PAGRN： input: h*w*3 (recurrent, without bn)

Block1: input: h*w*3 output: h/2*w/2*64
cost: h*w*64*3*3*3 + h*w*64*3*3*64+h*w*64 = 38656 *h*w

———————
Block2: input: h/2*w/2*64 output: h/2*w/2*128
cost: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 = 55296*h*w

batch_norm_pooling_2: input: h/2*w/2*128 output: h/4*w/4*128
cost: h/2*w/2*128 = 32*h*w

recurrent_2: input: h/16*w/16*512 output: h/16*w/16*128
cost: h/16*w/16*128*1*1*512 = 256*h*w

add_recurrent_2: input: h/4*w/4*128(2个) output: h/4*w/4*128
cost: h/4*w/4*128 = 8*h*w

Block2 total: 55296 + 32 + 256 + 8 = 55592*h*w
———————

Block3: input: h/4*w/4*128 output: h/4*w/4*256
cost: h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256*3 = 129024*h*w

batch_norm_pooling_3: input: h/4*w/4*256 output: h/8*w/8*256
cost: h/4*w/4*256 = 16*h*w

recurrent_3: input: h/16*w/16*512 output: h/16*w/16*256
cost: h/16*w/16*512*256*1*1 = 512*h*w

add_recurrent3: input: h/8*w/8*256 output: h/8*w/8*256
cost: h/8*w/8*256 = 4*h*w

Block3 total: 129024 + 16 + 512 + 4 = 129556*h*w

———————

Block4: input: h/8*w/8*256 output: h/8*w/8*512
cost: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512*3 = 129024*h*w

batch_norm_pooling_4: input: h/8*w/8*512 output: h/16*w/16*512
Cost h/8*w/8*512 = 8*h*w

recurrent_2: input: h/16*w/16*512 output: h/16*w/16*512
Cost: h/16*w/16*512*512*1*1 = 1024*h*w

add_recurrent2: input: h/16*w/16*512 output: h/16*w*16*512
cost: h/16*w/16*512 = 2*h*w

Block4 total: 129024 + 8 + 1024 + 2 = 130058*h*w

———————

Block5: input: h/16*w/16*512 output: h/16*w/16*512
cost: h/16*w/16*512*3*3*512*5 = 46080*h*w

attention5:
h/16*w/16*512 + 1*1*512*512 + h/16*w/16*512 + h/16*w/16*512*512 + h/16*w/16*512 + h/8*w/8*512 + h/8*w/8*256*1*1*512 = 265230*h*w

attention4:
h/8*w/8*256 + 1*1*256*256 + h/8*w/8*256 + h/8*w/8*256*256 + h/8*w/8*256 + h/4*w/4*256 + h/4*w/4*256*256 = 70684*h*w

attention3:
h/4*w/4*256 + 1*1*256*256 + h/4*w/4*256 + h/4*w/4*256*256 + h/4*w/4*256 = 69680*h*w

saliency_map:
h/4*w/4*1*1*256 = 16*h*w

totally:
38656 *h*w + 55592*h*w + 129556*h*w + 130058*h*w + 46080*h*w + 265230*h*w + 70684*h*w + 69680*h*w + 16*h*w = 805552 * h*w

参数量:
Block1: 3*3*3*64 + 3*3*64*64 = 38592
Block2: 3*3*64*128 + 3*3*128*128 + 512*128*1*1= 286720
Block3: 3*3*128*256 + 3*3*256*256 + 3*3*256*256 + 3*3*256*256 + 512*256*1*1 = 2195456
Block4: 3*3*256*512 + 3*3*512*512 + 3*3*512*512 + 3*3*512*512 + 512*512*1*1 = 8519680
Block5: 3*3*512*512 * 5 = 11796480
attention5: 512*512*2 + 512*256 = 655360
attention4: 256*256*3 = 65536
attention3: 256*256*3 = 65536
saliency_map = 256

totally: 38592 + 286720 + 2195456 + 8519680 + 11796480 + 655360 + 65536 + 65536 + 256 = 23623616

PAGRN： input: h*w*3 (recurrent, with bn)

Block1: input: h*w*3 output: h/2*w/2*64
cost: h*w*64*3*3*3 + h*w*64*3*3*64+h*w*64 = 38656 *h*w

————————
Block2: input: h/2*w/2*64 output: h/2*w/2*128
cost: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 = 55296*h*w

batch_norm_pooling_2: input: h/2*w/2*128 output: h/4*w/4*128
cost: h/2*w/2*128*(b+1)*2 + h/2*w/2*128 = (64*b+96)*h*w

recurrent_2: input: h/16*w/16*512 output: h/16*w/16*128
cost: h/16*w/16*128*1*1*512 = 256*h*w

add_recurrent_2: input: h/4*w/4*128(2个) output: h/4*w/4*128
cost: h/4*w/4*128 = 8*h*w

