→ Classical Architectures.

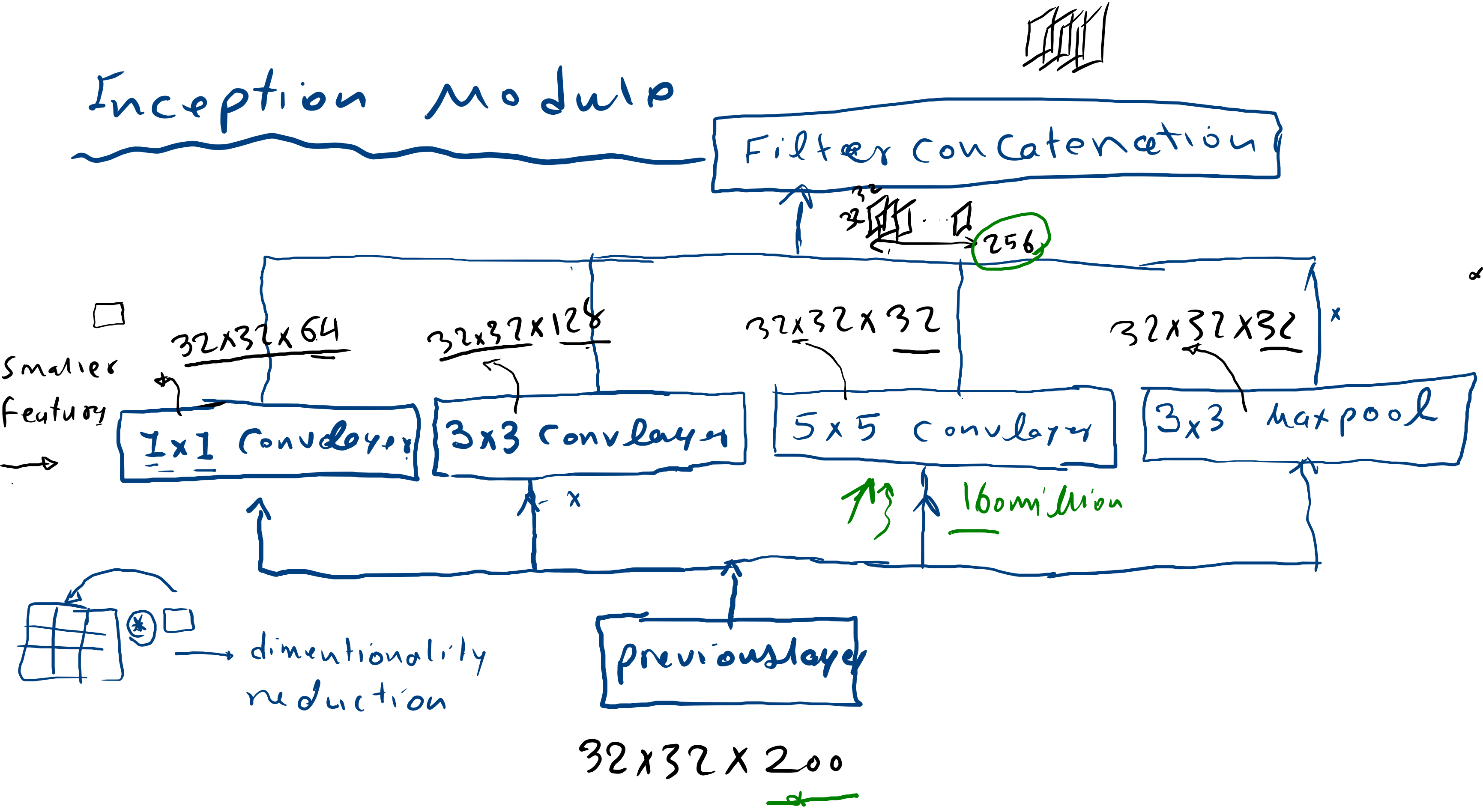
LeNet, AlexNet, VGG.

[لایه کاملاً به ترتیب اجرا بشوند!]

