



Cairo University

# REPORT ON RESNETS

By

Ahmed Usama Khalifa

Submitted to

Dr. Omar Nasr

FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
GIZA, EGYPT

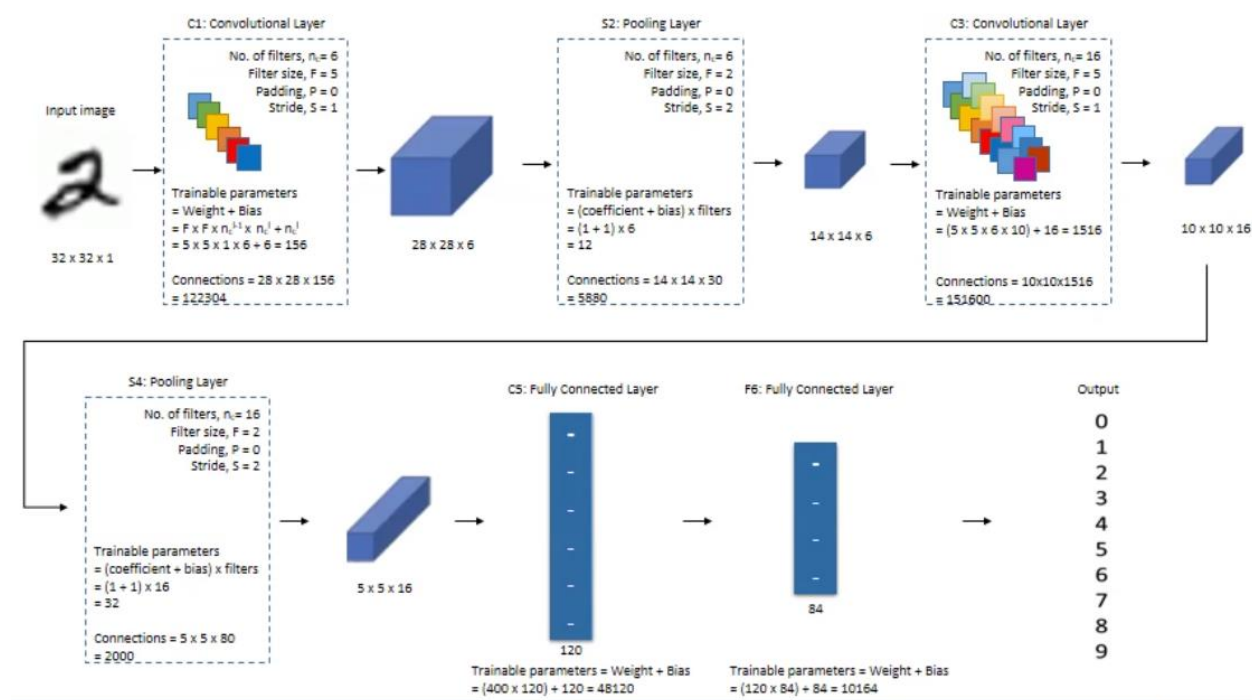
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# Outline