Block2 total: 55296 + (64*b+96) + 256 + 8 = (55656 + 64*b)*h*w
————————

Block3: input: h/4*w/4*128 output: h/4*w/4*256
cost: h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256*3 = 129024*h*w

batch_norm_pooling_3: input: h/4*w/4*256 output: h/8*w/8*256
cost: h/4*w/4*256*(b+1)*2 + h/4*w/4*256 = (32*(b+1) + 16)*h*w = (32*b+48)*h*w

recurrent_3: input: h/16*w/16*512 output: h/16*w/16*256
cost: h/16*w/16*512*256*1*1 = 512*h*w

add_recurrent3: input: h/8*w/8*256 output: h/8*w/8*256
cost: h/8*w/8*256 = 4*h*w

Block3 total: 129024 + (32*b+48) + 512 + 4 = (129588 + 32*b)*h*w

———————

Block4: input: h/8*w/8*256 output: h/8*w/8*512
cost: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512*3 = 129024*h*w

batch_norm_pooling_4: input: h/8*w/8*512 output: h/16*w/16*512
Cost h/8*w/8*512*(b+1)*2 + h/8*w/8*512 = (16*(b+1) + 8)*h*w = (16*b + 24)*h*w

recurrent_2: input: h/16*w/16*512 output: h/16*w/16*512
Cost: h/16*w/16*512*512*1*1 = 1024*h*w

add_recurrent2: input: h/16*w/16*512 output: h/16*w*16*512
cost: h/16*w/16*512 = 2*h*w

Block4 total: 129024 + (16*b + 24) + 1024 + 2 = (130074 + 16*b)*h*w

———————

Block5: input: h/16*w/16*512 output: h/16*w/16*512
cost: h/16*w/16*512*3*3*512*5 = 46080*h*w

attention5:
h/16*w/16*512 + 1*1*512*512 + h/16*w/16*512 + h/16*w/16*512*512 + h/16*w/16*512 + h/8*w/8*512 + h/8*w/8*256*1*1*512 = 265230*h*w

attention4:
h/8*w/8*256 + 1*1*256*256 + h/8*w/8*256 + h/8*w/8*256*256 + h/8*w/8*256 + h/4*w/4*256 + h/4*w/4*256*256 = 70684*h*w

attention3:
h/4*w/4*256 + 1*1*256*256 + h/4*w/4*256 + h/4*w/4*256*256 + h/4*w/4*256 = 69680*h*w

saliency_map:
h/4*w/4*1*1*256 = 16*h*w

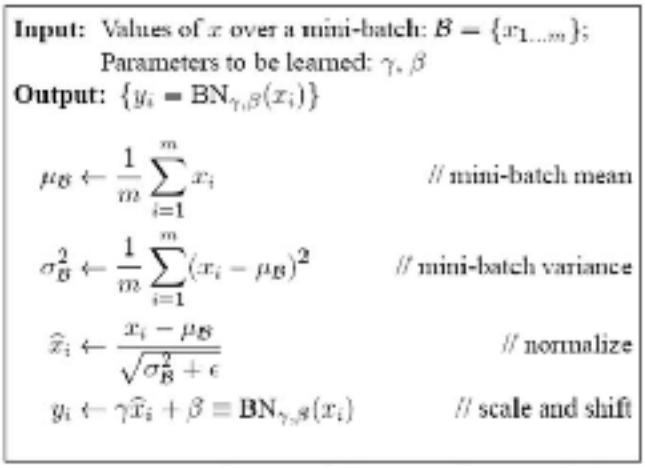
totally:
38656 *h*w + (55656 + 64*b)*h*w + (129588 + 32*b)*h*w + (130074 + 16*b)*h*w + 46080*h*w + 265230*h*w + 70684*h*w + 69680*h*w + 16*h*w = (805664 + 112*b) * h*w

参数量:
Block1: 3*3*3*64 + 3*3*64*64 = 38592
Block2: 3*3*64*128 + 3*3*128*128 + 2*128 + 512*128*1*1= 286976
Block3: 3*3*128*256 + 3*3*256*256 + 3*3*256*256 + 3*3*256*256 + 256*2 + 512*256*1*1 = 2195968

Block4: 3*3*256*512 + 3*3*512*512 + 3*3*512*512 + 3*3*512*512 + 512*2 + 512*512*1*1 = 8520704
Block5: 3*3*512*512 * 5 = 11796480
attention5: 512*512*2 + 512*256 = 655360
attention4: 256*256*3 = 65536
attention3: 256*256*3 = 65536
saliency_map = 256

totally: 38592 + 286976 + 2195968 + 8520704 + 11796480 + 655360 + 65536 + 65536 + 256 = 23625408

UCF:(with bn)
对于一个h*w*d的层（batchsize为b）：



求BN的时候对b*d*h*w的层，分别对d层每层的h*w*b个点求均值和方差

bn的运算量为:
mean: h*w*b*d
variance: h*w*b*d
normalize: h*w*d
scale and shift: h*w*d

Totally: h*w*d*(b+1)*2

参数量：d*2（mean和var）

Conv1: input: h*w*3 output: h/2*w/2*64
cost: h*w*64*3*3*3 + h*w*64*3*3*64 + h*w*64 + h*w*64*(b+1)*2 + h*w*64*(b+1)*2 = 38656*h*w + h*w*256*(b+1) = (38912 + 256*b)*h*w

