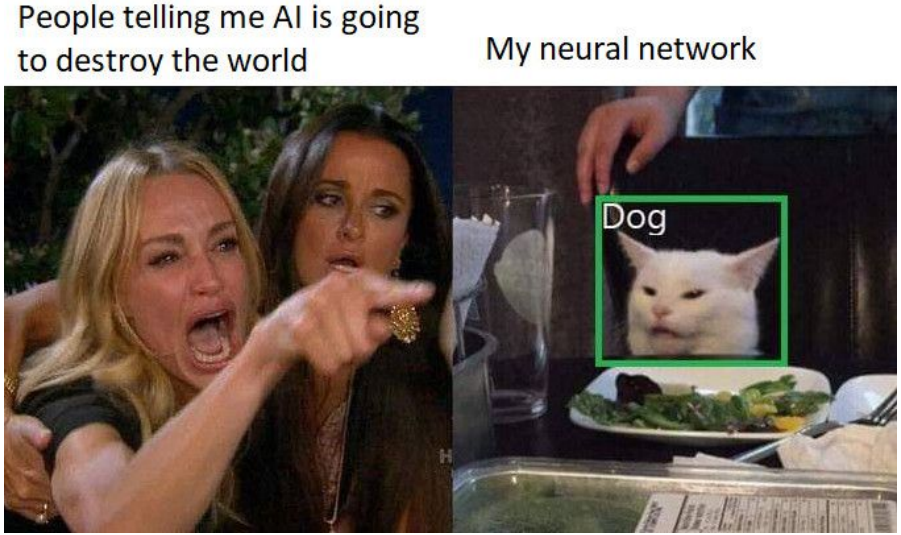
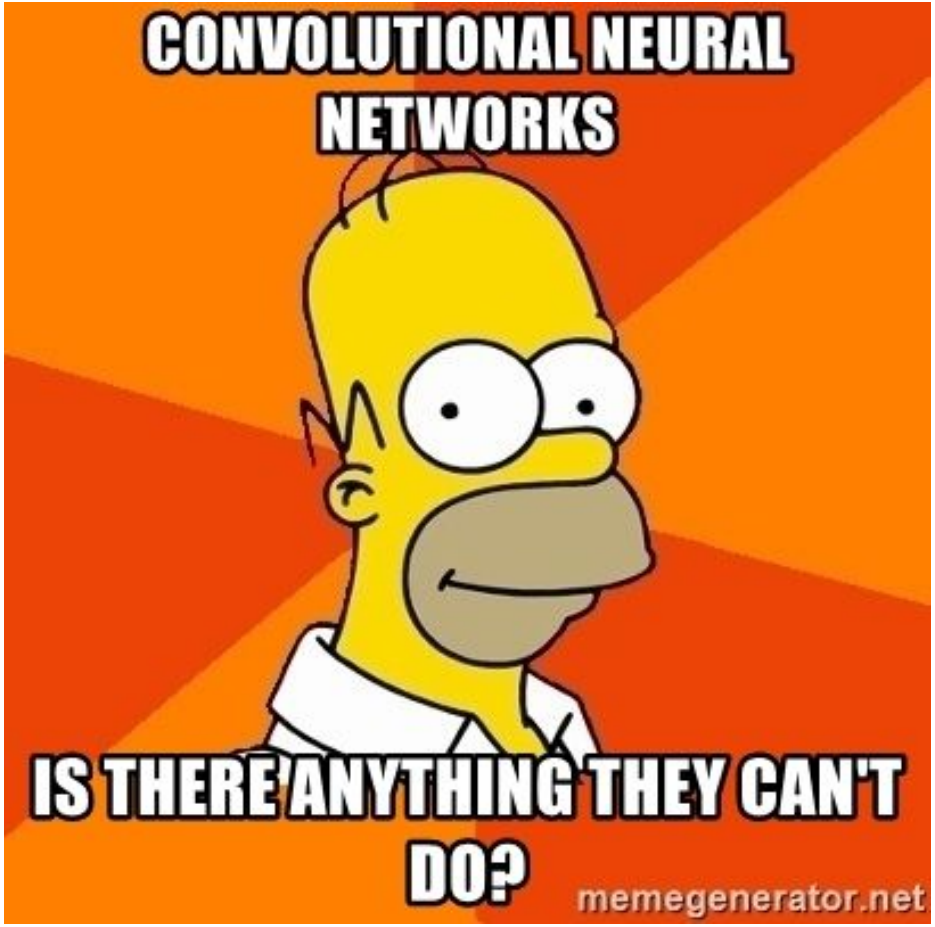
This is CS5045!

