LATE

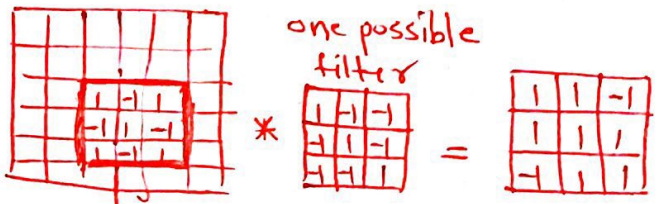
CSE 576 Quiz 11: 03/26/2019
Name:
ID:

1. Explain the step of filtering in a convolutional neural network with respect to images.

filtering is a mechanism to extract features from the images

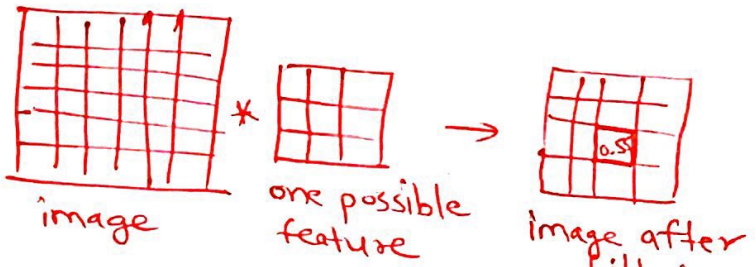
steps

① get all the feature maps
② take a particular image patch and multiply with all feature maps
③ take summation of matrices in ②
④ divide by total number of pixels in feature map



$[1+1+(-1)+1+1+1+1+(-1)+1+1]/9 = 0.55$

$\Rightarrow \sum$ & avg



2. Explain the step of max-pooling in a convolutional neural network with respect to images.

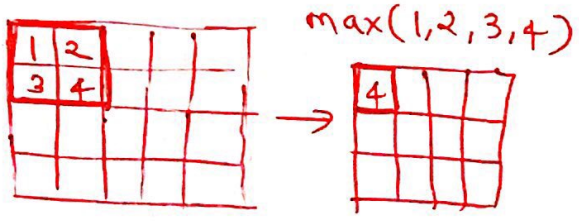
pooling is a mechanism for dimensionality reduction of images

steps

① pick window size & stride
② pass the window across the filtered images
③ take maximum or average value from each window

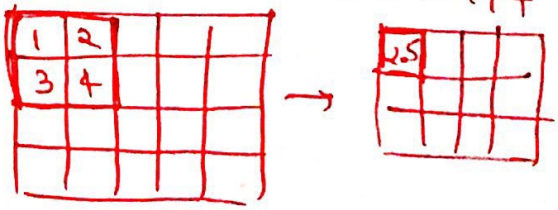
(called max pooling or avg pooling respectively)

max pool



max(1,2,3,4)

avg pool



1+2+3+4/4 = 2.5

3. Explain why using CNNs on relational database table is not appropriate.

Convolutional Networks are aimed to capture spatial patterns in the data such as images.
In relational data, changing the columns does not change the meaning of a data. Therefore, relational data doesn't have spatial relationships among columns.

4. For the filtering of the CNN, who makes the filter and how.

Dimensions of the feature maps are hyperparameters of a CNN architecture and they are learnt through (coefficients of feature map) backpropagation.