

Group: <94>

Topic: <T4>

Participants:

Andresen, Jon Eirik Lisle

Foslien, Sondre

Qs

1) Max pooling

1a) Do a max-pooling operation on the matrix in figure 1 with a stride length of 1 and a region size of 2x2

1b) Why do we do max-pooling operations in a convolutional neural network?

2) What is the purpose of a dropout layer?

3) Why do the filters in a CNN layers overlap?

4) What is a feature map?

5) Why do CNNs have increasing numbers of filters in each layer depending on how deep we go?

3	2	5	4	8	10	7	9
9	3	3	8	5	4	7	0
6	2	1	4	9	6	3	8
7	2	3	4	1	6	3	5
3	2	3	3	5	8	7	8
8	2	3	5	5	6	6	10
1	2	2	8	5	9	7	8
2	1	3	4	9	6	5	8

Figure 1: Matrix for task 1a)

Q&As

1) Question one

1a) Question one a

$$\begin{bmatrix} 9 & 8 & 10 & 9 \\ 7 & 4 & 9 & 8 \\ 8 & 5 & 8 & 10 \\ 2 & 8 & 9 & 8 \end{bmatrix}$$

1b) Question one a

This is sort of a downsampling-operation which reduces the spatial size of the problem, aids in faster computation and also has a type of regularization effect.

2) Question two

To avoid overfitting the network to the training data, a set fraction of the weights in the surrounding layers will be set to zero for that round

3) Question three

Filters in a CNN looks for certain features in the input, however the feature of interest might be larger than the filter size, or be placed such that it would not be seen in a sufficient way by a filter if they did not overlap

Q&As (2)

4) Question four

A feature map is the result from a convolution between the filters and the input image. The filter is convolved over each location, where each filter has its own set of parameters. This means that each filter looks for the same pattern over the entire picture.

5) Question five

CNN's usually learn to recognize very simple structures in the first layers. The deeper you go, the more complex structures can be learned to be recognized. To be able to recognize these structures the layers need more filters to find them.