Conv2: input: h/2*w/2*64 output: h/4*w/4*128
cost: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 + h/2*w/2*128 + h/2*w/2*128*(b+1)*2 + h/2*w/2*128*(b+1)*2 = 55328*h*w + 128*(b+1)*h*w

Conv3: input: h/4*w/4*128 output: h/8*w/8*256
cost: h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256*2 + h/4*w/4*256 + h/4*w/4*256*(b+1)*2 + h/4*w/4*256*(b+1)*2 + h/4*w/4*256*(b+1)*2 = 92176*h*w + 96*(b+1)*h*w

conv4: input: h/8*w/8*256 output: h/16*2/16*512
cost: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512*2 + h/8*w/8*512 + h/8*w/8*512*(b+1)*2*3 = 92168*h*w + 48*(b+1)*h*w

Conv5: input: h/16*w/16*512 output: h/32*w/32*512
cost: h/16*w/16*512*3*3*512*3 + h/16*w/16*512 + h/16*w/16*512*(b+1)*2*3= 27650*h*w + 12*(b+1)*h*w

deconv5: input: h/32*w/32*512 output: h/16*w/16*512
cost: h/16*w/16*512*8(bilinear interpolation) + h/16*w/16*512*3*3*512*3 + h/16*w/16*512*(b+1)*2*3 = 27664*h*w + 12*(b+1)*h*w

deconv4: input: h/16*w/16*512 output: h/8*w/8*256
cost: h/8*w/8*512*8 + h/8*w/8*512*3*3*512*2 + h/8*w/8*256*3*3*512 + h/8*w/8*512*(b+1)*2*3 = 92224*h*w + 48*(b+1)*h*w

deconv3: input: h/8*w/8*256 ouptut: h/4*w/4*128
cost: h/4*w/4*256*8 + h/4*w/4*256*3*3*256*2 + h/4*w/4*128*3*3*256 + h/4*w/4*256*(b+1)*2*3 = 92288*h*w + 96*(b+1)*h*w

deconv2: input: h/4*w/4*128 output: h/2*w/2*64
cost: h/2*w/2*128*8 + h/2*w/2*128*3*3*128 + h/2*w/2*64*3*3*128 + h/2*w/2*128*(b+1)*2*2 = 55552*h*w + 128*(b+1)*h*w

deconv1: input: h/2*w/2*64 output: h*w*2
cost: h*w*64*8 + h*w*64*3*3*64 + h*w*2*3*3*64 + h*w*64*(b+1)*2*2 = 38528*h*w + h*w*256*(b+1)

Totally:
Without BN: 38656 + 55328 + 92176 + 92168 + 27650 + 27664 + 92224 + 92288 + 55552 + 38528 = 612234*h*w
BN: [h*w*256*(b+1) + 128*(b+1)*h*w + 96*(b+1)*h*w + 48*(b+1)*h*w + 12*(b+1)*h*w]*2 = 1080*(b+1)*h*w
Add Up:
612234 + 1080*(b+1) = (613314 + 1080*b)*h*w

参数量:
conv1: 3*3*3*64 + 3*3*64*64 = 38592
conv2: 3*3*64*128 + 3*3*128*128 = 221184
conv3: 3*3*128*256 + 3*3*256*256 + 3*3*256*256 = 1474560
conv4: 3*3*256*512 + 3*3*512*512 + 3*3*512*512 = 5898240
conv5: 3*3*512*512 + 3*3*512*512 + 3*3*512*512 = 7077888
deconv5: 3*3*512*512 + 3*3*512*512 + 3*3*512*512 = 7077888
deconv4: 3*3*512*512 + 3*3*512*512 + 3*3*512*256 = 5898240
deconv3: 3*3*256*256 + 3*3*256*256 + 3*3*256*128 = 1474560
deconv2: 3*3*128*128 + 3*3*128*64 = 221184
deconv1: 3*3*64*64 + 3*3*64*2 = 38016

BN: 2*[64*2+128*2+256*3+512*3+512*3] = 8448

Totally:
38592 + 221184 + 1474560 + 5898240 + 7077888 + 7077888 + 5898240 + 1474560 + 221184 + 38016 + 8448 = 29420352 + 8448 = 29428800

MDF: 假设最小的superpixel数为n, 二级superpixel数为n（每个一级superpixel对应一个二级superpixel），并且总共有k个superpixel划分方案：

block1: h/4*w/4*96*11*11*3 + h/8*w/8*96*3*3 = 2191*h*w
block2: h/8*w/8*256*5*5*96 + h/16*w/16*256*3*3 = 9609*h*w
block3: h/16*w/16*384*3*3*256 = 3456*h*w
block4: h/16*w/16*384*3*3*384 = 5184*h*w
block5: h/16*w/16*384*3*3*256 + h/32*w/32*256*3*3 = 3458*h*w
fc6: h/32*w/32*256*4096 = 1025*h*w
fc7: 4096*4096 = 16777216

一个Feature extractor:
(2191 + 9609 + 3456 + 5184 + 3458 + 1025)*h*w + 16777216 = 24923*h*w + 16777216