GCR:ioc7cdl

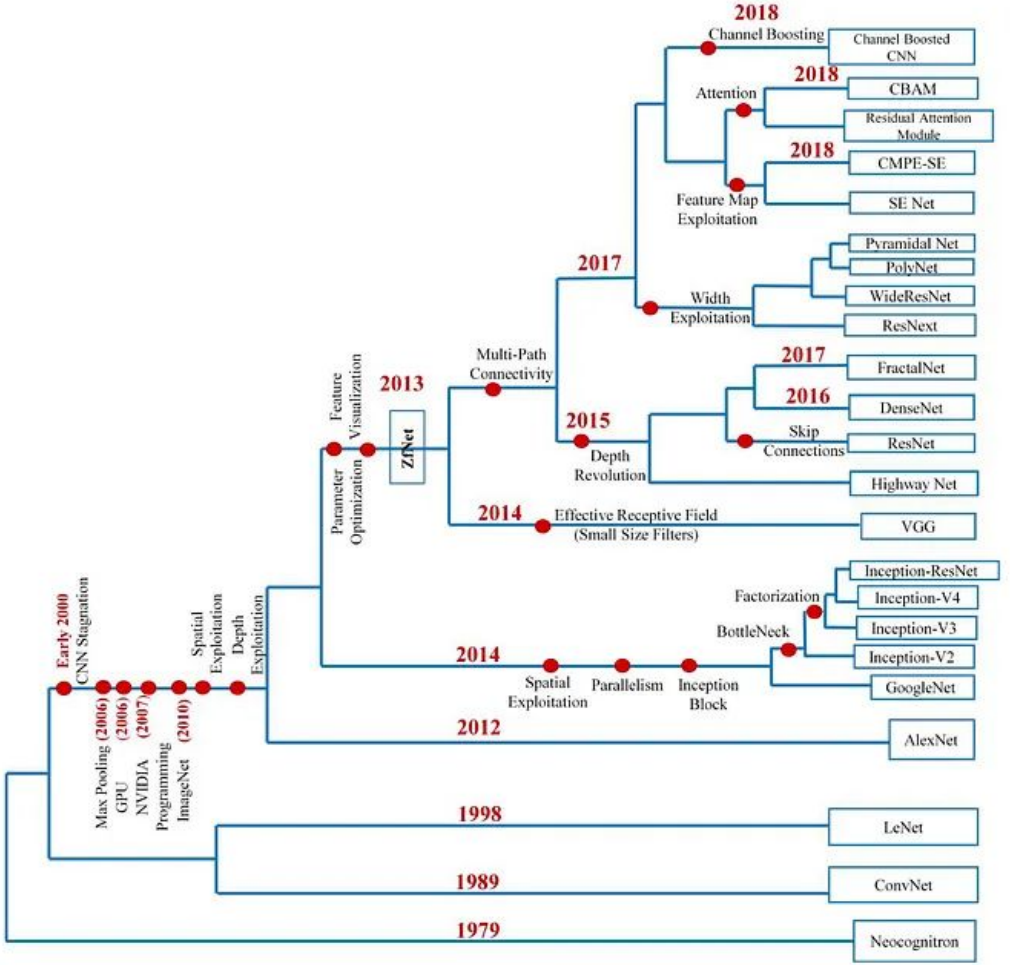
P.S. These slides are useless if you do not attend classes