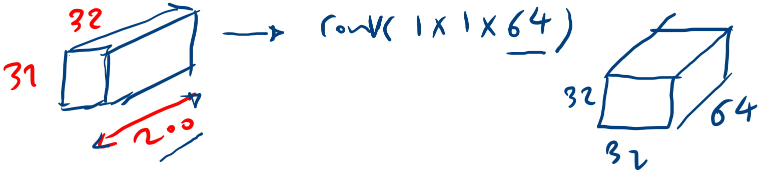
Inception Google 2014

Inception module

Inception Module


Filter concatenation
32
32
256
32x32x64
32x32x128
32x32x32
32x32x32
x
Smaller features
1x1 Convlayer
3x3 Convlayer
5x5 Convlayer
3x3 maxpool
x
160million
dimentionality reduction
previouslayer
32x32x200

32x32x200

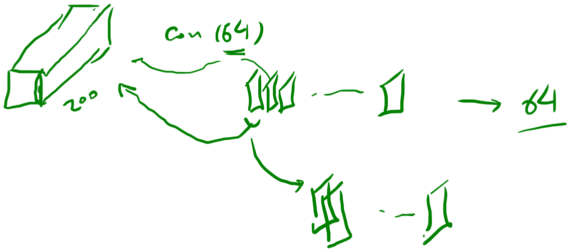

32
32
200
conv(1x1x64)
32
32
64

maxpool

down sampling

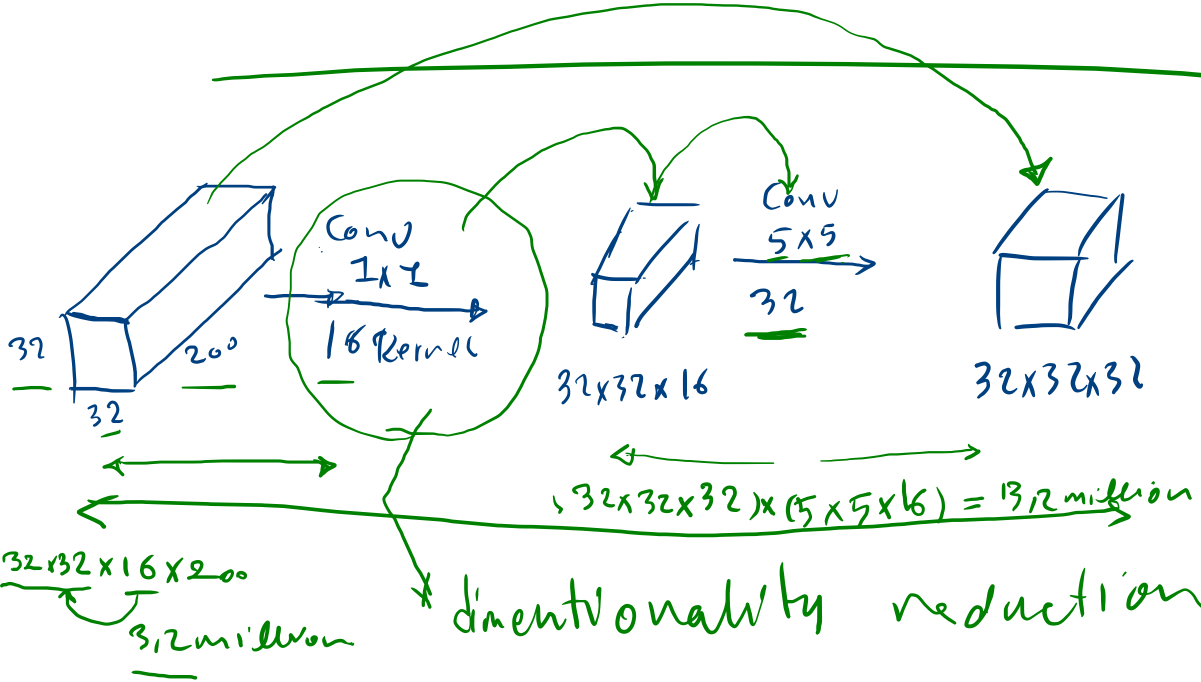
(x, y)

Con (1x1) → depth


Con (64)
200
64

Inception module ~~pto~~ disadvantage .

