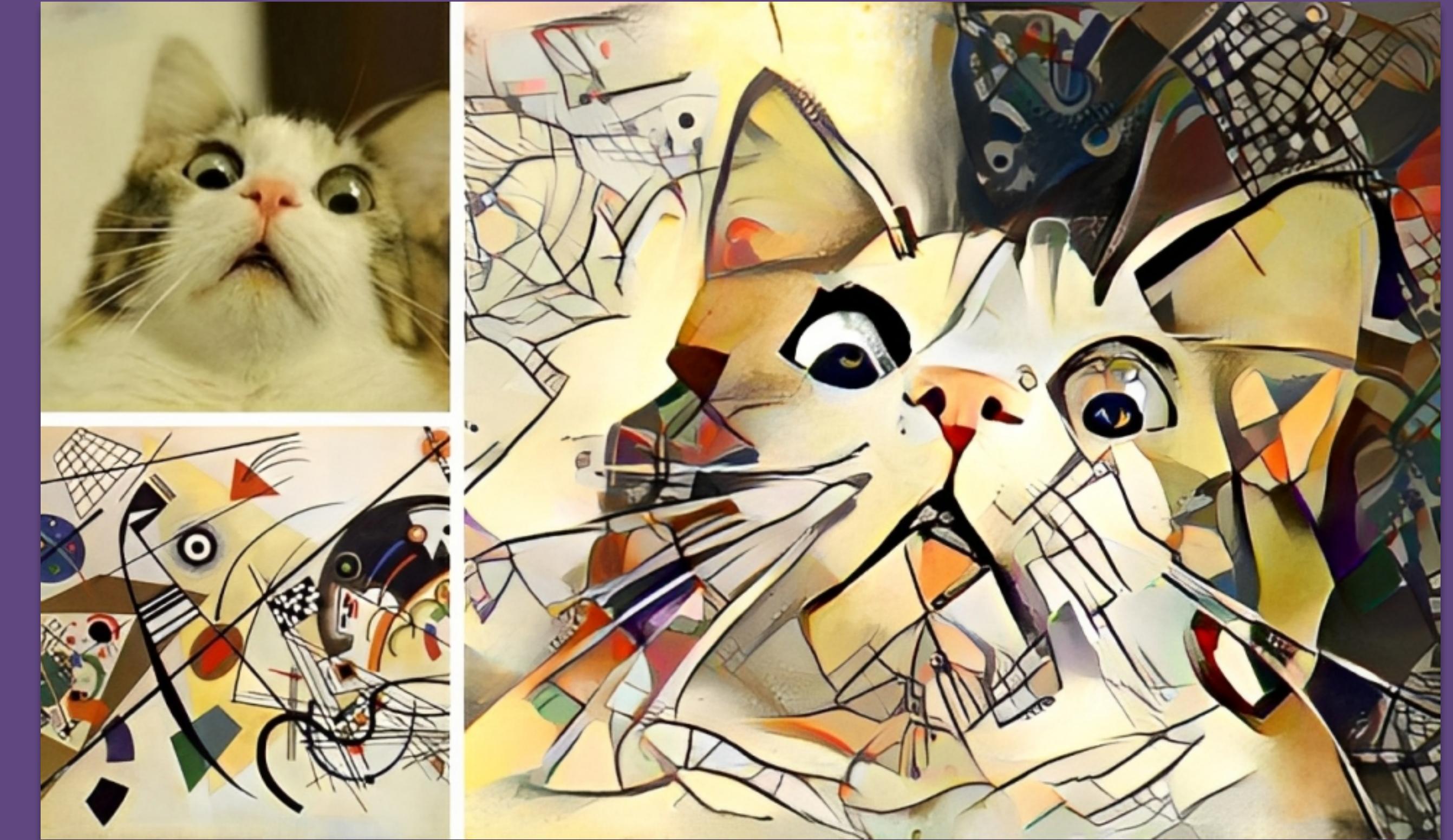


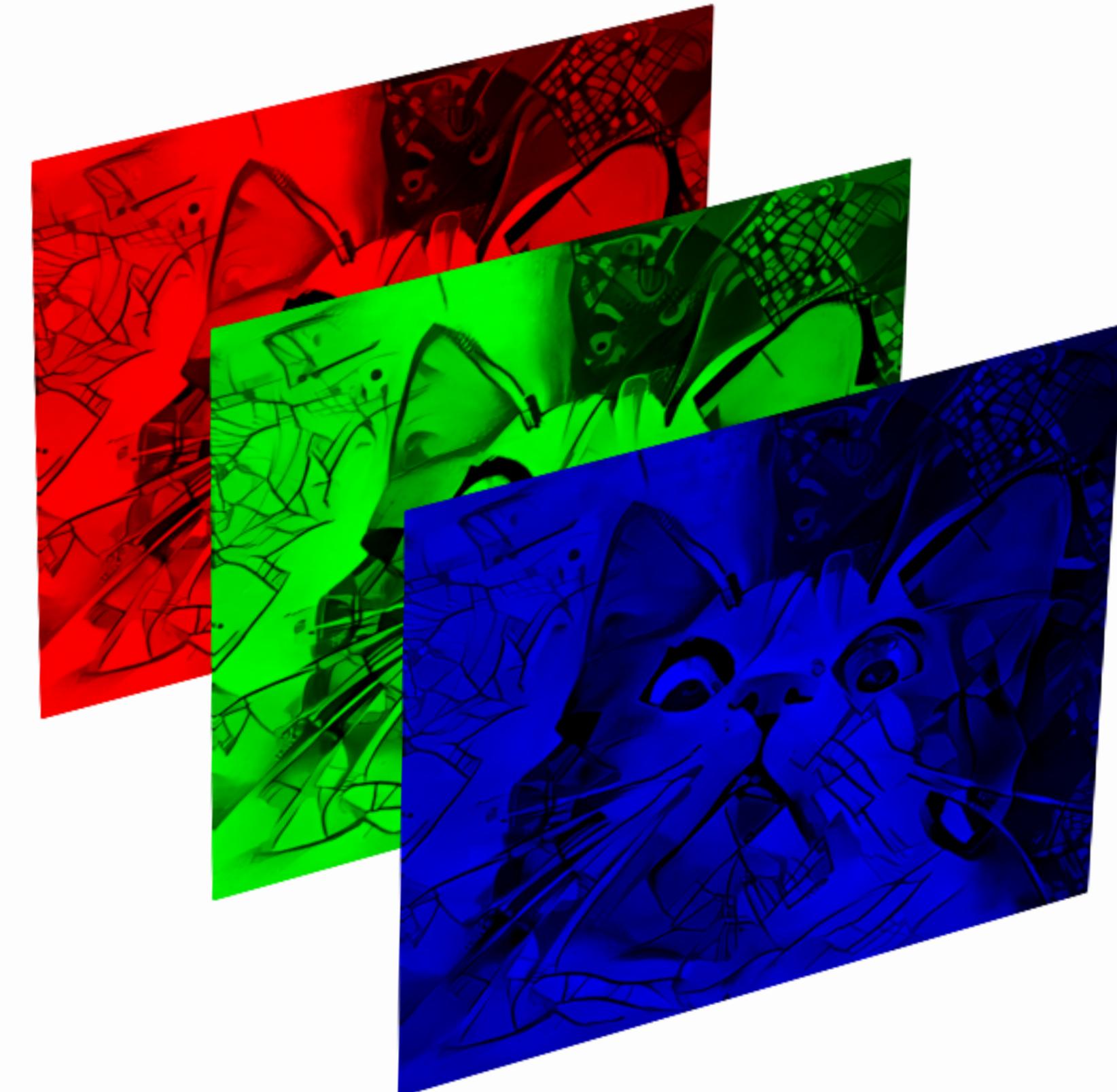
Tutorial 3: Convolutional Neural Networks



Practical Deep Learning for Science
14 May, 2023

Vocabulary

Channels



Not necessarily always 3

NCHW vs NHWC

- **N** - number of example in the batch
- **C** - channel number
- **H** - height
- **W** - width
- Torch expects data to be in **(N,C,H,W)** format

Permute and reshape are two completely different operations!