Convolution Neural Networks

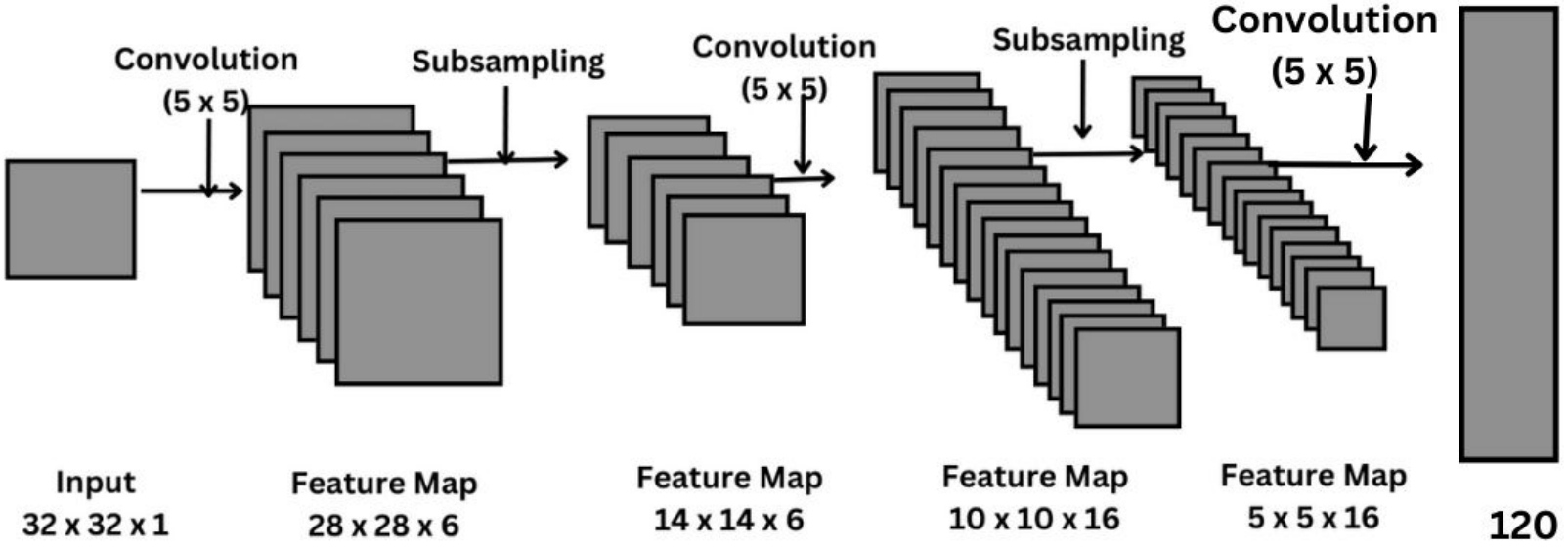



CONVOLUTIONAL NEURAL NETWORKS
IS THERE ANYTHING THEY CAN'T DO?
memegenerator.net

CNN Architectures

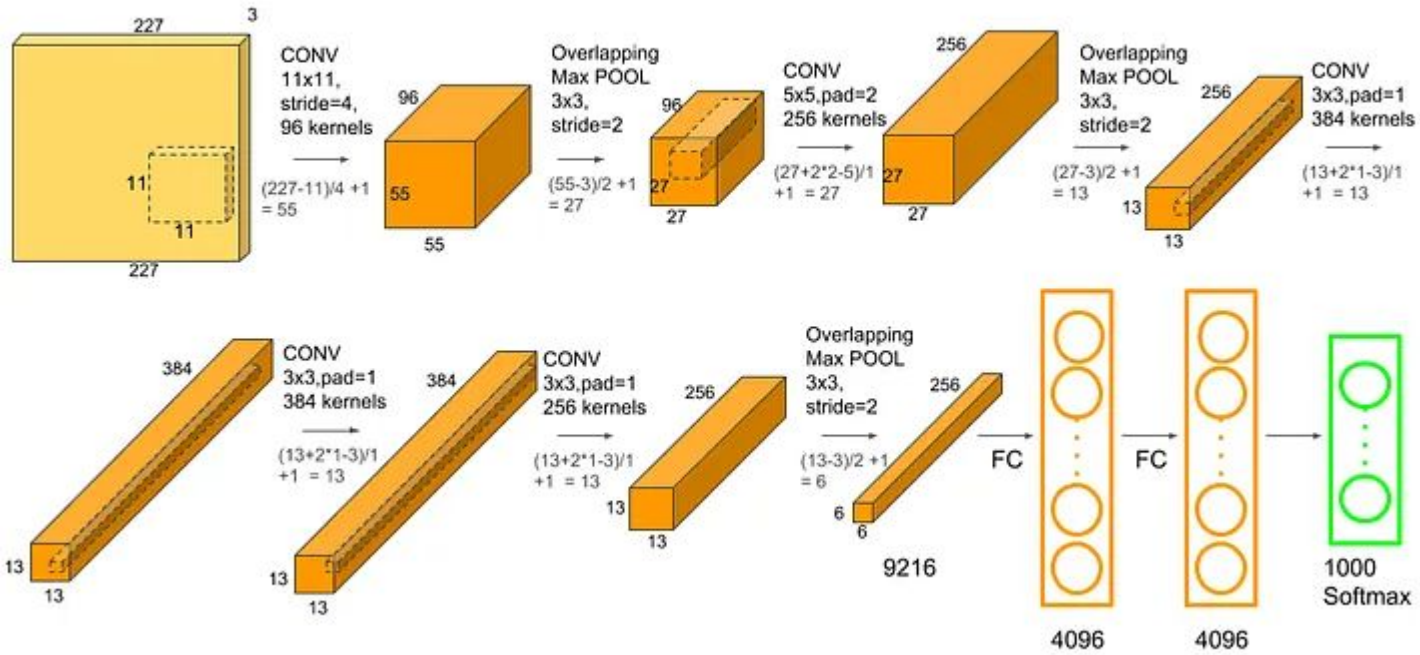


LENET


Convolution
(5 x 5)
Subsampling
Convolution
(5 x 5)
Subsampling
Convolution
(5 x 5)
Input
32 x 32 x 1
Feature Map
28 x 28 x 6
Feature Map
14 x 14 x 6
Feature Map
10 x 10 x 16
Feature Map
5 x 5 x 16
120

