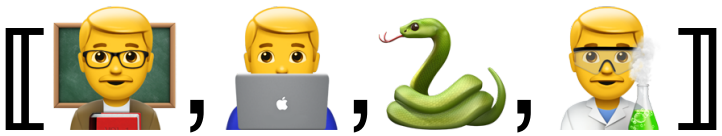
Lecture Notes for

Machine Learning in Python



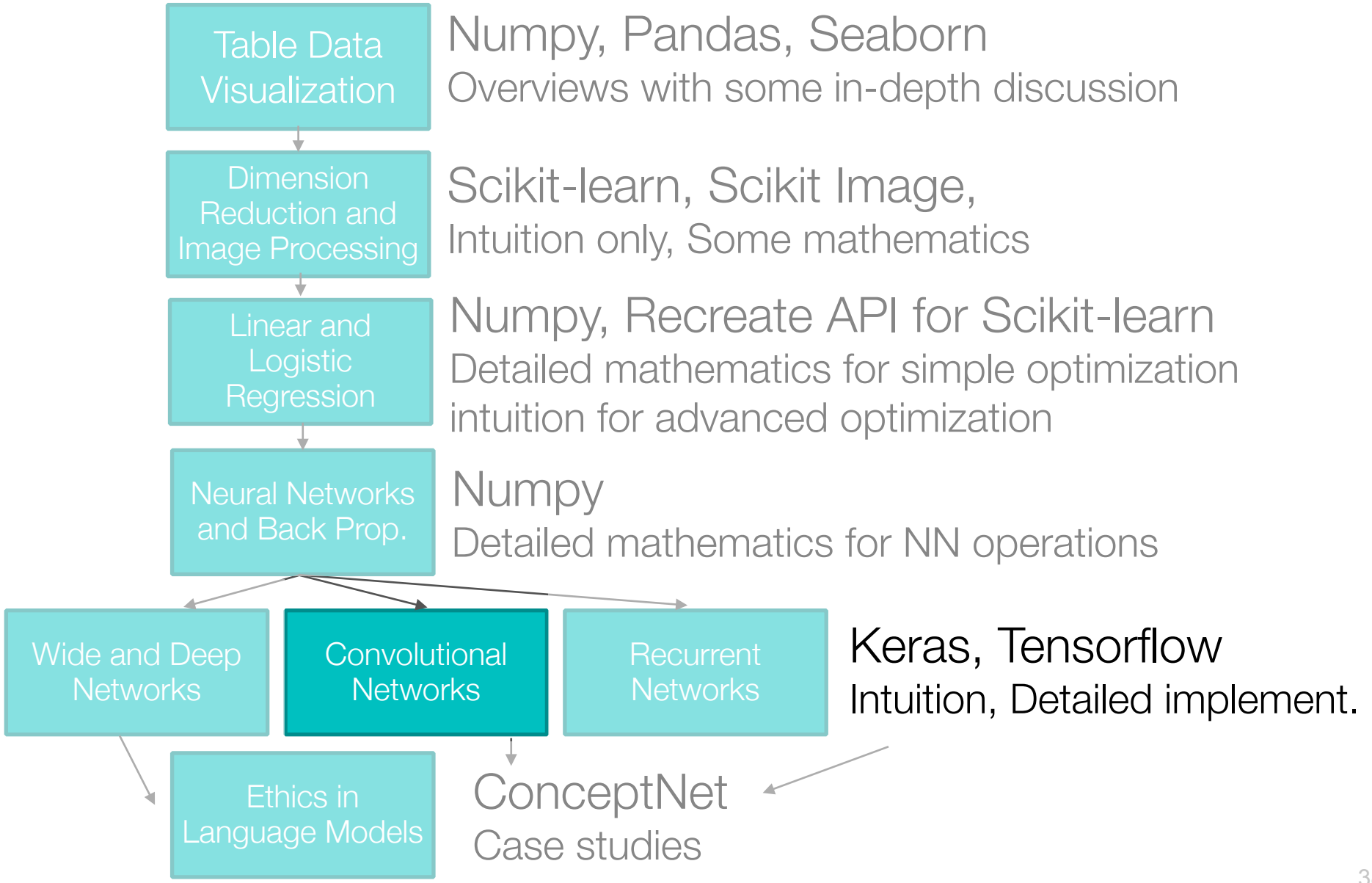
Professor Eric Larson

An Ongoing History of Convolutional Networks

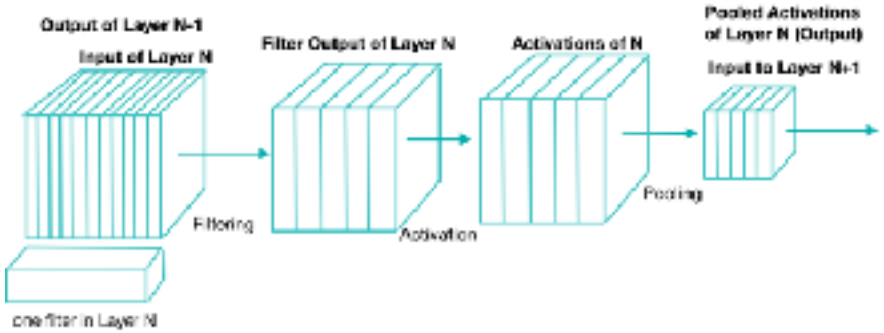