- Classical networks (LeNet-5, AlexNet, VGG)
- ResNet
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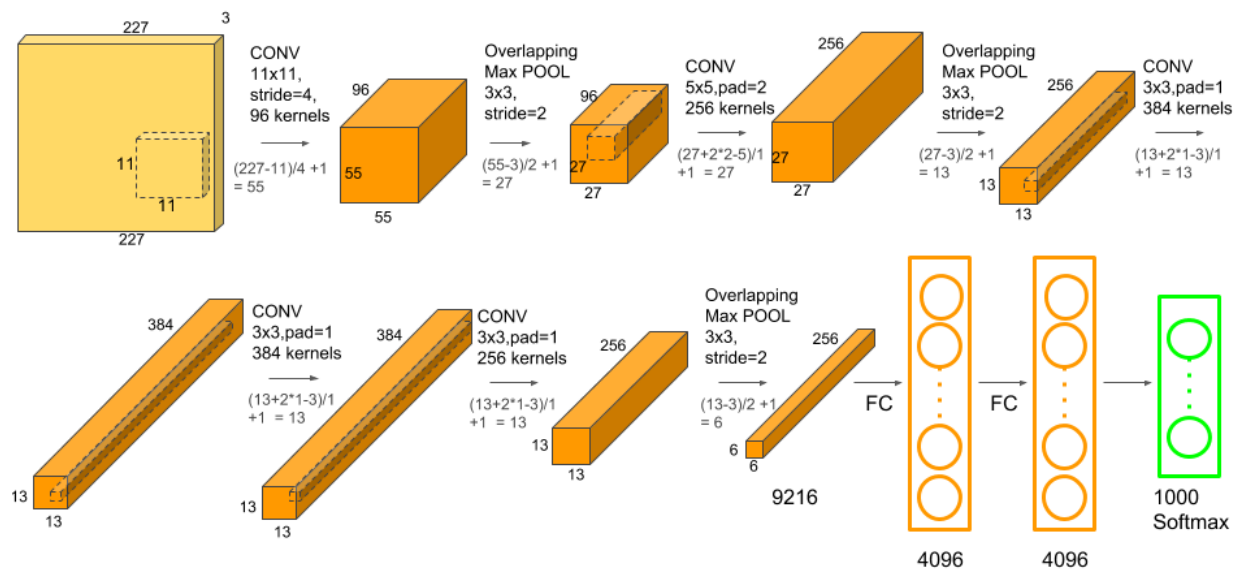
## LeNet-5

LeNet-5 is a very simple network. It only has 7 layers, among which there are 3 convolutional layers (C1, C3 and C5), 2 sub-sampling (pooling) layers (S2 and S4), and 1 fully connected layer (F6), that are followed by the output layer. Convolutional layers use 5 by 5 convolutions with stride 1. Sub-sampling layers are 2 by 2 average pooling layers. Tanh sigmoid activations are used throughout the network.



# AlexNet

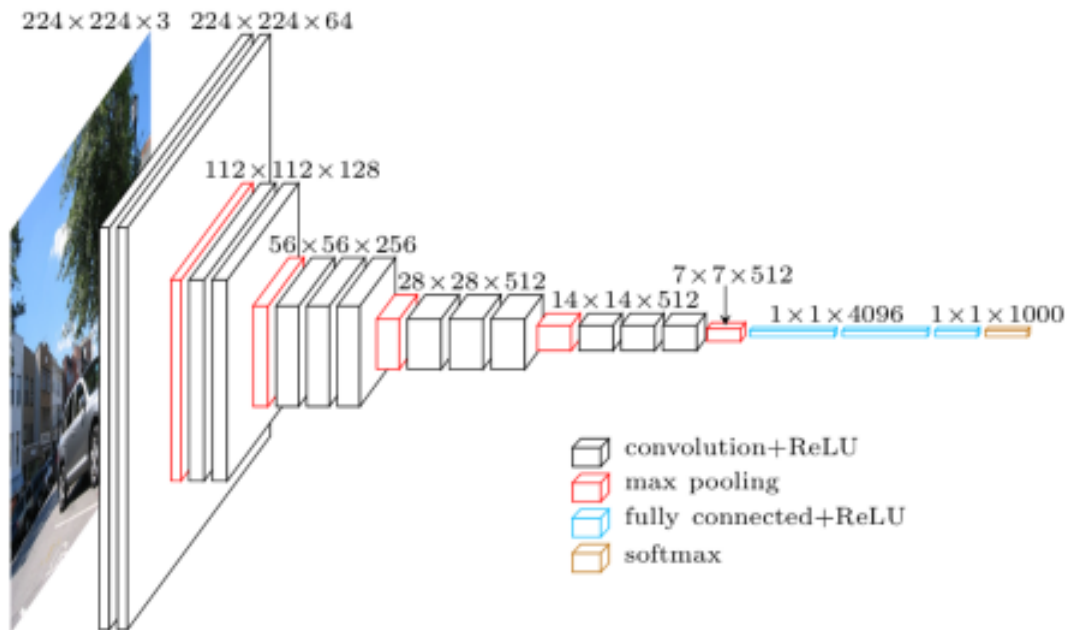
It has 60 million parameters and 650,000 neurons. It consists of **5 Convolutional Layers** and **3 Fully Connected Layers**.