ALEX NET

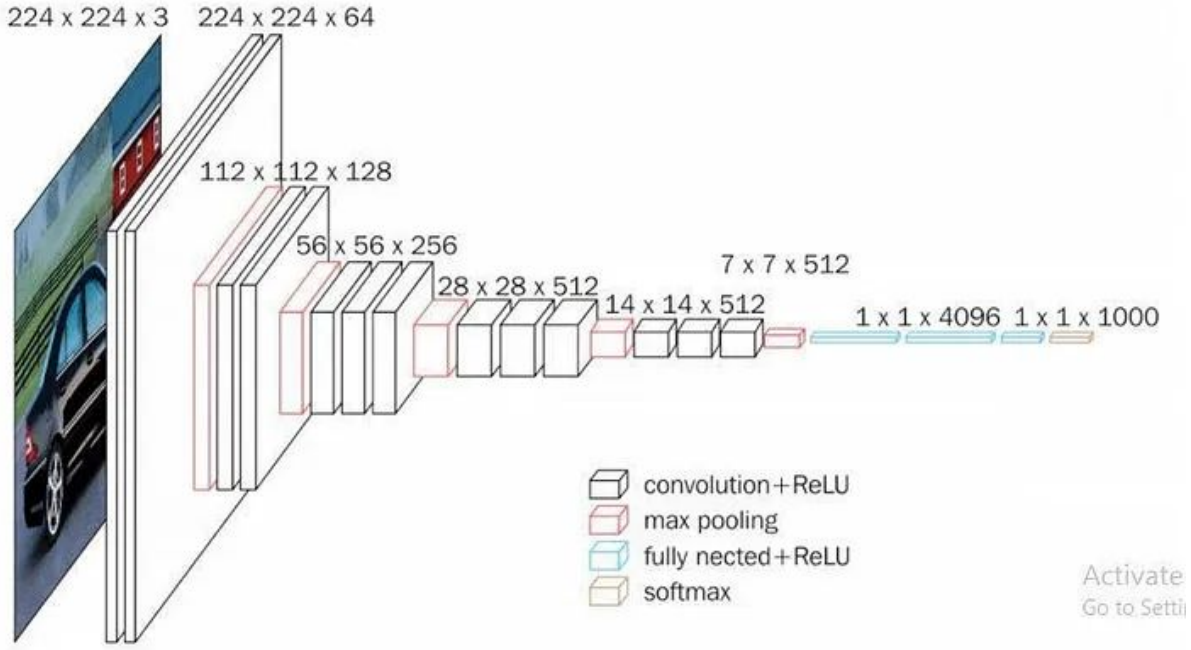
ILSVRC 2014 Winner



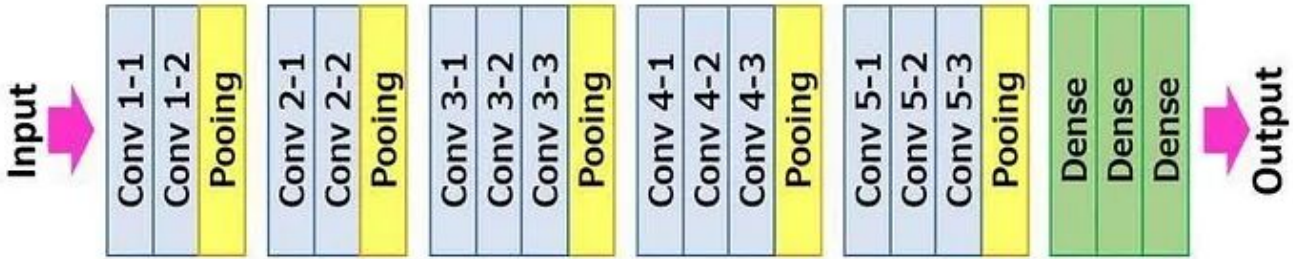
VGG -16

ILSVRC 2014 Runner Up

Visual Geometry Group

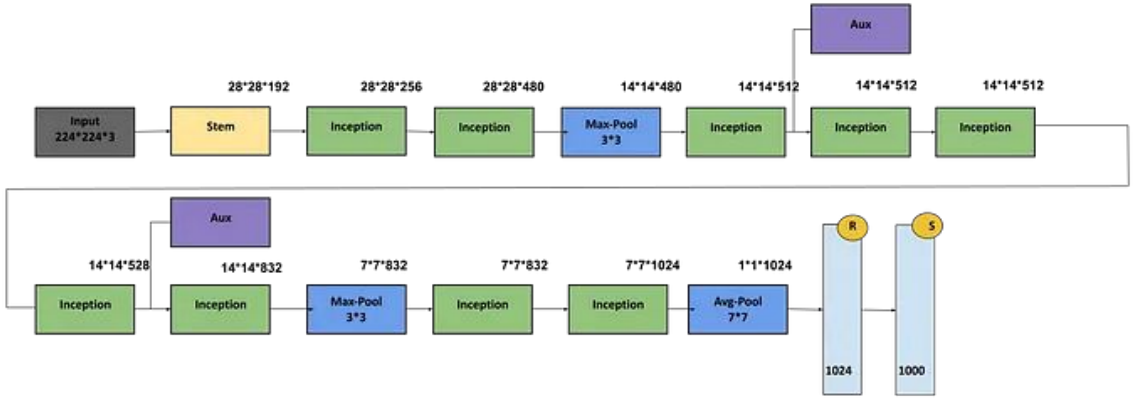


Activate
Go to Setti

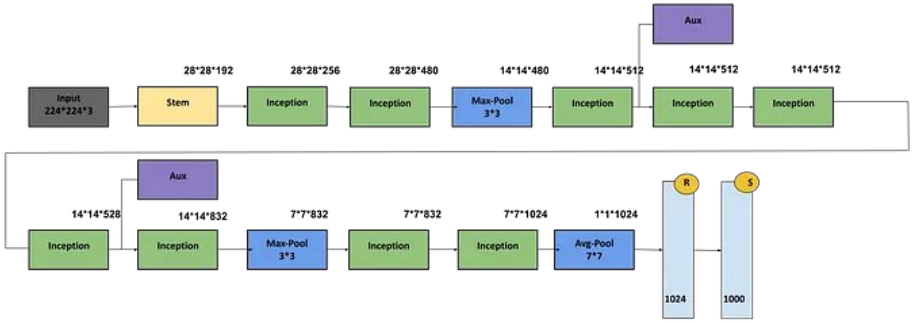


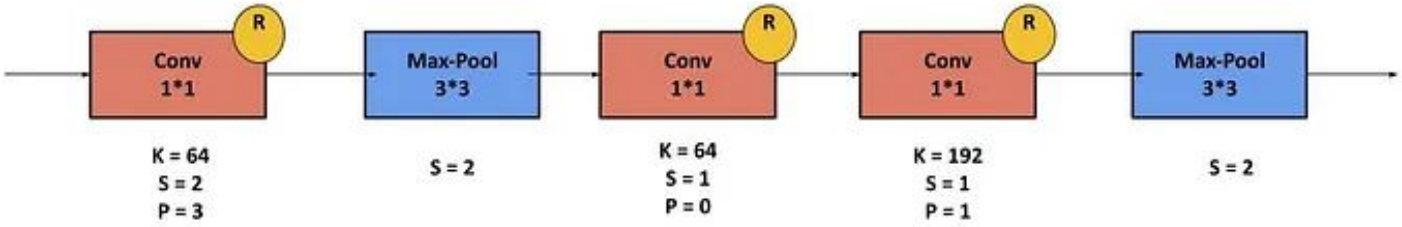
GoogleNet

ILSVRC 2014 Winner