总共的extractor个数：
(n+n+1)*(24923*h*w + 16777216)
一、二级superpixel通过提取n次特征，三级superpixel(原图)提取1次特征

NN_Layer1: 3*4096 -> 300
3*4096*300 = 3686400
NN_Layer2: 300 -> 300
300*300 = 90000
output: 300->2
600

NN_layer total:
3686400 + 90000 + 600 = 3777000
重复n次

Totally:
((2n+1)*(24923*h*w + 16777216) + 3777000*n)*k + h*w*k = k*((49846*n + 24924)*h*w + 3777000*n)
对于k个划分方案做fuse

参数量：
96*3*11*11 + 256*96*5*5 + 384*256*3*3 + 384*384*3*3 + 384*256*3*3 + h/32*w/32*256*4096 + 4096*4096 + 3*4096*300 + 300*300 + 300*2 = 20523040 + 1024*h*w + 3777000 = 24300040 + 1024*h*w

RFCN:

block1: h*w*64*3*3*4 + h*w*64*3*3*64 + h*w*64 = 39232*h*w
block2: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 + h/2*w/2*128 = 55328*h*w
block3: h/4*w4*256*3*3*128 + h/4*w/4*256*3*3*256 + h/4*w/4*256*3*3*256 + h/4*w/4*256 = 92176*h*w
block4: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512 + h/8*w/8*512*3*3*512 + h/8*w/8*512 = 92168*h*w
block5: h/16*w/16*512*3*3*512 + h/16*w/16*512*3*3*512 + h/16*w/16*512*3*3*512 + h/16*w/16*512 = 27650*h*w
Fc6: h/32*w/32*4096*7*7*512 = 100352*h*w
fc7: h/32*w/32*4096*4096 = 16384*h*w
score: h/32*w/32*60*4096 = 240*h*w
upscore2: h/16*w/16*60*4*4*60 = 225*h*w
Score pool4: h/16*w/16*60*512 = 120*h*w
fuse: h/16*w/16*60 = 0.234375*h*w
upsample_fused16: h/8*w/8*60*4*4*60 = 900*h*w
score_pool3: h/8*w/8*60*256 = 240*h*w
score_final: h/8*w/8*60 = 0.9375*h*w
bigscore: h*w*2*16*16*60 = 30720*h*w

Totally:
39232 + 55328 + 92176 + 92168 + 27650 + 100352 + 16384 + 240 + 225 + 120 + 0.234375 + 900 + 240 + 0.9375 + 30720 = 455736.171875*h*w

参数量：
block1: 64*4*3*3 + 64*64*3*3 = 39168
block2: 128*64*3*3 + 128*128*3*3 = 221184
block3: 256*128*3*3 + 256*256*3*3 + 256*256*3*3 = 1474560
block4: 512*256*3*3 + 512*512*3*3 + 512*512*3*3 = 5898240
block5: 512*512*3*3 + 512*512*3*3 + 512*512*3*3 = 7077888
fc6: 512*4096*3*3 = 18874368
fc7: 4096*4096 = 16777216
score: 4096*60 = 2457604
Upscore2: 60*60*4*4 = 57600
scorepool4: 512*60 = 30720
upsample_fused16: 60*60*4*4 = 57600
bigscore: 60*2*16*16 = 30720

Totally:
39168 + 221184 + 1474560 + 5898240 + 7077888 + 18874368 + 16777216 + 2457604 + 57600 + 30720 + 57600 + 30720 = 52996868

DS:
block1: h*w*64*3*3*3 + h*w*64*3*3*64 + h/2*w/2*64*2*2 = 38656*h*w
block2: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 + h/4*w/4*128*2*2 = 55328*h*w
block3: h/4*w4*256*3*3*128 + h/4*w/4*256*3*3*256 + h/4*w/4*256*3*3*256 + h/4*w/4*256 = 92176*h*w
block4: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512 + h/8*w/8*512*3*3*512 + h/8*w/8*512 = 92168*h*w
block5: h/16*w/16*512*3*3*512 + h/16*w/16*512*3*3*512 + h/16*w/16*512*3*3*512 + h/16*w/16*512 = 27650*h*w
conv6: h/32*w/32*4096*7*7*512 = 100352*h*w
conv7: h/32*w/32*4096*1*1*4096 = 16384*h*w
score: h/32*w/32*1*1*1*4096 = 4*h*w
deconv: h*w*1*63*63*1 = 3969*h*w

Totally:
38656 + 55328 + 92176 + 92168 + 27650 + 100352 + 16384 + 4 + 3969 = 426687*h*w

参数量：
block1: 64*3*3*3 + 64*64*3*3 = 38592
block2: 128*64*3*3 + 128*128*3*3 = 221184
block3: 256*128*3*3 + 256*256*3*3 + 256*256*3*3 = 1474560
block4: 512*256*3*3 + 512*512*3*3 + 512*512*3*3 = 5898240
block5: 512*512*3*3 + 512*512*3*3 + 512*512*3*3 = 7077888
conv6: 4096*512*3*3 = 18874368
conv7: 4096*4096*1*1 = 16777216
score: 4096*1*1*1 = 4096
deconv: 63