Class logistics and Agenda

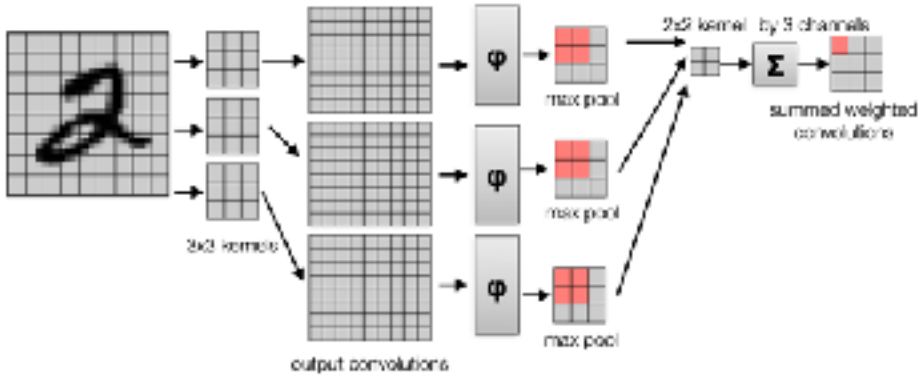
- Wide/Deep Lab (late turn in)
- Agenda:
  - CNN Demo
  - CNN Town Hall
  - History of CNNs
    - with Modern CNN Architectures
- Next Time:
  - Transformers

