

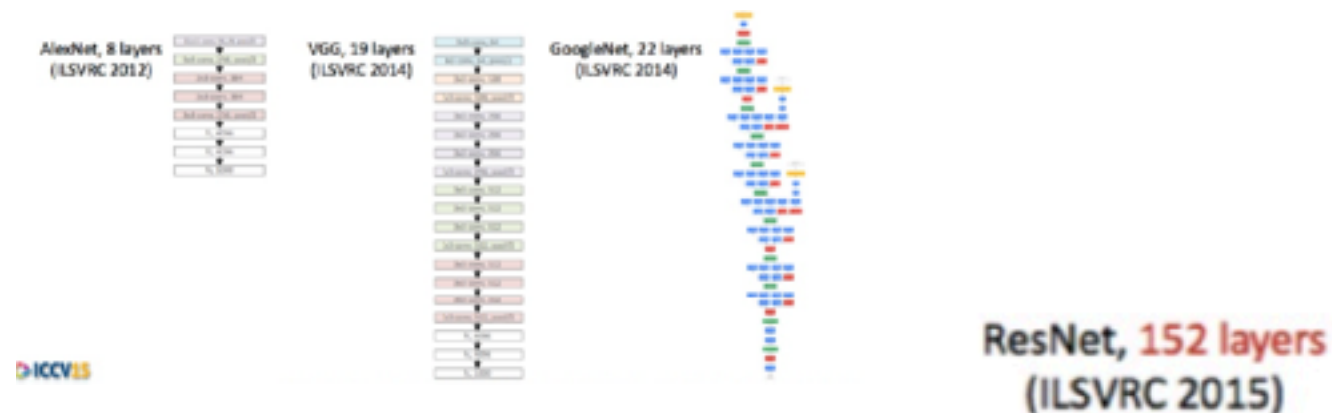
Lecture Notes for **Machine Learning in Python**

Professor Eric Larson
**Demonstration of More Advanced
Convolutional Neural Networks**

Class logistics and Agenda

- CNNs due next week
- Agenda:
 - More Advanced CNN Demo
 - CNN Town Hall
 - Introduction to RNNs

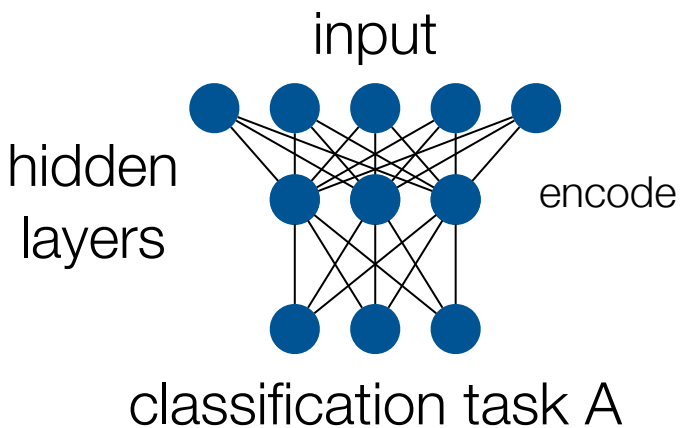
Last Time:



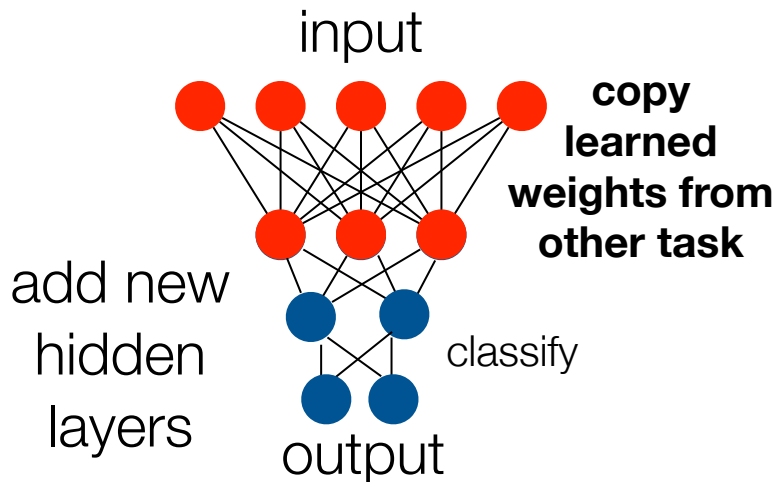
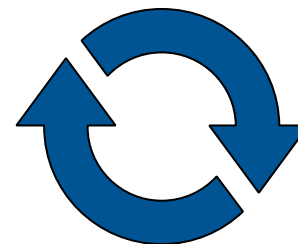
- Bottlenecks
- Parallel Paths, Concatenation
- Residual Paths
- Separable Convolution

Transfer Learning

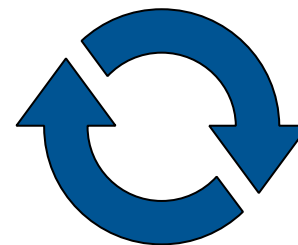
- transfer learning: a basic primer



train with lots of
data (like ImageNet)



train with fewer
labeled data (new task)



Many Pre-trained Models to choose from!

AlexNet

A landmark in computer vision, this 2012 winner of ImageNet has over 50,000 citations.



AlexNet (Places)

The same architecture as the classic AlexNet model, but trained on the Places365 dataset.



Inception v1

Also known as GoogLeNet, this network set the state of the art in ImageNet classification in 2014.



Inception v1 (Places)

The same architecture as the classic Inception v1 model, but trained on the Places365 dataset.



VGG 19

Introduced in 2014, this network is simpler than Inception variants, using only 3x3 convolutions and no branches.



Inception v3

Released in 2015, this iteration of the Inception architecture improved performance and efficiency.



Inception v4

Released in 2016, this is the fourth iteration of the inception architecture, focusing on uniformity.



ResNet v2 50

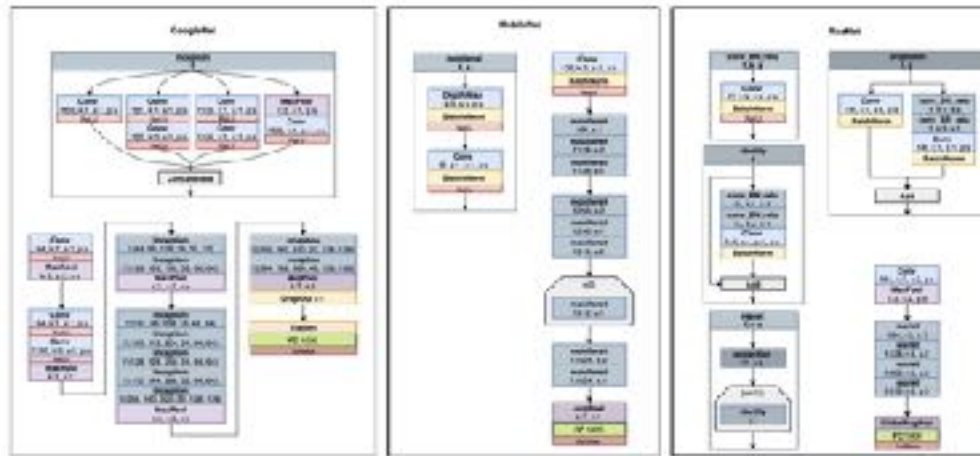
ResNets use skip connections to enable stronger gradients in much deeper networks. This variant has 50 layers.



More Modern CNN Architectures

Even more Convolutional
Neural Networks
...in TensorFlow
...with Keras

Demo



12. More Advanced CNN Techniques.ipynb

CNN Town Hall



Machine Learning 101

Next Time:

- Intro to Recurrent Neural Network Architectures
 - RNNs, GRUs, LSTMs
 - Ethics by Case Study