Totally:
38592 + 221184 + 1474560 + 5898240 + 7077888 + 18874368 + 16777216 + 4096 + 63 = 50366207

DCL:
data_conv: h*w*128*3*3*3 = 3456*h*w
data_fc: h*w*128*128 = 16384*h*w
data_ms_saliency: h*w*128 = 128*h*w

conv1_1: h*w*64*3*3*3 = 1728*h*w
conv1_2: h*w*64*3*3*64 = 36864*h*w
pool1: h/2*w/2*64*3*3 = 144*h*w
pool1_conv: h/2*w/2*128*3*3*64 = 18432*h*w
pool1_fc: h/2*w/2*128*128 = 4096*h*w
pool1_ms_saliency: h/2*w/2*128 = 32*h*w

conv2_1: h/2*w/2*128*3*3*128 = 36864*h*w
conv2_2: h/2*w/2*128*3*3*128 = 36864
pool2: h/4*w/4*128*3*3 = 72*h*w
pool2_conv: h/4*w/4*128*3*3*128 = 9216*h*w
pool2_fc: h/4*w/4*128*128 = 1024*h*w
pool2_ms_saliency: h/4*w/4*128 = 8*h*w

block3:
h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256 + h/4*w/4*256*3*3*256 + h/8*w/8*256*3*3 + h/8*w/8*128*3*3*256 + h/8*w/8*128*128 + h/8*w/8*128 = 97170*h*w

block4:
h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512 + h/8*w/8*512*3*3*512 + h/8*w/8*512*3*3 + h/8*w/8*128*3*3*512 + h/8*w/8*128*128 + h/8*w/8*128 = 101706*h*w

block5:
h/8*w/8*512*5*5*512 + h/8*w/8*512*5*5*512 + h/8*w/8*512*5*5*512 + h/8*w/8*512*3*3 + h/8*w/8*4096*8*8*512 + h/8*w/8*4096*4096 + h/8*w/8*4096 = 2666632*h*w

fuse:
h*w*6

Totally:
3456 + 16384 + 128 + 1728 + 36864 + 144 + 18432 + 4096 + 32 + 36864 + 36864 + 72 + 9216 + 1024 + 8 + 97170 + 101706 + 2666632 + 6 = 3030826*h*w

参数量:
data: 3*128*3*3 + 128*128*1*1 + 128*1*1*1 = 19968
block1: 3*64*3*3 + 64*64*3*3 + 64*128*3*3 + 128*128*1*1 + 128*1*1*1 = 128832
block2: 128*128*3*3 + 128*128*3*3 + 128*128*3*3 + 128*128*1*1 + 128*1*1*1 = 458880
block3: 128*256*3*3 + 256*256*3*3 + 256*256*3*3 + 256*128*3*3 + 128*128*1*1 + 128*1*1*1 = 1785984
block4: 256*512*3*3 + 512*512*3*3 + 512*512*3*3 + 512*128*3*3 + 128*128*1*1 + 128*1*1*1 = 6504576
block5: 512*512*3*3 + 512*512*3*3 + 512*512*3*3 + 512*4096*4*4 + 4096*4096*1*1 + 4096*1*1*1 = 57413632

Totally:
19968 + 128832 + 458880 + 1785984 + 6504576 + 57413632 = 66311872

Mobilenet + deeplabv3:
head_conv: h/2*w/2*32*3*3*3 = 216*h*w
block1: 456*h*w
block2: 582*h*w + 513*h*w = 1095*h*w
block3: 308*h*w + 219*h*w + 219*h*w = 746*h*w
block4: 315*h*w + 822*h*w + 822*h*w + 822*h*w = 2781*h*w
block5: 1014*h*w + 1809*h*w + 1809*h*w = 4632*h*w
Block6: 2385*h*w + 4935*h*w + 4935*h*w = 12255*h*w
block7: 7335*h*w

ASPP:
Aspp0: h/8*w/8*256*320 = 1280*h*w
apss1, 2, 3: h/8*w/8*256*320*3*3 * 3 = 34560*h*w

Other:
GAP conv:
256*1*1*320 = 81920
Concate conv:
h/8*w/8*256*1280 = 5120*h*w
Low feature conv:
h/4*w/4*48*24 = 72*h*w
Concate conv:
h/4*w/4*304*1 = 19*h*w

Totally:
(216 + 456 + 1095 + 746 + 2781 + 4632 + 12255 + 7335 + 1280 + 34560 + 5120 + 72 + 19)*h*w + 81920 = 70567*h*w + 81920

参数量：
head_conv: 3*3*3*32 = 864
block1: 1824
block2: 4704 + 8208 = 12912
block3: 9360 + 14016 + 14016 = 37392
block4: 20160 + 52608*3 = 177984
block5: 64896 + 115776*2 = 296448
block6: 152640 + 315840*2 = 784320
block7: 469440
ASPP: 320*1*1*256 + 320*3*3*256*3 = 2293760
Gap conv: 320*1*1*256 = 81920
Conv: 1280*256*1*1 = 327680
conv2: 24*48*1*1 = 1152
last_conv: 304*1*1*1 = 304