- An **RGB** image of size **100x50**

What we want

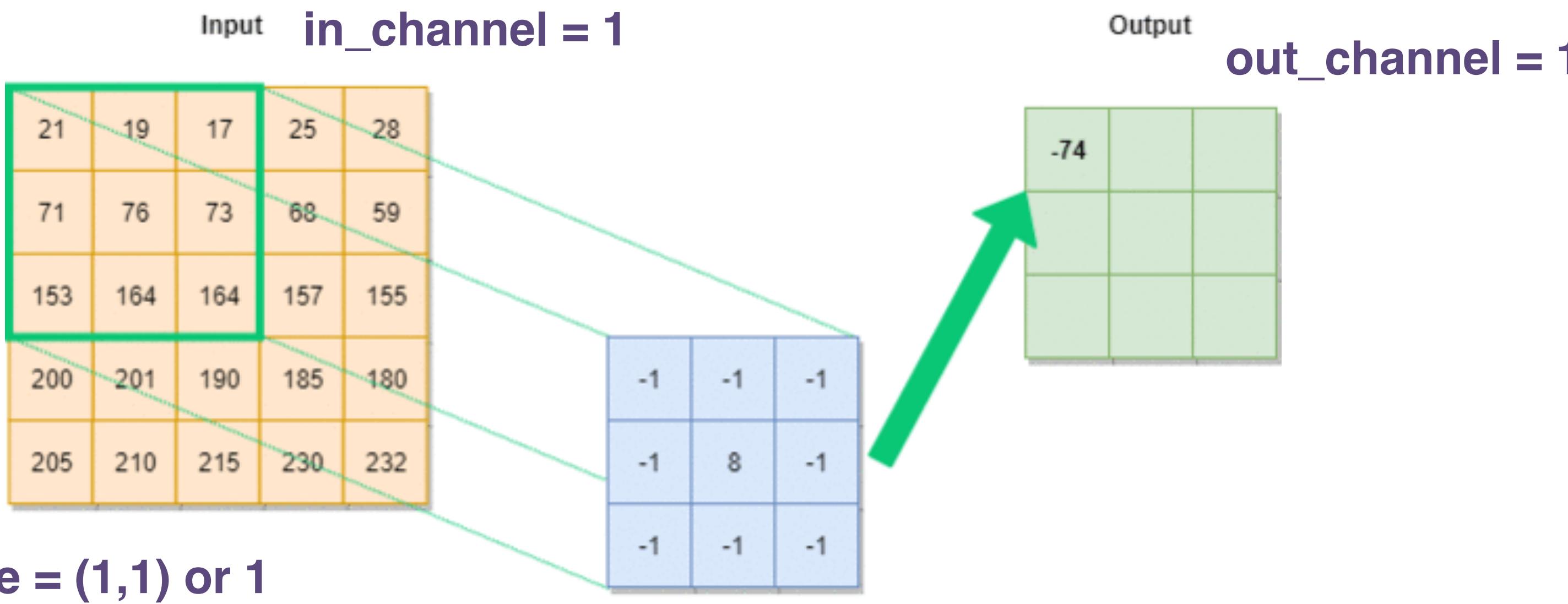
```
>>> img_tensor.shape  
torch.Size([1, 3, 100, 50])
```

What we do not want

```
>>> img_tensor.shape  
torch.Size([1, 100, 50, 3])
```

Fix

```
>>> img_tensor = img_tensor.permute(0,3,1,2)  
>>> img_tensor.shape  
torch.Size([1, 3, 100, 50])
```

