases till a certain threshold value, and then starts decreasing. What could be the possible reason for this decrease?



   (a) Even if number of kernels increase, only few of them are used for prediction.

   (b) As the number of kernels increase, the predictive power of neural network decrease.

   (c) As the number of kernels increase, they start to correlate with each other which in turn helps overfitting.

   (d) None of these.