

Convolutions and pooling

Quiz, 5 questions

✓ **Congratulations! You passed!**

Next Item



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point

1.

Choose correct statements about convolutional layer:



Convolutional layer provides translation invariance



Un-selected is correct



Convolutional layer doesn't need a bias term



Un-selected is correct



Convolutional layer is a special case of a fully-connected layer



Correct

Convolutional layer can be viewed as a special case of a fully connected layer when all the weights outside the local receptive field of each output neuron equal 0 and kernel parameters are shared between neurons



Convolutional layer works the same way for every input patch



Correct

Because kernel parameters are shared!



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2.

Choose correct statements about pooling layer:

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Pooling layer provides translation invariance

 **Correct**

Remember the slash classifier example? Taking maximum gave us translation invariance.



Pooling layer is strictly differentiable

Un-selected is correct



Pooling layer reduces the number of convolutional filters

Un-selected is correct



Pooling layer can reduce spatial dimensions (width and height of the input volume)

Correct

When used with stride > 1



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3.

Back-propagation for convolutional layer first calculates the gradients as if the kernel parameters were not shared and then...



Takes a maximum gradient for each shared parameter



Takes a mean of the gradients for each shared parameter



Takes a minimum gradient for each shared parameter



Takes a sum of gradients for each shared parameter

Correct

That's it!

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4.

Suppose you have a $10 \times 10 \times 3$ colour image input and you want to stack two convolutional layers with kernel size 3×3 with 10 and 20 filters respectively. How many parameters do you have to train for these two layers? Don't forget bias terms!

Preview

2100

$(3*3*3+1)*10+(3*3*10+1)*20$

Correct Response

$(3*3*3+1)*10 + (3*3*10+1)*20$

Your answer, $(3*3*3+1)*10+(3*3*10+1)*20$, is equivalent to the instructor's answer $(3*3*3+1)*10 + (3*3*10+1)*20$.



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point

5.

What receptive field do we have after stacking n convolutional layers with kernel size $k \times k$ and stride 1? Layers numeration starts with 1. The resulting receptive field will be a square, input its side as an answer.

Preview

$kn - n + 1$

$n*k-n+1$

Correct Response

Your answer, $n*k-n+1$, is equivalent to the instructor's answer $(k-1)*(n-1)+k$.

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