Class Overview, by topic

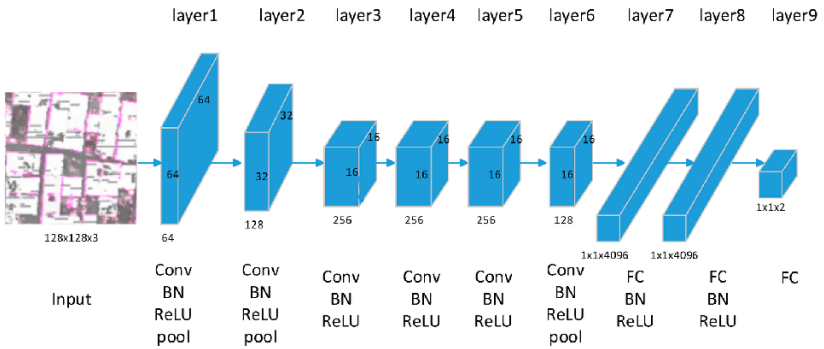


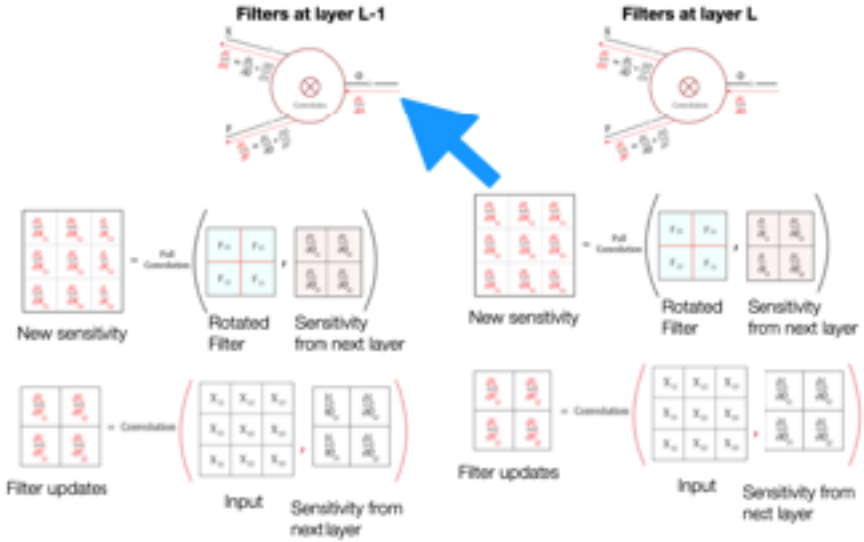
Last Time:





Structure of Each Tensor: Channels x Rows x Columns





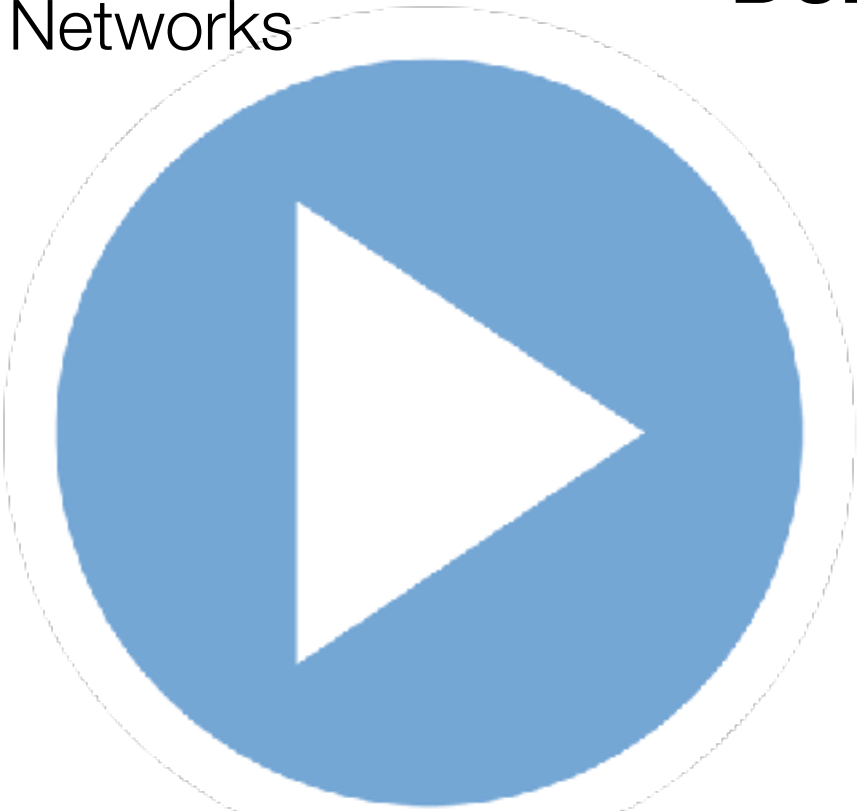
Last Time!

Convolutional Neural Networks
in TensorFlow
with Keras

with Sequential API!