Totally:
864 + 1824 + 12912 + 37392 + 177984 + 296448 + 784320 + 469440 + 2293760 + 81920 + 327680 + 1152 + 304 = 4486000

UCF:
Conv1: input: h*w*3 output: h/2*w/2*64
cost: h*w*64*3*3*3 + h*w*64*3*3*64 + h*w*64 = 38656*h*w

Conv2: input: h/2*w/2*64 output: h/4*w/4*128
cost: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 + h/2*w/2*128 = 55328*h*w

Conv3: input: h/4*w/4*128 output: h/8*w/8*256
cost: h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256*2 + h/4*w/4*256 = 92176*h*w

conv4: input: h/8*w/8*256 output: h/16*2/16*512
cost: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512*2 + h/8*w/8*512 = 92168*h*w

Conv5: input: h/16*w/16*512 output: h/32*w/32*512
cost: h/16*w/16*512*3*3*512*3 + h/16*w/16*512 = 27650*h*w

deconv5: input: h/32*w/32*512 output: h/16*w/16*512
cost: h/16*w/16*512*8(bilinear interpolation) + h/16*w/16*512*3*3*512*3 = 27664*h*w

deconv4: input: h/16*w/16*512 output: h/8*w/8*256

cost: h/8*w/8*512*8 + h/8*w/8*512*3*3*512*2 + h/8*w/8*256*3*3*512 = 92224*h*w

deconv3: input: h/8*w/8*256 ouptut: h/4*w/4*128
cost: h/4*w/4*256*8 + h/4*w/4*256*3*3*256*2 + h/4*w/4*128*3*3*256 = 92288*h*w

deconv2: input: h/4*w/4*128 output: h/2*w/2*64
cost: h/2*w/2*128*8 + h/2*w/2*128*3*3*128 + h/2*w/2*64*3*3*128 = 55552*h*w

deconv1: input: h/2*w/2*64 output: h*w*2
cost: h*w*64*8 + h*w*64*3*3*64 + h*w*2*3*3*64 = 38528*h*w

Totally:
38656 + 55328 + 92176 + 92168 + 27650 + 27664 + 92224 + 92288 + 55552 + 38528 = 612234*h*w

参数量:
conv1: 3*3*3*64 + 3*3*64*64 = 38592
conv2: 3*3*64*128 + 3*3*128*128 = 221184
conv3: 3*3*128*256 + 3*3*256*256 + 3*3*256*256 = 1474560
conv4: 3*3*256*512 + 3*3*512*512 + 3*3*512*512 = 5898240
conv5: 3*3*512*512 + 3*3*512*512 + 3*3*512*512 = 7077888
deconv5: 3*3*512*512 + 3*3*512*512 + 3*3*512*512 = 7077888
deconv4: 3*3*512*512 + 3*3*512*512 + 3*3*512*256 = 5898240
deconv3: 3*3*256*256 + 3*3*256*256 + 3*3*256*128 = 1474560
deconv2: 3*3*128*128 + 3*3*128*64 = 221184
deconv1: 3*3*64*64 + 3*3*64*2 = 38016

Totally:
38592 + 221184 + 1474560 + 5898240 + 7077888 + 7077888 + 5898240 + 1474560 + 221184 + 38016 = 29420352

PAGRN: input: h*w*3

Block1: input: h*w*3 output: h/2*w/2*64
cost: h*w*64*3*3*3 + h*w*64*3*3*64+h*w*64 = 38656 *h*w

Block2: input: h/2*w/2*64 output: h/4*w/4*128
cost: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128+h/2*w/2*128 = 55328*h*w

Block3: input: h/4*w/4*128 output: h/8*w/8*256
cost: h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256*3 + h/4*w/4*256 = 129040*h*w

Block4: input: h/8*w/8*256 output: h/16*w/16*512
cost: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512*3 + h/8*w/8*512 = 129032*h*w

Block5: input: h/16*w/16*512 output: h/16*w/16*512
cost: h/16*w/16*512*3*3*512*5 = 46080*h*w

attention5:
h/16*w/16*512 + 1*1*512*512 + h/16*w/16*512 + h/16*w/16*512*512 + h/16*w/16*512 + h/8*w/8*512 + h/8*w/8*256*1*1*512 = 265230*h*w

attention4:
h/8*w/8*256 + 1*1*256*256 + h/8*w/8*256 + h/8*w/8*256*256 + h/8*w/8*256 + h/4*w/4*256 + h/4*w/4*256*256 = 70684*h*w

attention3:
h/4*w/4*256 + 1*1*256*256 + h/4*w/4*256 + h/4*w/4*256*256 + h/4*w/4*256 = 69680*h*w

saliency_map:
h/4*w/4*1*1*256 = 16*h*w

totally:
38656 *h*w + 55328*h*w + 129040*h*w + 129032*h*w + 46080*h*w + 265230*h*w + 70684*h*w + 69680*h*w + 16*h*w = 803746 * h*w

