

Case Study: VGGNet

[Simonyan and Zisserman, 2014]

(not counting biases)

INPUT: [224x224x3] memory: $224*224*3=150K$ params: 0
 CONV3-64: [224x224x64] memory: $224*224*64=3.2M$ params: $(3*3*3)*64 = 1,728$
 CONV3-64: [224x224x64] memory: $224*224*64=3.2M$ params: $(3*3*64)*64 = 36,864$
 POOL2: [112x112x64] memory: $112*112*64=800K$ params: 0
 CONV3-128: [112x112x128] memory: $112*112*128=1.6M$ params: $(3*3*64)*128 = 73,728$
 CONV3-128: [112x112x128] memory: $112*112*128=1.6M$ params: $(3*3*128)*128 = 147,456$
 POOL2: [56x56x128] memory: $56*56*128=400K$ params: 0
 CONV3-256: [56x56x256] memory: $56*56*256=800K$ params: $(3*3*128)*256 = 294,912$
 CONV3-256: [56x56x256] memory: $56*56*256=800K$ params: $(3*3*256)*256 = 589,824$
 CONV3-256: [56x56x256] memory: $56*56*256=800K$ params: $(3*3*256)*256 = 589,824$
 POOL2: [28x28x256] memory: $28*28*256=200K$ params: 0
 CONV3-512: [28x28x512] memory: $28*28*512=400K$ params: $(3*3*256)*512 = 1,179,648$
 CONV3-512: [28x28x512] memory: $28*28*512=400K$ params: $(3*3*512)*512 = 2,359,296$
 CONV3-512: [28x28x512] memory: $28*28*512=400K$ params: $(3*3*512)*512 = 2,359,296$
 POOL2: [14x14x512] memory: $14*14*512=100K$ params: 0
 CONV3-512: [14x14x512] memory: $14*14*512=100K$ params: $(3*3*512)*512 = 2,359,296$
 CONV3-512: [14x14x512] memory: $14*14*512=100K$ params: $(3*3*512)*512 = 2,359,296$
 CONV3-512: [14x14x512] memory: $14*14*512=100K$ params: $(3*3*512)*512 = 2,359,296$
 POOL2: [7x7x512] memory: $7*7*512=25K$ params: 0
 FC: [1x1x4096] memory: 4096 params: $7*7*512*4096 = 102,760,448$
 FC: [1x1x4096] memory: 4096 params: $4096*4096 = 16,777,216$
 FC: [1x1x1000] memory: 1000 params: $4096*1000 = 4,096,000$

TOTAL memory: $24M * 4 \text{ bytes} \approx 93MB$ / image (only forward! ~ 2 for bwd)

TOTAL params: 138M parameters

