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File - model_summary
1 G:\Anaconda3\envs\dml\python.exe F:/FSR/SNIKO_Paper/model_summary.py
2 2018-12-10 21:17:55.748656: I tensorflow/core/platform/cpu_feature_guard.cc:141] Your CPU
3 supports instructions that this TensorFlow binary was not compiled to use: AVX2
3 2018-12-10 21:17:56.934907: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1411] Found
device 0 with properties:
4 name: GeForce 940M major: 5 minor: 0 memoryClockRate(GHz): 1.176
5 pciBusID: 0000:04:00.0
6 totalMemory: 2.00GiB freeMemory: 1.65GiB
7 2018-12-10 21:17:56.962073: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1490] Adding
visible gpu devices: 0
8 2018-12-10 21:18:10.177556: I tensorflow/core/common_runtime/gpu/gpu_device.cc:971] Device
interconnect StreamExecutor with strength 1 edge matrix:
9 2018-12-10 21:18:10.177993: I tensorflow/core/common_runtime/gpu/gpu_device.cc:977]      0
10 2018-12-10 21:18:10.178278: I tensorflow/core/common_runtime/gpu/gpu_device.cc:990] 0:   N
11 2018-12-10 21:18:10.223711: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1103] Created
TensorFlow device (/job:localhost/replica:0/task:0/device:GPU:0 with 1402 MB memory) →
physical GPU (device: 0, name: GeForce 940M, pci bus id: 0000:04:00.0, compute capability: 5
.0)
12 mobilenet
13 -----
14 Layer (type)          Output Shape         Param #
15 =====
16 input_1 (InputLayer)  (None, 224, 3)      0
17 conv1_pad (ZeroPadding2D) (None, 225, 3)      0
18 conv1 (Conv2D)        (None, 225, 32)     864
19 conv1_bn (BatchNormalization) (None, 112, 32)    128
20 conv1_relu (ReLU)     (None, 112, 32)      0

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File - model_summary
26 conv_dw_1 (DepthwiseConv2D) (None, 112, 112, 32) 288
27
28 conv_dw_1_bn (BatchNormaliza (None, 112, 112, 32) 128
29
30 conv_dw_1_relu (ReLU) (None, 112, 112, 32) 0
31
32 conv_pw_1 (Conv2D) (None, 112, 112, 64) 2048
33
34 conv_pw_1_bn (BatchNormaliza (None, 112, 112, 64) 256
35
36 conv_pw_1_relu (ReLU) (None, 112, 112, 64) 0
37
38 conv_pad_2 (ZeroPadding2D) (None, 112, 112, 64) 0
39
40 conv_dw_2 (DepthwiseConv2D) (None, 113, 113, 64) 576
41
42 conv_dw_2_bn (BatchNormaliza (None, 56, 56, 64) 256
43
44 conv_dw_2_relu (ReLU) (None, 56, 56, 64) 0
45
46 conv_pw_2 (Conv2D) (None, 56, 56, 128) 8192
47
48 conv_pw_2_bn (BatchNormaliza (None, 56, 56, 128) 512
49
50 conv_pw_2_relu (ReLU) (None, 56, 56, 128) 0
51
52 conv_dw_3 (DepthwiseConv2D) (None, 56, 56, 128) 1152
53
54 conv_dw_3_bn (BatchNormaliza (None, 56, 56, 128) 512
55
56 conv_dw_3_relu (ReLU) (None, 56, 56, 128) 0
57
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File - model_summary
58 conv_pw_3 (Conv2D) (None, 56, 56, 128) 16384
59
60 conv_pw_3_bn (BatchNormaliza (None, 56, 56, 128) 512
61
62 conv_pw_3_relu (ReLU) (None, 56, 56, 128) 0
63
64 conv_pad_4 (ZeroPadding2D) (None, 57, 57, 128) 0
65