参数量:
Block1: 3*3*3*64 + 3*3*64*64 = 38592
Block2: 3*3*64*128 + 3*3*128*128 = 221184
Block3: 3*3*128*256 + 3*3*256*256 + 3*3*256*256 + 3*3*256*256 = 2064384
Block4: 3*3*256*512 + 3*3*512*512 + 3*3*512*512 + 3*3*512*512 = 8257536
Block5: 3*3*512*512 * 5 = 11796480
attention5: 512*512*2 + 512*256 = 655360
attention4: 256*256*3 = 65536
attention3: 256*256*3 = 65536
saliency_map = 256

totally: 38592 + 221184 + 2064384 + 8257536 + 11796480 + 655360 + 65536 + 65536 + 256 = 23164864

NLDF: input: 354*354

Conv1: input: h*w*3 output: h/2*w/2*64
cost: h*w*64*3*3*3 + h*w*64*3*3*64 + h*w*64 = 38656*h*w

Conv2: input: h/2*w/2*64 output: h/4*w/4*128
cost: h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 + h/2*w/2*128 = 55328*h*w

Conv3: input: h/4*w/4*128 output: h/8*w/8*256
cost: h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256*2 + h/4*w/4*256 = 92176*h*w

conv4: input: h/8*w/8*256 output: h/16*2/16*512
cost: h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512*2 + h/8*w/8*512 = 92168*h*w

Conv5: input: h/16*w/16*512 output: h/32*w/32*512
cost: h/16*w/16*512*3*3*512*3 + h/16*w/16*512 = 27650*h*w

Conv6: input: h/2*w/2*64 output: h/2*w/2*128
cost: h/2*w/2*128*3*3*64 = 18432*h*w

Conv7: input: h/4*w/4*128 output: h/4*w/4*128
cost: h/4*w/4*128*3*3*128 = 9216*h*w

Conv8: input: h/8*w/8*256 output: h/8*w/8*128
cost: h/8*w/8*128*3*3*256 = 4608*h*w

Conv9: input: h/16*2/16*512 output: h/16*w/16*128
Cost: h/16*w/16*128*3*3*512 = 2304*h*w

Conv10: input: h/32*w/32*512 output: h/32*w/32*128
cost: h/32*w/32*128*3*3*512 = 576*h*w

contrast1:
h/2*w/2*128 + h/2*w/2*128*3*3 = 320*h*w

contrast2:
h/4*w/4*128 + h/4*w/4*128*3*3 = 80*h*w

Contrast3:
h/8*w/8*128 + h/8*w/8*128*3*3 = 20*h*w

Contrast4:
h/16*w/16*128*(1+3*3) = 5*h*w

Contrast5:
h/32*w/32*128*(1+3*3) = 1.25*h*w

unpooling5: input: h/32*w/32*(128+128) output: h/16*2/16*128
cost: h/16*w/16*128*5*5*256 = 3200*h*w

Unpooling4: input: h/16*w/16*(128*2+128) output: h/8*w/8*256
cost: h/8*w/8*256*5*5*128*3 = 38400*h*w

Unpooling3: input: h/8*w/8*(128*2+256) output: h/4*w/4*384
cost: h/4*w/4*384*5*5*128*4 = 307200*h*w

Unpooling2: input h/4*w/4*(128*2+384) output: h/2*w/2*512
cost: h/2*w/2*512*5*5*128*5 = 2048000*h*w

Local: input: h/2*w/2*(128*2+512) output: h/2*w/2*640
Cost: h/2*w/2*640*(128*2+512) = 122880*h*w

Local score: h/2*w/2*640 output: h/2*w/2*2
cost: h/2*w/2*2*640 = 320*h*w

Global: input: h/32*w/32*512 (11*11*512) output: 1*1*128
11*11*512 -> 7*7*128 -> 3*3*128 -> 1*1*128
h/32*w/32*512 -> (h/32-4)*(w/32-4)*128 -> (h/32-8)*(w/32-8)*128 -> (h/32-10)*(w/32-10)*128
Cost: 7*7*128*5*5*512 + 3*3*128*5*5*128 + 1*1*128*3*3*128 = 84115456 (without h*w)
Cost: (h/32-4)*(w/32-4)*128*5*5*512 + (h/32-8)*(w/32-8)*128*5*5*128 + (h/32-10)*(w/32-10)*128*3*3*128 = 2144*h*w - 204800*(h+w) + 26214400 - 102400*(h+w) + 26214400 - 46080*(h+w) + 14745600 = 2144*h*w - 353280*(h+w) + 67174400 (with h*w)

Global score: input: 1*1*128 output: 1*1*2
cost: 1*1*2*1*128 = 256

add_score:
h/2*w/2*2 = 0.5*h*w

totally:
38656*h*w + 55328*h*w + 92176*h*w + 92168*h*w + 27650*h*w + 18432*h*w + 9216*h*w + 4608*h*w + 2304*h*w + 576*h*w + 320*h*w + 80*h*w + 20*h*w + 5*h*w + 1.25*h*w + 3200*h*w + 38400*h*w + 307200*h*w + 2048000*h*w + 122880*h*w + 320*h*w + 84115456 + 256 + 0.5*h*w = 2861540.75*h*w + 84115712(without h*w)