If needed:

Finish Demo



`11. Convolutional Neural Networks.ipynb`

Image Data Augmentation

```
cnn = Sequential()
```

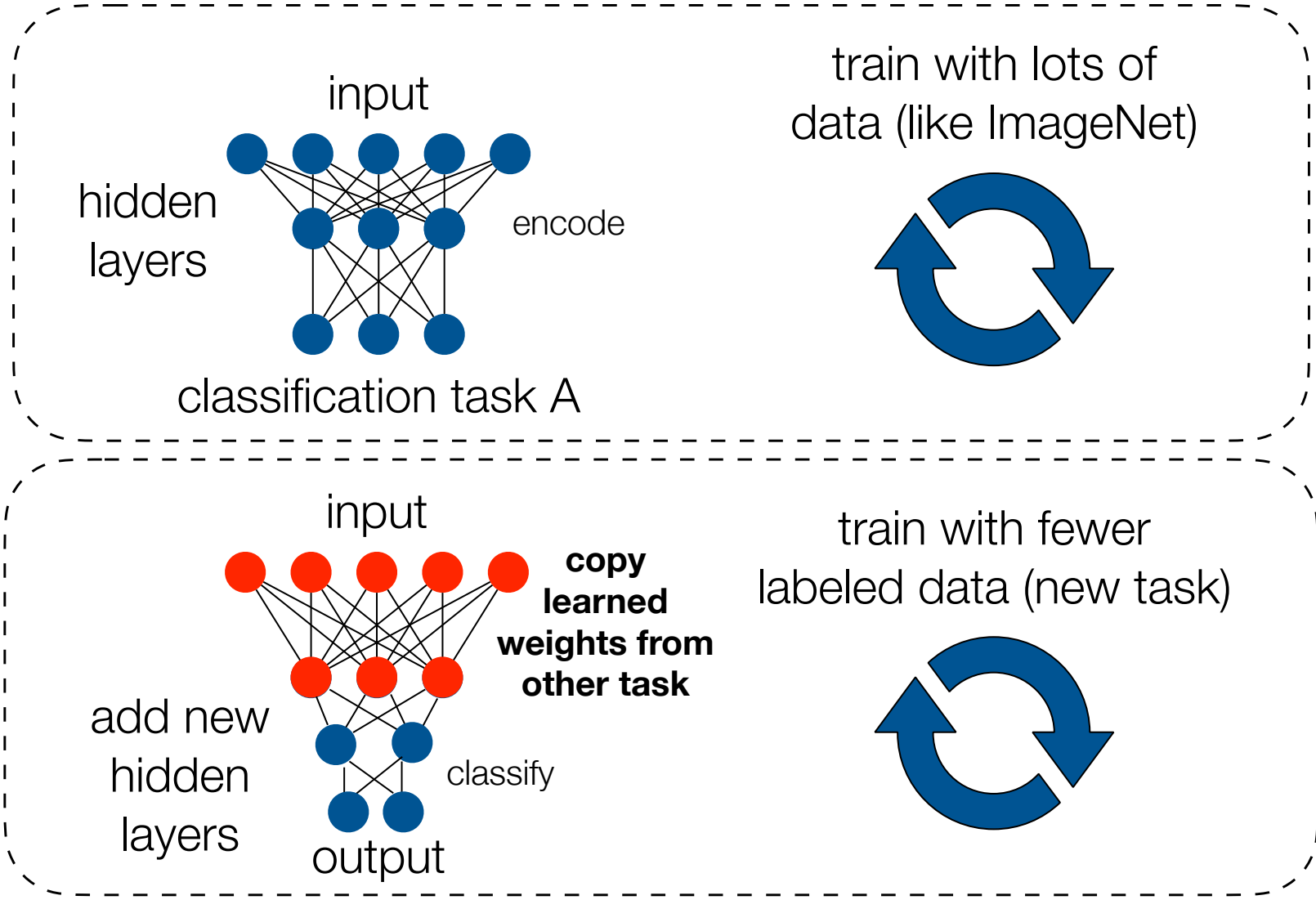
```
# add in augmentations directly
cnn.add( RandomFlip("horizontal") ) # flip horizontally
cnn.add( RandomRotation(0.05) ) # rotate by 5%
cnn.add( RandomTranslation(height_factor=0.1, width_factor=0.1) )
cnn.add( RandomBrightness(factor=0.1, value_range=(0.0, 1.0)) ) #
cnn.add( RandomContrast(0.1) ) # add or decrease contrast
```

RandomRotation( )