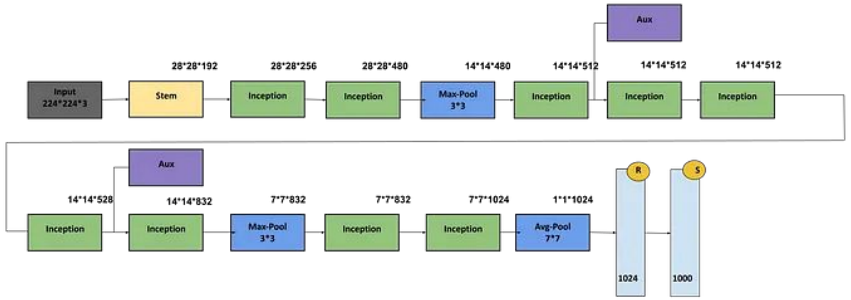


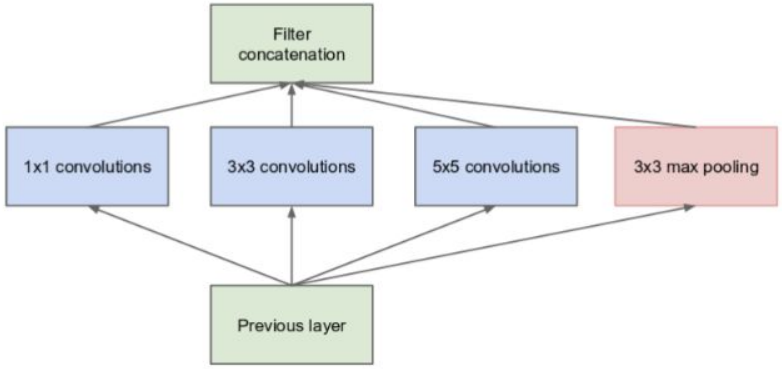
GoogleNet - Stem Block

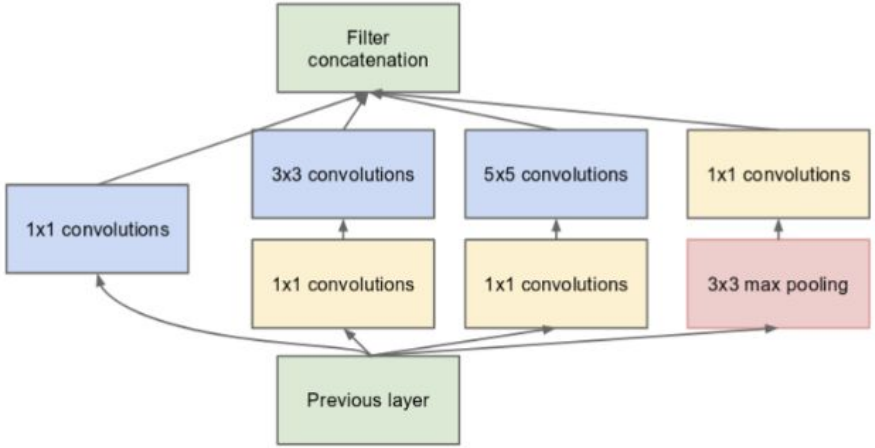




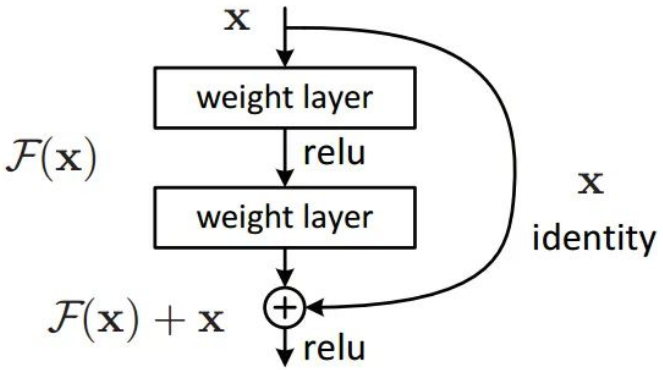
GoogleNet - Inception Block







ResNet-50


x
weight layer
$\mathcal{F}(\mathbf{x})$
relu
weight layer
x
identity
$\mathcal{F}(\mathbf{x}) + \mathbf{x}$
relu