high computational cost


32
32
200
Conv
1x1
16 Kernel
32x32x16
Conv
5x5
32
32x32x32

32x32x16x200

3,2million

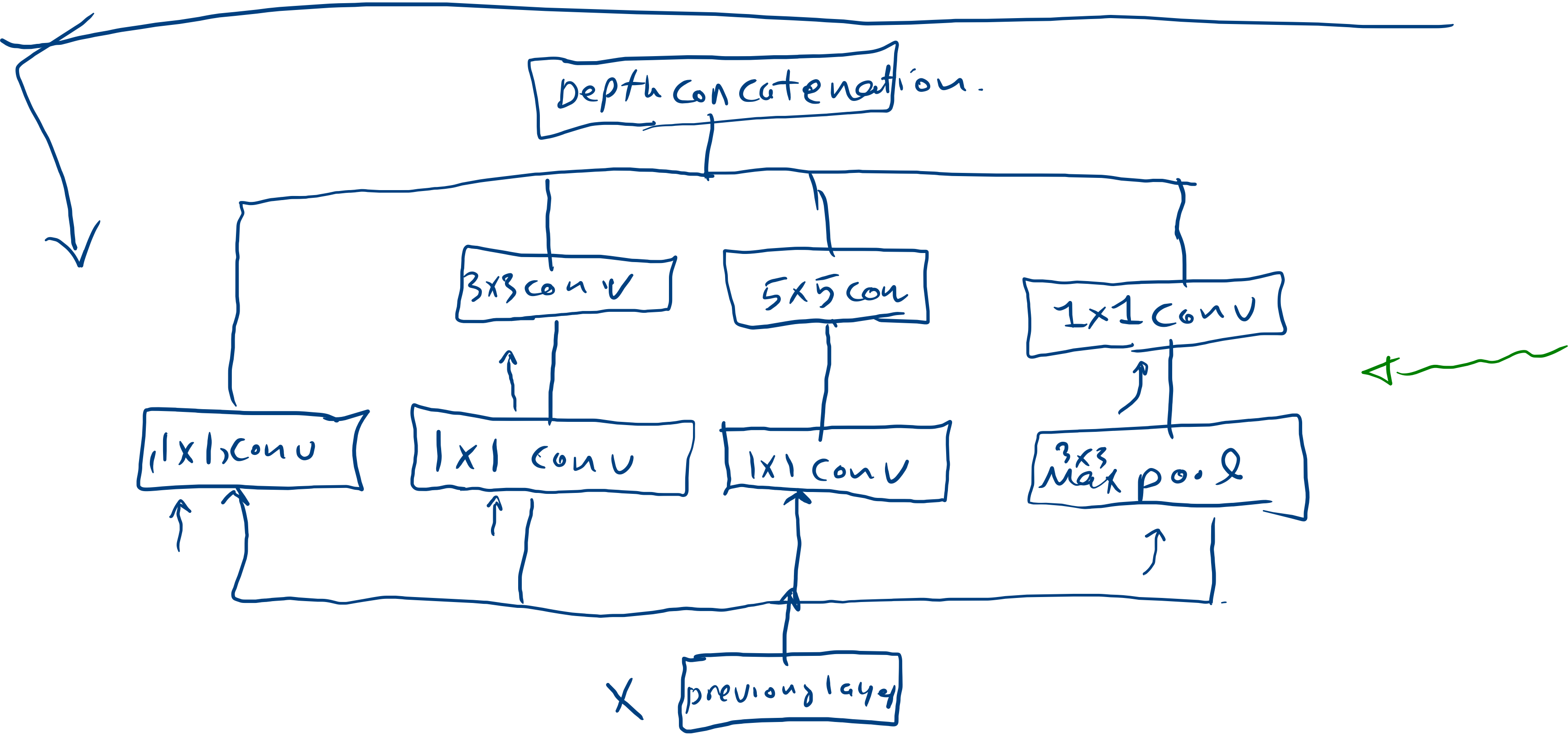
(32x32x32)x(5x5x16) = 13,2 million

≈ 16 million

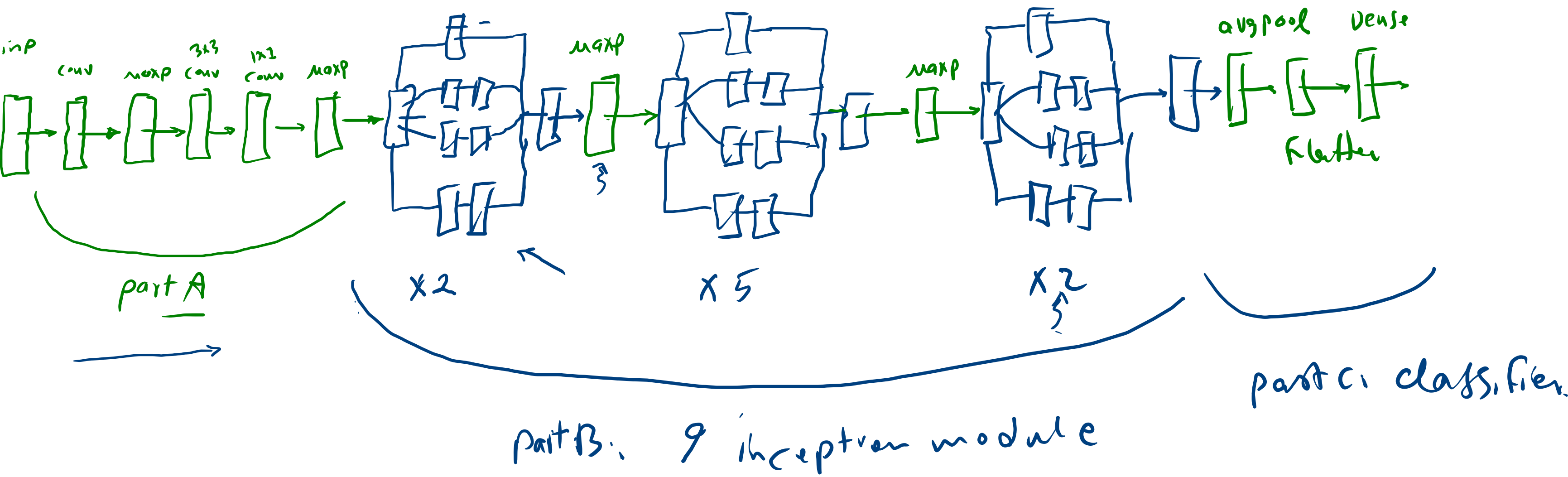
dimentionality reduction

Conv (1X1)

Inception with Dimentionality reduction