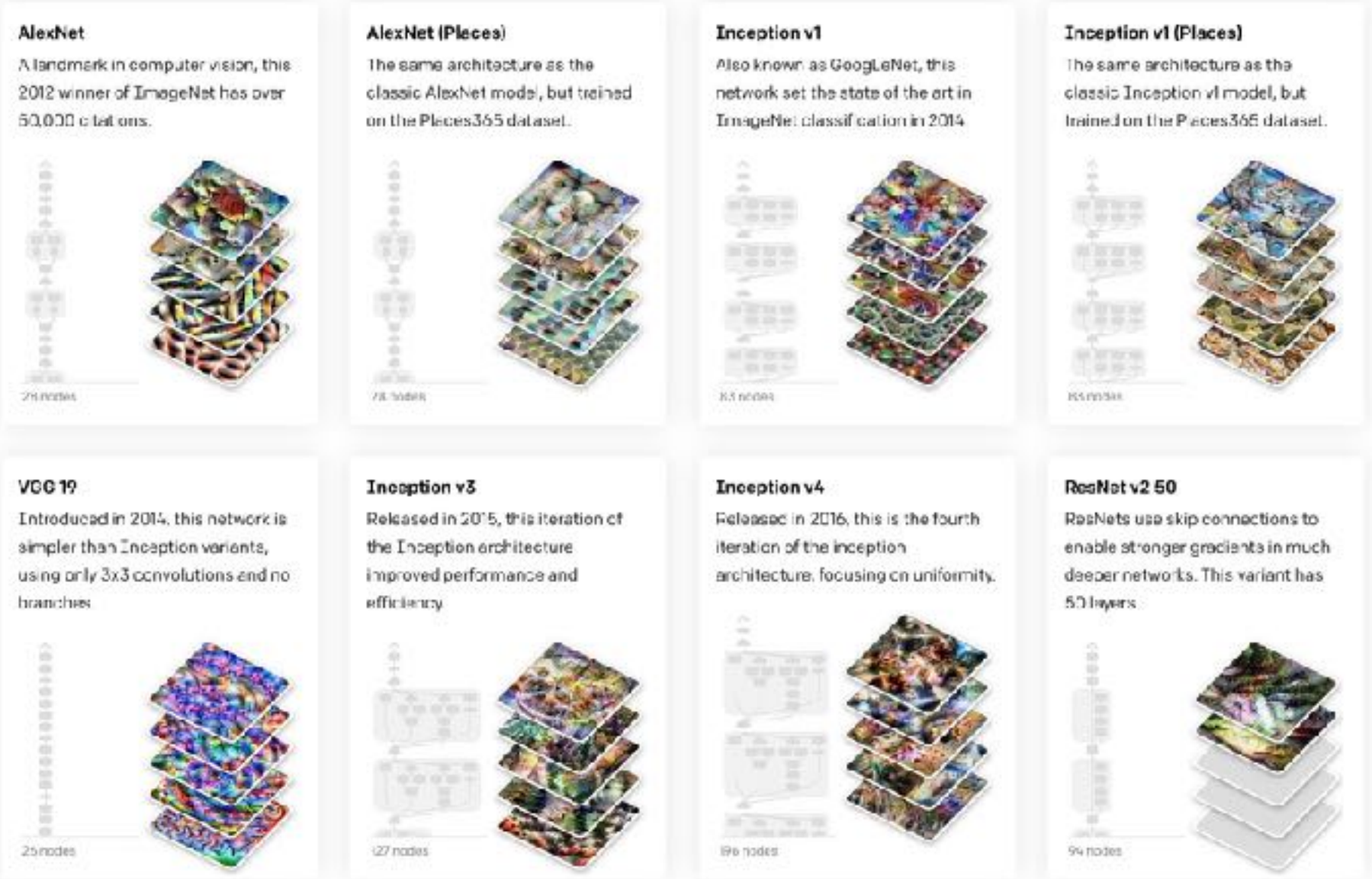
https://machinelearningmastery.com/how-to-configure-image-data-augmentation-when-training-deep-learning-neural-networks/

Transfer Learning

- transfer learning: a basic primer



Many Pre-trained Models to choose from!



CNN Town Hall

Thanks to machine-learning algorithms, the robot apocalypse was short-lived.