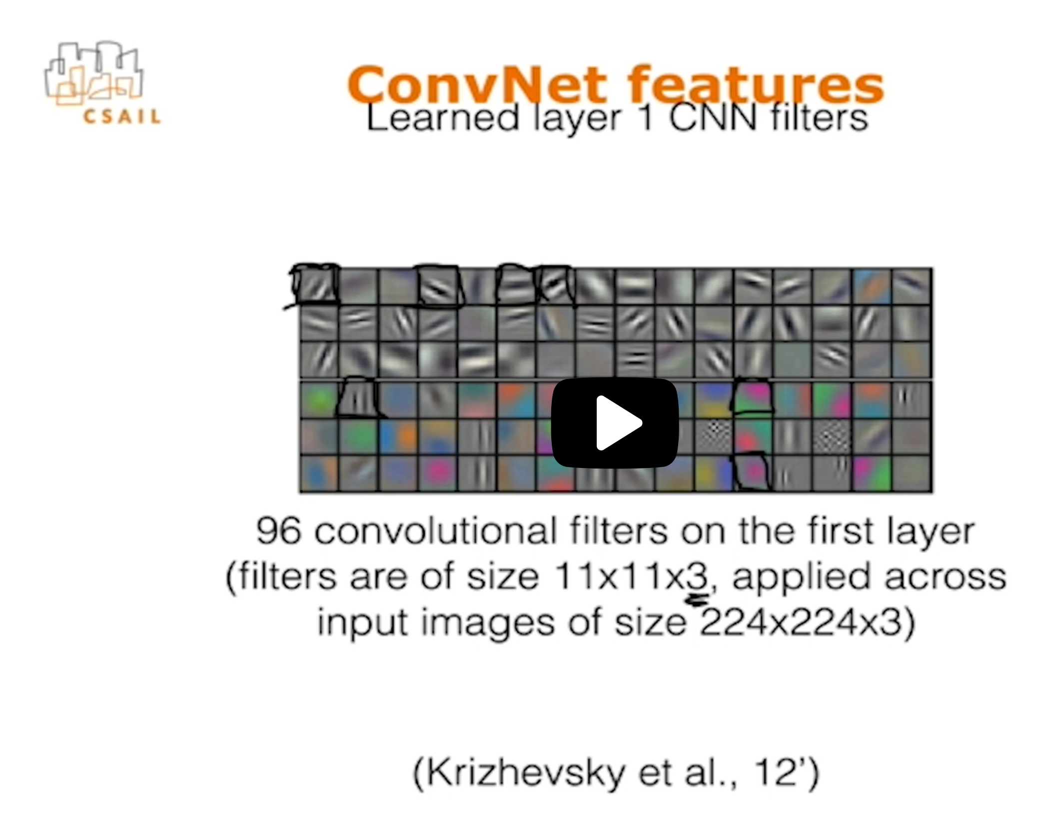
2. CNN - Continued

Convolution Neural Networks (Continued)



7:44 / 7:44 Speed 1.50x

are run through the image generating feature map.

Second thing is, the pulling that

tries to generate a slightly more compressed image

forgetting where things are, but maintaining information

about what's there, what was activated.

And CNN's are architectures that combine these type of layers

successively in a variety of different ways.

End of transcript. Skip to the start.

Video

Download video file

Transcripts

Download SubRip (.srt) file

Download Text (.txt) file

CNN - Numerical Example

1/1 point (graded)

In this problem, we are going to work out the outputs of a tiny toy example of CNN that is made up of just one conv layer consisting of just one filter F of shape 2×2 followed by a max-pooling layer of shape 2×2. The input image is of shape 3×3

The output of the CNN is calculated as $\text{Pool}\left(\text{ReLU}\left(\text{Conv}\left(I\right)\right)\right)$ where ReLU is the rectified linear activation function given by:

$$\text{ReLU}\left(x\right) = \max\left(0, x\right)$$

Also assume that the stride for the convolution and pool layers is 1

For the following values of the image I and filter weights F enter below the value of the output of the CNN (hint - it will be a single integer):

$$I = \begin{bmatrix} 1 & 0 & 2 \\ 3 & 1 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

$$F = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

5

Answer: 5

Solution:

First let's calculate the output of the convolutional layer

$$I = \begin{bmatrix} 1 & 0 & 2 \\ 3 & 1 & 0 \\ 0 & 0 & 4 \end{bmatrix}$$

$$F = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\mathrm{Conv}\,(I) = \begin{bmatrix} 1 & 0 & 2 \\ 3 & 1 & 0 \\ 0 & 0 & 4 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\mathrm{Conv}\,(I) = \begin{bmatrix} 2 & 0 \\ 3 & 5 \end{bmatrix}$$

$$\mathrm{ReLU}\,(\mathrm{Conv}\,(I)) = \mathrm{ReLU}\,(\begin{bmatrix} 2 & 0 \\ 3 & 5 \end{bmatrix})$$

$$\mathrm{ReLU}\,(\mathrm{Conv}\,(I)) = \begin{bmatrix} 2 & 0 \\ 3 & 5 \end{bmatrix}$$

$$\mathrm{Pool}\,(\mathrm{ReLU}\,(\mathrm{Conv}\,(I))) = \mathrm{Pool}\,(\begin{bmatrix} 2 & 0 \\ 3 & 5 \end{bmatrix})$$

$$\mathrm{Pool}\,(\mathrm{ReLU}\,(\mathrm{Conv}\,(I))) = 5$$

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

CNN Meaning

1/1 point (graded)

If you are trying to recognize a large number of features, you should have a small number of filters.

- true
- false ✔

Solution:

Each filter represents a distinct set of weights, which corresponds to searching for a particular feature in the image. If you have a large number of features, you want many filters.

Submit You have used 1 of 3 attempts

Answers are displayed within the problem

Discussion

Hide Discussion

Topic: Unit 3 Neural networks (2.5 weeks):Lecture 12. Convolutional Neural Networks / 2. CNN - Continued

Add a Post

Show all posts ▼ by recent activity ▼

There are no posts in this topic yet.

✖

Learn About Verified Certificates