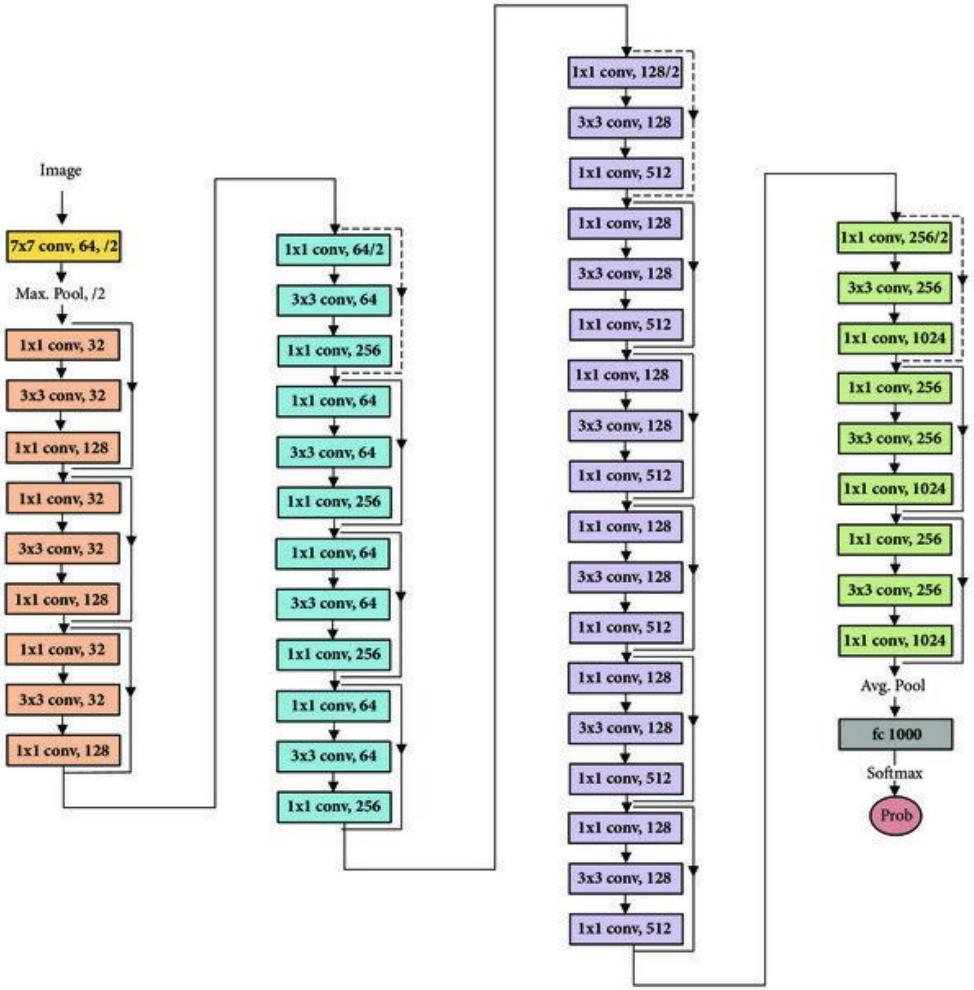


Image
7x7 conv, 64, /2
Max. Pool, /2
1x1 conv, 32
3x3 conv, 32
1x1 conv, 128
1x1 conv, 32
3x3 conv, 32
1x1 conv, 128
1x1 conv, 32
3x3 conv, 32
1x1 conv, 128
1x1 conv, 64/2
3x3 conv, 64
1x1 conv, 256
1x1 conv, 64
3x3 conv, 64
1x1 conv, 256
1x1 conv, 64
3x3 conv, 64
1x1 conv, 256
1x1 conv, 64
3x3 conv, 64
1x1 conv, 256
1x1 conv, 128/2
3x3 conv, 128
1x1 conv, 512
1x1 conv, 128
3x3 conv, 128
1x1 conv, 512
1x1 conv, 128
3x3 conv, 128
1x1 conv, 512
1x1 conv, 128
3x3 conv, 128
1x1 conv, 512
1x1 conv, 128
3x3 conv, 128
1x1 conv, 512
1x1 conv, 128
3x3 conv, 128
1x1 conv, 512
1x1 conv, 256/2
3x3 conv, 256
1x1 conv, 1024
1x1 conv, 256
3x3 conv, 256
1x1 conv, 1024
1x1 conv, 256