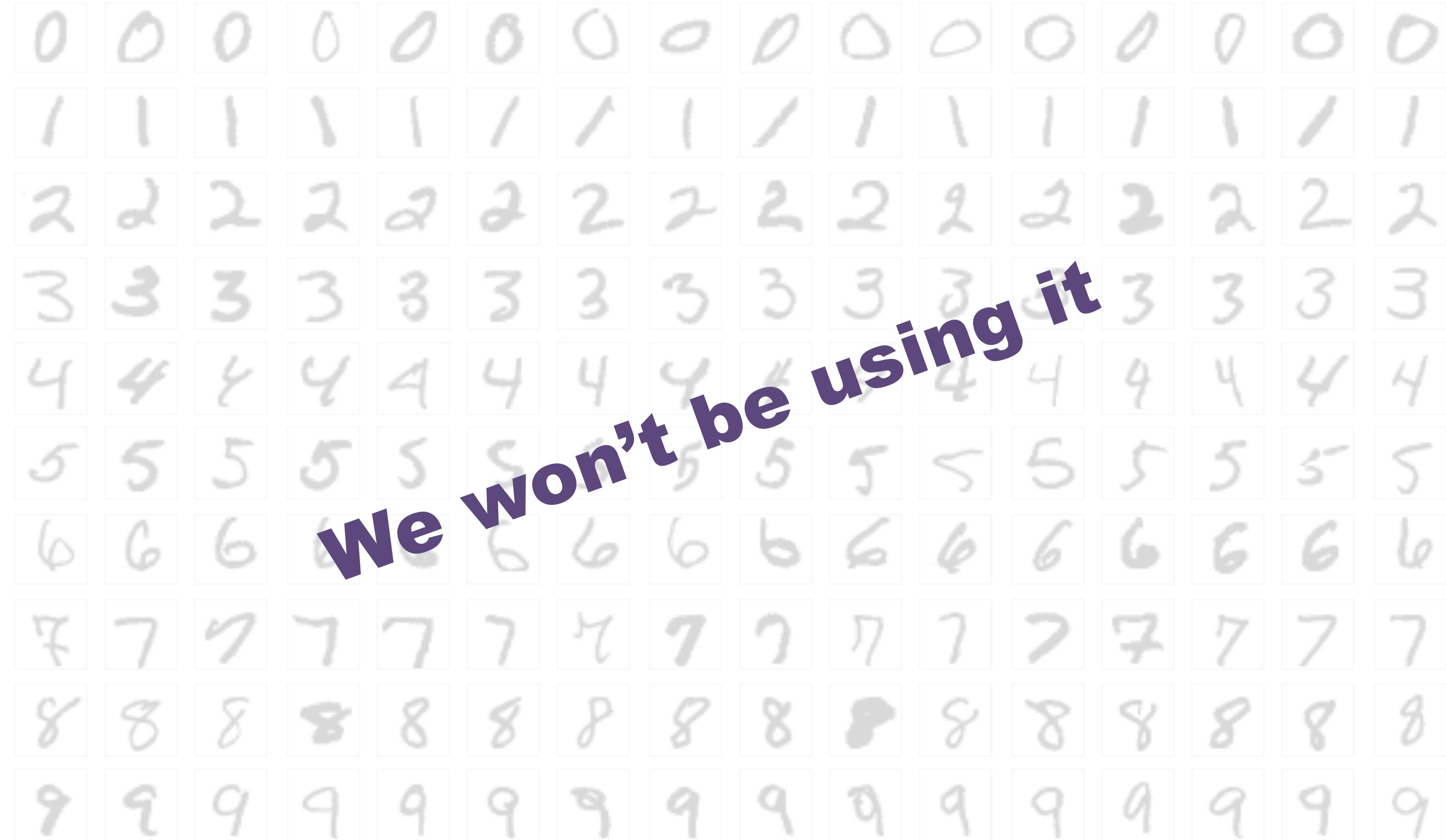


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padding = ‘valid’ or 0

- **in_channels**
- **out_channels**
- **kernel_size**
- **stride**
- **padding**

Dataset



MNIST

- Handwritten digits
- 28x28
- Grayscale (1 channel)
- Pretty old (1994)
- Quite simple

Fashion-MNIST

- 28 x 28
- grayscale images (1 channel)
- 10 classes
- Slightly more complex than MNIST

Before we wrap up...

Before we wrap up...

♦ Slack

- Your *primary* lifeguard

♦ Final project

- Start (early) by creating a slack channel
- Keep it private (you don't wanna spam everyone)

♦ Feedback