CV Quiz 3 (10 marks)

Answer any five (5) of the following questions:

Q1 Apply transposed convolution on the input I using kernel k. [2 marks]

I=

3	5	2
6	7	1
2	1	9

k=

2	5	3
6	9	1
2	7	9

Stride=(2,2), Crop=same

Q2) Weighted sums in the last neural layer of an image classifier are given as follows: [2 marks]

56, 89, -45, -10

What will be the final activations and outputs when:

(i) The problem being solved is a multi-class classification problem
(ii) The problem being solved in a multi-label classification problem

Classes involved are cat, dog, rabbit and mouse in the order required for the network.

Q3) In a CNN layer, the input volume size is 57x57x57, and the output volume size is also 57x57x57. Design four possible layers that can perform this task. Give the size and stride of the kernels and the kind of padding used. [2 marks]

Q4) After backpropagation, compute the updated w7 value in the slide 11 of Lec 14. Be smart; Almost all the intermediate values are already given in the slides. [2 marks]

Q5) Following are the activation vector, weight matrix and dC/dz matrix for the last layer. Compute dC/dz for the second last layer. [2 marks]

Activation vector:

2

3

Weight matrix:

4 5

6 7

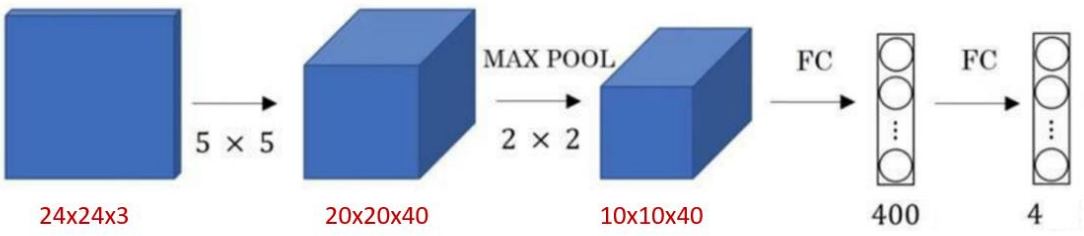
dC/dz matrix:

8

9

NOTE: gradient of a sigmoid function (sig) is sig(1-sig).

Q6) Convert the following Convolutional Neural Network into a Fully Convolutional Network such that we still have the 4 required output activations. [2 marks]



Give the size (incl. channels), stride, padding for all the filters being used, even for the ones already given. Also provide the number of filters in each layer.