3x3 conv, 256
1x1 conv, 1024
Avg. Pool
fc 1000
Softmax
Prob

Inception - Resnet

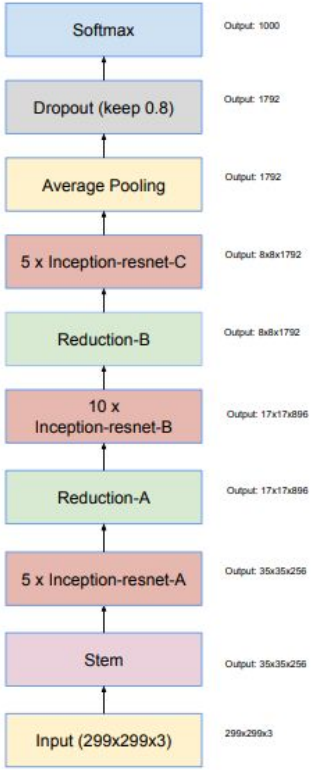


Figure 15. Schema for Inception-ResNet-v1 and Inception-ResNet-v2 networks. This schema applies to both networks but the underlying components differ. Inception-ResNet-v1 uses the blocks as described in Figures 14, 10, 7, 11, 12 and 13. Inception-ResNet-v2 uses the blocks as described in Figures 3, 16, 7,17, 18 and 19. The output sizes in the diagram refer to the activation vector tensor shapes of Inception-ResNet-v1.

Inception - Resnet

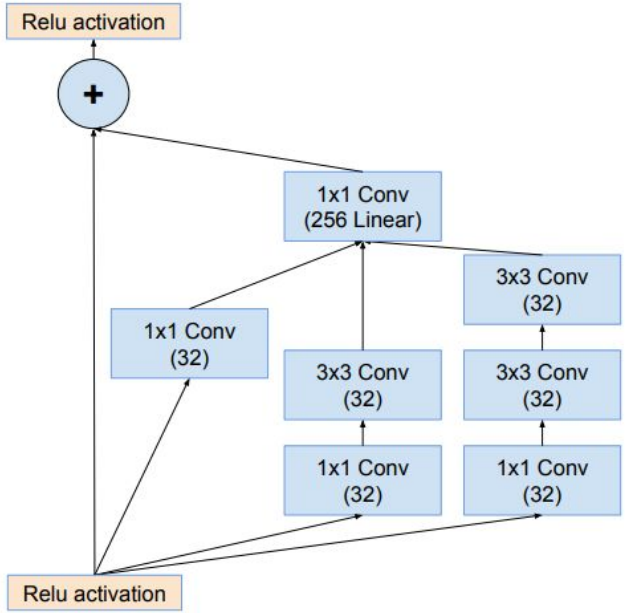


Figure 10. The schema for 35×35 grid (Inception-ResNet-A) module of Inception-ResNet-v1 network.