Depth concatenation.
3x3 conv
5x5 con
1x1 conv
1x1 conv
1x1 conv
1x1 conv
3x3 Max pool
X
previous layer

Google Net

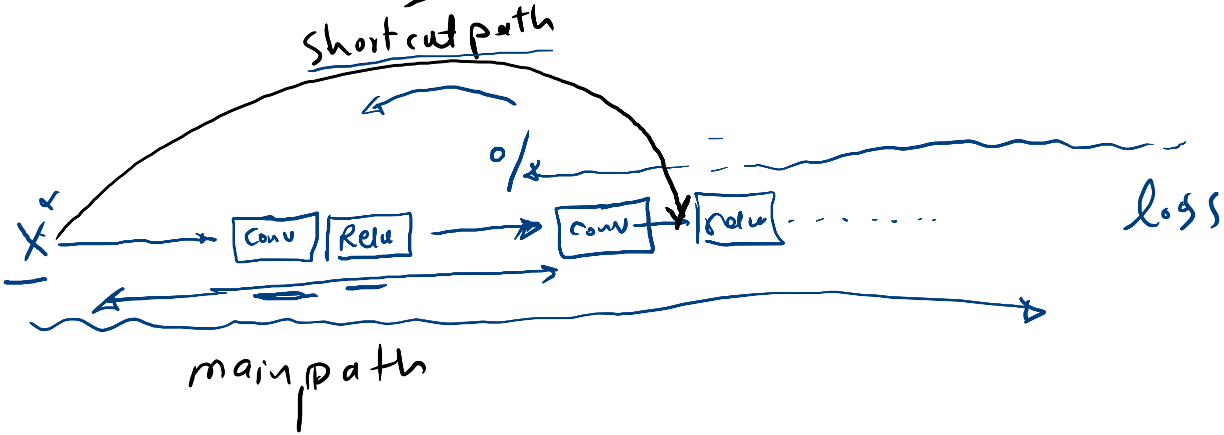

inp
conv
maxp
3x3 conv
1x1 conv
maxp
maxp
maxp
avgpool
(softmax)
Dense
Flatten
x2
x5
x2
part A
part B: 9 inception module
part C: classifier