2861540.75*h*w + 256 + 2144*h*w - 353280*(h+w) + 67174400 = 2863684.75*h*w - 353280*(h+w) + 67174656 (with h*w)

参数量:
conv1: 3*3*3*64 + 3*3*64*64 = 38592
conv2: 3*3*64*128 + 3*3*128*128 = 221184
conv3: 3*3*128*256 + 3*3*256*256 + 3*3*256*256 = 1474560
conv4: 3*3*256*512 + 3*3*512*512 + 3*3*512*512 = 5898240
conv5: 3*3*512*512 + 3*3*512*512 + 3*3*512*512 = 7077888
conv6: 3*3*64*128 = 73728
conv7: 3*3*128*128 = 147456
conv8: 3*3*256*128 = 294912
conv9: 3*3*512*128 = 589824
conv10: 3*3*512*128 = 589824
unpooling5: 5*5*256*128 = 819200
unpooling4: 5*5*384*256 = 2457600
unpooling3: 5*5*512*384 = 4915200
unpooling2: 5*5*640*512 = 8192000
local: 768*640 = 491520
local_score: 640*2 = 1280
global: 5*5*512*128 + 5*5*128*128 + 3*3*128*128 = 2195456
global_score = 128*2 = 256

totally:
38592 + 221184 + 1474560 + 5898240 + 7077888 + 73728 + 147456 + 294912 + 589824 + 589824 + 819200 + 2457600 + 4915200 + 8192000 + 491520 + 1280 + 2195456 + 256 = 35478720

DSS:
conv_1:
h*w*64*3*3*3 + h*w*64*3*3*64 + h*w*64 = 38656*h*w

conv_2:
h/2*w/2*128*3*3*64 + h/2*w/2*128*3*3*128 + h/2*w/2*128 = 55328*h*w

conv_3:
h/4*w/4*256*3*3*128 + h/4*w/4*256*3*3*256*2 + h/4*w/4*256 = 92176*h*w

conv_4:
h/8*w/8*512*3*3*256 + h/8*w/8*512*3*3*512*2 + h/8*w/8*512 = 92168*h*w

conv_5:
h/16*w/16*512*3*3*512*3 + h/16*w16*512 = 27650*h*w

Conv1_2:
h*w*128*3*3*64 + h*w*128*3*3*128 + h*w*1*1*128 = 221312*h*w

conv2_2:
h/2*w/2*128*3*3*128 + h/2*w/2*128*3*3*128 + h/2*w/2*1*1*128 = 73760*h*w

Conv3_3:
h/4*w/4*256*5*5*256 + h/4*w/4*256*5*5*256 + h/4*w/4*1*256 = 204816*h*w

conv4_3:
h/8*w/8*256*5*5*512 + h/8*w/8*256*5*5*256 + h/8*w/8*1*256 = 76804*h*w

conv5_3:
h/16*w/16*512*5*5*512 + h/16*w/16*512*5*5*512 + h/16*w/16*1*512 = 51202*h*w

pool5:
h/32*w/32*512*7*7*512 + h/32*w/32*512*7*7*512 + h/32*w/32*1*512 = 25088*h*w

Short connection:
conv4_3: h/8*w/8*3
conv3_3: h/4*w/4*3
conv2_2: h/2*w/2*5
conv1_2: h*w*5

Totally:
38656 + 55328 + 92176 + 92168 + 27650 + 221312 + 73760 + 204816 + 76804 + 51202 + 25088 + 6.484375 = 984054.484375*h*w

参数量:
conv1: 3*3*3*64 + 3*3*64*64 = 38592
conv2: 3*3*64*128 + 3*3*128*128 = 221184
conv3: 3*3*128*256 + 3*3*256*256 + 3*3*256*256 = 1474560
conv4: 3*3*256*512 + 3*3*512*512 + 3*3*512*512 = 5898240
conv5: 3*3*512*512 + 3*3*512*512 + 3*3*512*512 = 7077888
conv1_2: 3*3*64*128 + 3*3*128*128 + 1*1*128*1 = 221312
conv2_2: 3*3*128*128 + 3*3*128*128 + 1*1*128*1 = 295040
conv3_3: 5*5*256*256 + 5*5*256*256 + 1*1*256*1 = 3277056
conv4_3: 5*5*512*256 + 5*5*256*256 + 1*1*256*1 = 4915456
conv5_3: 5*5*512*512 + 5*5*512*512 + 1*1*512*1 = 13107712
pool5: 7*7*512*512 + 7*7*512*512 + 1*1*512*1 = 25690624

short connection:
conv4_3: 1*1*3*1 = 3
conv3_3: 1*1*3*1 = 3
conv2_2: 1*1*5*1 = 5

conv1_2: 1*1*5*1 = 5

totally:
38592 + 221184 + 1474560 + 5898240 + 7077888 + 221312 + 295040 + 3277056 + 4915456 + 13107712 + 25690624 + 3 + 3 + 5 + 5 = 62217680