7, Pooling and Upsampling
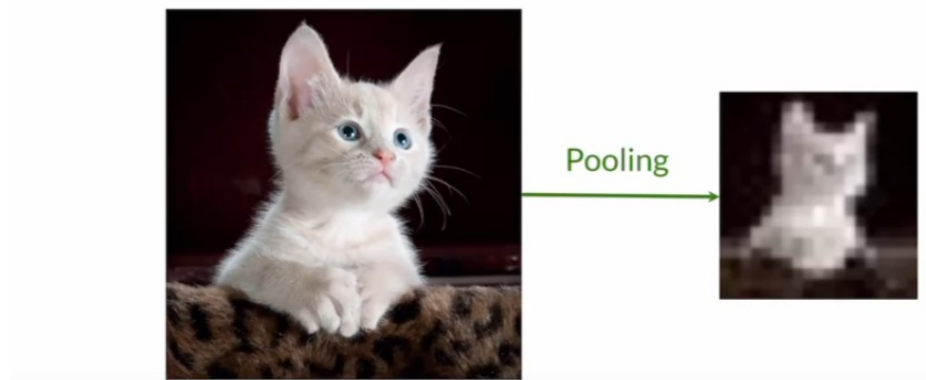
Outline of this video

Notes

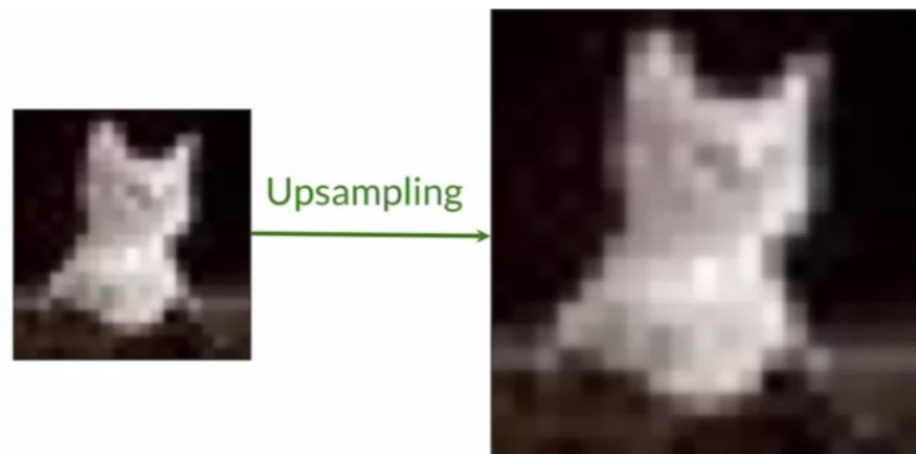▼ pooling and upsampling is common in Convolution Neural Network

    ▼ 1, pooling

- reduce size of input

> For instance, a picture of this cat after a pooling layer will result in this **blurry image** with a lower size or **lower resolution**
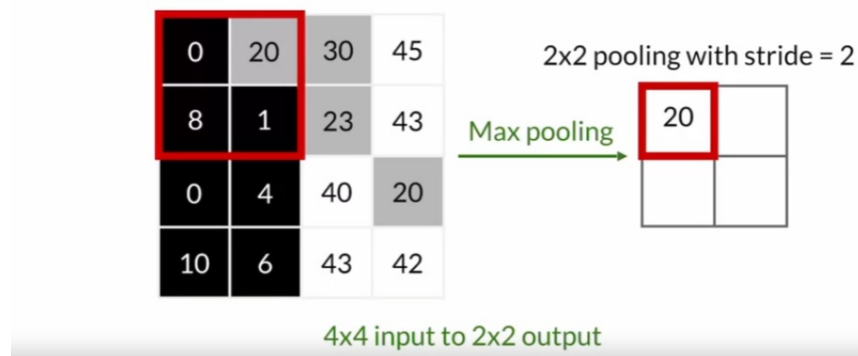
    ▼ 2, Upsampling

    >> Increasing the size of an image by inferring pixels.(technique to infer, got many, i.e Nearest Neighbours)