66 conv_dw_4 (DepthwiseConv2D) (None, 28, 28, 128) 1152
67
68 conv_dw_4_bn (BatchNormaliza (None, 28, 28, 128) 512
69
70 conv_dw_4_relu (ReLU) (None, 28, 28, 128) 0
71
72 conv_pw_4 (Conv2D) (None, 28, 28, 256) 32768
73
74 conv_pw_4_bn (BatchNormaliza (None, 28, 28, 256) 1024
75
76 conv_pw_4_relu (ReLU) (None, 28, 28, 256) 0
77
78 conv_dw_5 (DepthwiseConv2D) (None, 28, 28, 256) 2304
79
80 conv_dw_5_bn (BatchNormaliza (None, 28, 28, 256) 1024
81
82 conv_dw_5_relu (ReLU) (None, 28, 28, 256) 0
83
84 conv_pw_5 (Conv2D) (None, 28, 28, 256) 65536
85
86 conv_pw_5_bn (BatchNormaliza (None, 28, 28, 256) 1024
87
88 conv_pw_5_relu (ReLU) (None, 28, 28, 256) 0
89
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File - model_summary

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90 conv_pad_6 (ZeroPadding2D) (None, 29, 29, 256) 0
91
92 conv_dw_6 (DepthwiseConv2D) (None, 14, 14, 256) 2304
93
94 conv_dw_6_bn (BatchNormaliza (None, 14, 14, 256) 1024
95
96 conv_dw_6_relu (ReLU) (None, 14, 14, 256) 0
97
98 conv_pw_6 (Conv2D) (None, 14, 14, 512) 131072
99
100 conv_pw_6_bn (BatchNormaliza (None, 14, 14, 512) 2048
101
102 conv_pw_6_relu (ReLU) (None, 14, 14, 512) 0
103
104 conv_dw_7 (DepthwiseConv2D) (None, 14, 14, 512) 4608
105
106 conv_dw_7_bn (BatchNormaliza (None, 14, 14, 512) 2048
107
108 conv_dw_7_relu (ReLU) (None, 14, 14, 512) 0
109
110 conv_pw_7 (Conv2D) (None, 14, 14, 512) 262144
111
112 conv_pw_7_bn (BatchNormaliza (None, 14, 14, 512) 2048
113
114 conv_pw_7_relu (ReLU) (None, 14, 14, 512) 0
115
116 conv_dw_8 (DepthwiseConv2D) (None, 14, 14, 512) 4608
117
118 conv_dw_8_bn (BatchNormaliza (None, 14, 14, 512) 2048
119
120 conv_dw_8_relu (ReLU) (None, 14, 14, 512) 0
121
```

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File - model_summary
122 conv_pw_8 (Conv2D)          (None, 14, 14, 512)      262144
123
124 conv_pw_8_bn (BatchNormaliza (None, 14, 14, 512)      2048
125
126 conv_pw_8_relu (ReLU)       (None, 14, 14, 512)      0
127
128 conv_dw_9 (DepthwiseConv2D) (None, 14, 14, 512)      4608
129
130 conv_dw_9_bn (BatchNormaliza (None, 14, 14, 512)      2048
131
132 conv_dw_9_relu (ReLU)       (None, 14, 14, 512)      0
133
134 conv_pw_9 (Conv2D)          (None, 14, 14, 512)      262144
135
136 conv_pw_9_bn (BatchNormaliza (None, 14, 14, 512)      2048
137
138 conv_pw_9_relu (ReLU)       (None, 14, 14, 512)      0
139
140 conv_dw_10 (DepthwiseConv2D) (None, 14, 14, 512)      4608
141
142 conv_dw_10_bn (BatchNormaliz (None, 14, 14, 512)      2048
143
144 conv_dw_10_relu (ReLU)       (None, 14, 14, 512)      0
145
146 conv_pw_10 (Conv2D)          (None, 14, 14, 512)      262144
147
148 conv_pw_10_bn (BatchNormaliz (None, 14, 14, 512)      2048
149
150 conv_pw_10_relu (ReLU)       (None, 14, 14, 512)      0
151
152 conv_dw_11 (DepthwiseConv2D) (None, 14, 14, 512)      4608
153
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File - model_summary