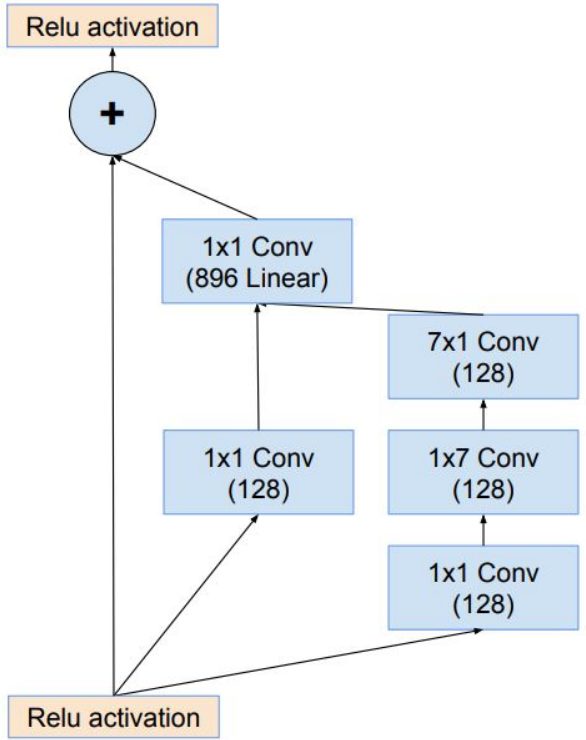


Figure 11. The schema for 17×17 grid (Inception-ResNet-B) module of Inception-ResNet-v1 network.

Inception - Resnet

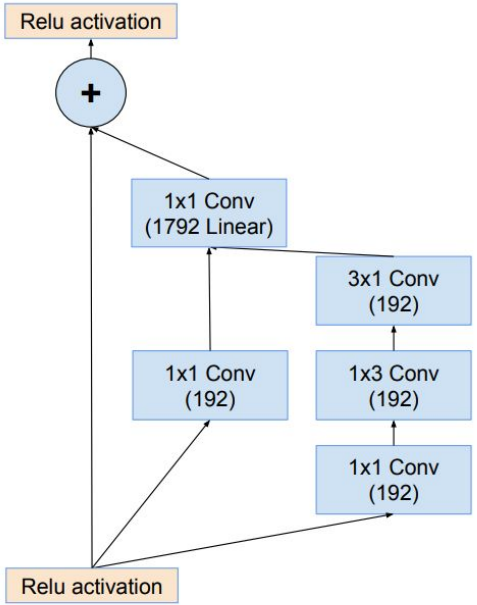


Figure 13. The schema for 8×8 grid (Inception-ResNet-C) module of Inception-ResNet-v1 network.

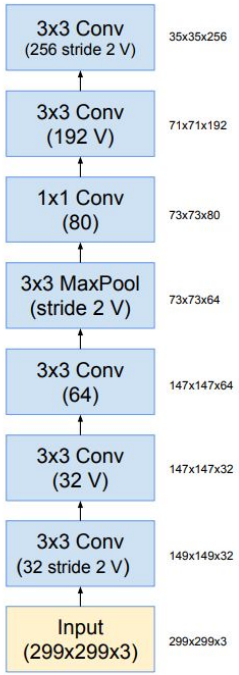


Figure 14. The stem of the Inception-ResNet-v1 ne

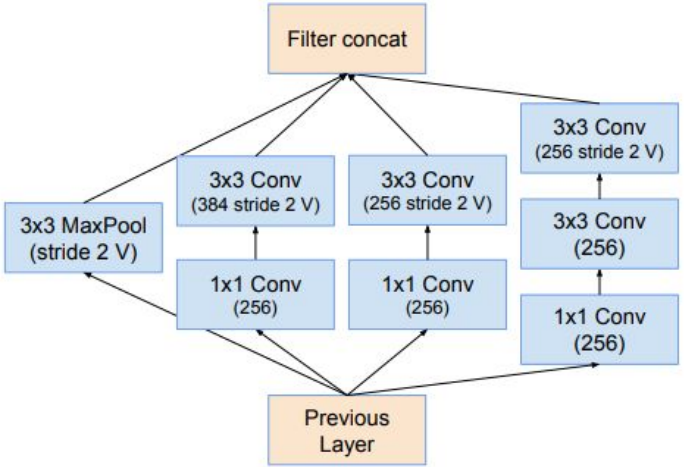


Figure 12. "Reduction-B" 17×17 to 8×8 grid-reduction module. This module used by the smaller Inception-ResNet-v1 network in Figure 15.

CNN Architectures

DenseNet

Xception

MobileNet

ResNext

ZFNet

References

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https://arxiv.org/pdf/1602.07261v2.pdf