ResNet

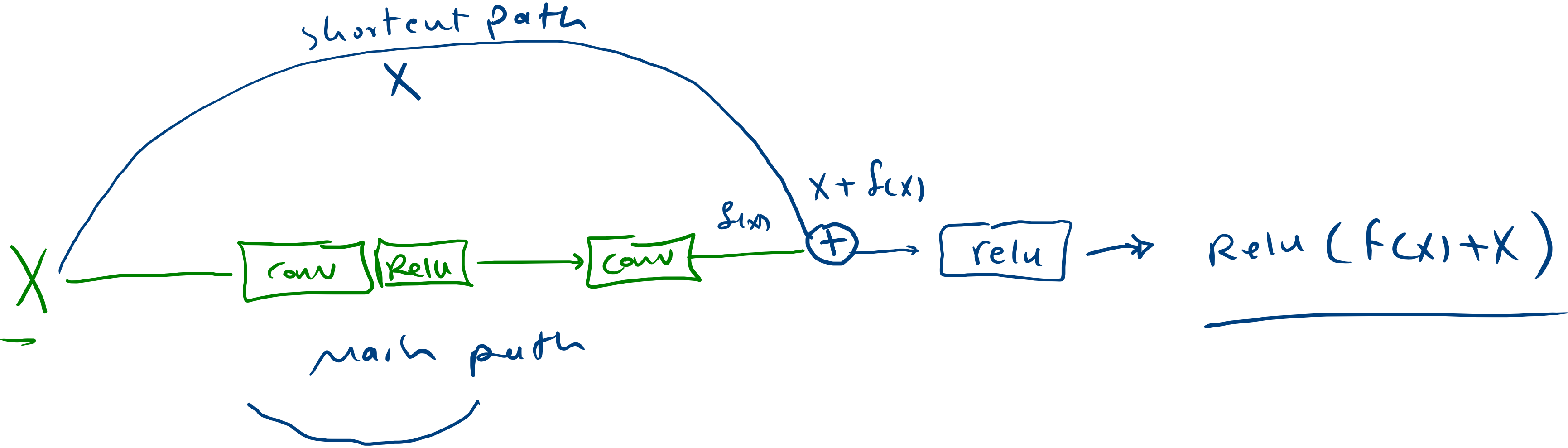
microsoft

vanishing gradient

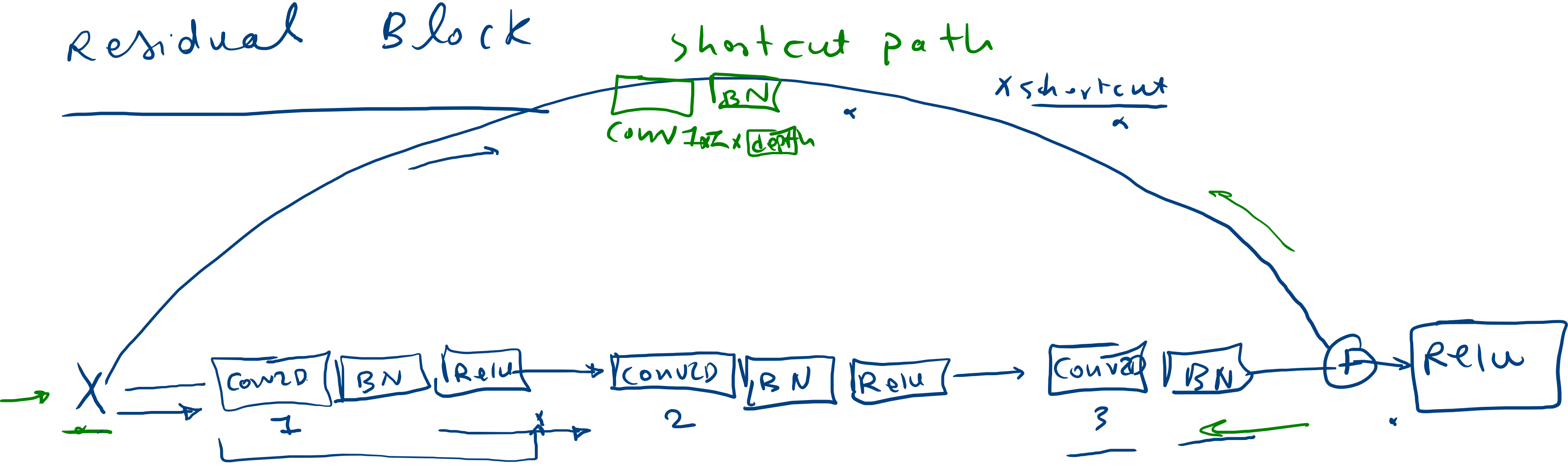
اگر شبکه‌ی مورد نظر از مقدار معمول عمیق شود چه مشکلی پیش می آید ؟


Shortcut path
X
Conv
Relu
conv
Relu
0/x
loss
main path

ResNet → Super deep Neural Networks.


shortcut path
X
X
conv
Relu
conv
f(x)
x + f(x)
+
relu
Relu(F(X)+X)
main path

Residual Block


shortcut path
Conv 1x1 x depth
BN
X shortcut
X
Conv2D
BN
Relu
1
Conv2D
BN
Relu
2
Conv2D
BN
3
+
Relu

if res-block == True

res block

else:

main path.

ResNet 50

stage 1 → 7x7 conv layer ~~7x7~~

stage 2 → 3 residual block (9 conv layers)

stage 3 → 4 res block (12 conv layers)

stage 4 → 6 RB (18 conv layers)

stage 5 → 3 RB (9 conv layer)

Fully Connected layer

The End