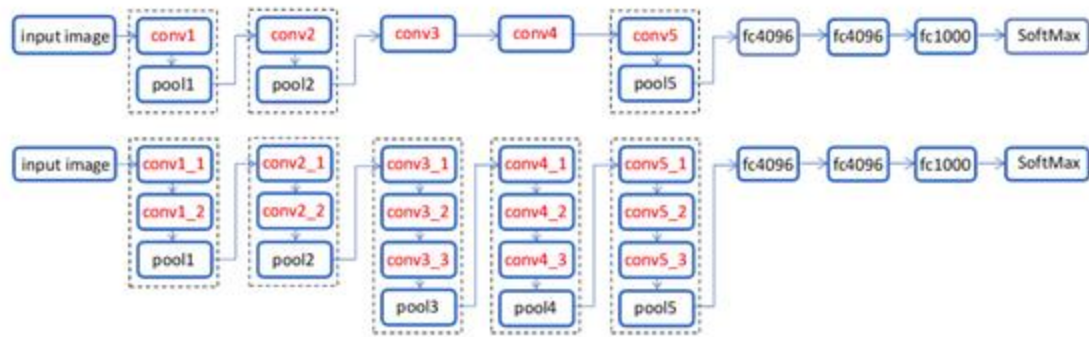
# VGG

The used VGG 16 is much deeper which consists of 16 weight layers including thirteen convolutional layers with filter size of 3 X 3, and fully-connected layers with filter size of 3 X 3, and fully connected layers. The configurations of fully-connected layers in VGG-16 are the same with AlexNet. The stride and padding of all convolutional layers are fixed to 1 pixel. **All convolutional layers are divided into 5 groups and each group is followed by a max-**

pooling layer.



ConvNet Configuration					
A	A-LRN	B	C	D	E
11 weight layers	11 weight layers	13 weight layers	16 weight layers	16 weight layers	19 weight layers
input ( $224 \times 224$ RGB image)					
conv3-64	conv3-64 <b>LRN</b>	conv3-64 <b>conv3-64</b>	conv3-64 conv3-64	conv3-64 conv3-64	conv3-64 conv3-64
maxpool					
conv3-128	conv3-128	conv3-128 <b>conv3-128</b>	conv3-128 conv3-128	conv3-128 conv3-128	conv3-128 conv3-128
maxpool					
conv3-256 conv3-256	conv3-256 conv3-256	conv3-256 conv3-256	conv3-256 conv3-256 <b>conv1-256</b>	conv3-256 conv3-256 <b>conv3-256</b>	conv3-256 conv3-256 conv3-256 <b>conv3-256</b>
maxpool					
conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512 <b>conv1-512</b>	conv3-512 conv3-512 <b>conv3-512</b>	conv3-512 conv3-512 conv3-512 <b>conv3-512</b>
maxpool					
conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512 <b>conv1-512</b>	conv3-512 conv3-512 <b>conv3-512</b>	conv3-512 conv3-512 conv3-512 <b>conv3-512</b>
maxpool					
FC-4096					
FC-4096					
FC-1000					
soft-max					



- The Top part is the architecture of AlexNet and the bottom part is the architecture of VGG-16.

## ResNet

The core idea of ResNet is introducing a so-called “identity shortcut connection” that skips one or more layers.