> Programming frameworks like TensorFlow and PyTorch actually take care of this whole process for you. You just need to know that they infer the values from missing pixels in the output by looking at the known values from the input and just like pooling, up-sampling layers don't have any learnable parameters. It's just some fixed rule. These are just different fixed rules.
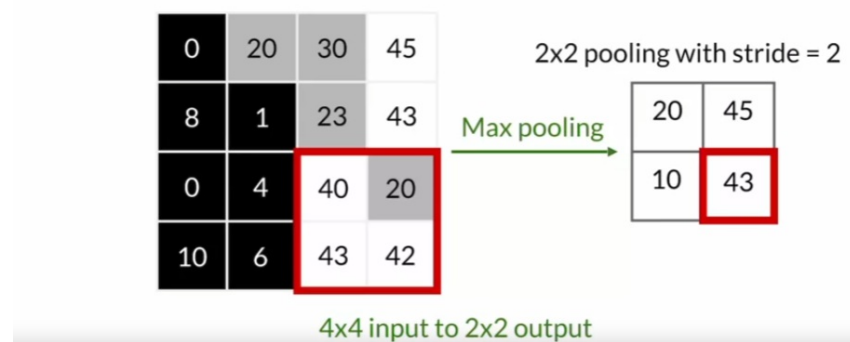
▼ 2 by 2 Max Pooling filter

Max Pooling

>>the red box is so called >> 'window'

  ▼ >> 2 by 2 pooling, if stride 2 then the window will not overlap

Max Pooling

  >> so do the same as 3 by 3 pooling, if slide = 3, then no overlap also
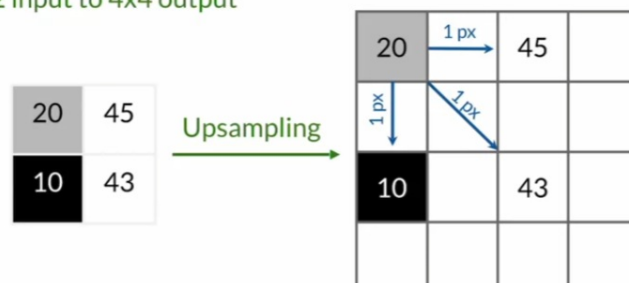
▼ other type of pooling

  1, Average pooling

  2, Min pooling

▼ Upsampling: Nearest Neighbors
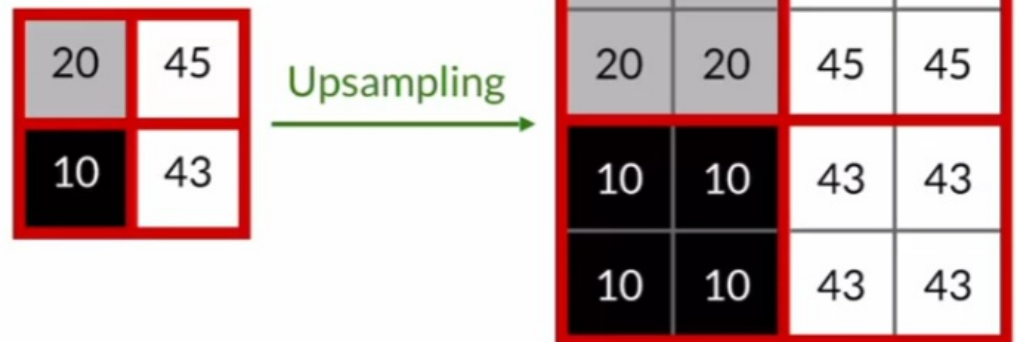
  ▼ step 1

Upsampling: Nearest Neighbors

  ▼ last step

Upsampling: Nearest Neighbors

2x2 input to 4x4 output

First, you assign the value in the top left corner from the input to the top left pixel in the output. The other values from the input to pixels that are added distance of two pixels from that top left corner and for other cases, this distance might be different **depending on the size of the enlargement that you would want**. There'll be exactly one pixel in between each of these, including this diagonal. Then assign the same value to every other pixel as it is to its nearest neighbor. For every two-by-two corner in the output, the pixel values will look the same. You can also think of this as putting these values into the corners first and for every other pixel finding its nearest neighbor.

▼ other type of pooling
1. Linear interpolation
2. Bi-linear interpolation

🔖Vocabs

▼ salient >> 最重要的

The salient points or facts of a situation are the most important ones. 最重要的; 突出的 [正式]

What max pooling is doing here is that it's getting the most salient information from this image, which are these b . This can be really important for distilling information where you really care about only the most salient information.

🔖 QOTD

🔖Summary

▼ easy summary

Summary

- Pooling reduces the size of the input

- Upsampling increases the size of the input

- No learnable parameters!