154 conv_dw_11_bn (BatchNormaliz (None, 14, 14, 512) 2048
155 conv_dw_11_relu (ReLU) (None, 14, 14, 512) 0
156
157 conv_pw_11 (Conv2D) (None, 14, 14, 512) 262144
158
159 conv_pw_11_bn (BatchNormaliz (None, 14, 14, 512) 2048
160
161 conv_pw_11_relu (ReLU) (None, 14, 14, 512) 2048
162
163 conv_pad_12 (ZeroPadding2D) (None, 15, 15, 512) 0
164
165 conv_dw_12 (DepthwiseConv2D) (None, 7, 7, 512) 4608
166
167 conv_dw_12_bn (BatchNormaliz (None, 7, 7, 512) 4608
168
169 conv_dw_12_relu (ReLU) (None, 7, 7, 512) 2048
170
171 conv_pw_12 (Conv2D) (None, 7, 7, 1024) 524288
172
173 conv_pw_12_bn (BatchNormaliz (None, 7, 7, 1024) 4096
174
175 conv_pw_12_relu (ReLU) (None, 7, 7, 1024) 0
176
177 conv_dw_13 (DepthwiseConv2D) (None, 7, 7, 1024) 9216
178
179 conv_dw_13_bn (BatchNormaliz (None, 7, 7, 1024) 4096
180
181 conv_dw_13_relu (ReLU) (None, 7, 7, 1024) 0
182
183 conv_pw_13 (Conv2D) (None, 7, 7, 1024) 1048576
184
185
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File - model_summary
186 conv_pw_13_bn (BatchNormaliz (None, 7, 7, 1024) 4096
187 =====
188 conv_pw_13_relu (ReLU) (None, 7, 7, 1024) 0
189 =====
190 global_average_pooling2d (Global (None, 1024) 0
191 =====
192 reshape_1 (Reshape) (None, 1, 1, 1024) 0
193 =====
194 dropout (Dropout) (None, 1, 1, 1024) 0
195 =====
196 conv_preds (Conv2D) (None, 1, 1, 1000) 1025000
197 =====
198 act_softmax (Activation) (None, 1, 1, 1000) 0
199 =====
200 reshape_2 (Reshape) (None, 1000) 0
201 =====
202 Total params: 4,253,864
203 Trainable params: 4,231,976
204 Non-trainable params: 21,888
205 =====
206 None
207 =====
208 mobilenet_v2
209 =====
210 Layer (type) Output Shape Param # Connected to
211 =====
212 input_2 (InputLayer) (None, 224, 224, 3) 0
213 =====
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File - model_summary
213 -----
214 Conv1_pad (ZeroPadding2D)      (None, 225, 225, 3)  0      input_2[θ][0]
215 -----
216 Conv1 (Conv2D)                (None, 112, 112, 32) 864  Conv1_pad[θ][0]
217 -----
218 bn_Conv1 (BatchNormalization) (None, 112, 112, 32) 128  Conv1[θ][0]
219 -----
220 Conv1_relu (ReLU)            (None, 112, 112, 32) 0      bn_Conv1[θ][0]
221 -----
222 expanded_conv_depthwise (Depthwise (None, 112, 112, 32) 288  Conv1_relu[θ][0]
223 -----
224 expanded_conv_depthwise_BN (Batch (None, 112, 112, 32) 128  expanded_conv_depthwise[θ]
225 -----
226 expanded_conv_depthwise_relu (ReLU (None, 112, 112, 32) 0      expanded_conv_depthwise_BN
227 -----
228 expanded_conv_project (Conv2D) (None, 112, 112, 16) 512
229 expanded_conv_depthwise_relu[θ][0]
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File - model_summary
229 -----
230 expanded_conv_project_BN (Batch (None, 112, 112, 16) 64
231 ]
232 -----  
233 block_1_expand (Conv2D)
234 [0] (None, 112, 112, 96) 1536 expanded_conv_project_BN[θ]
235 -----  
236 block_1_expand_BN (BatchNormali (None, 112, 112, 96) 384 block_1_expand[θ][θ]
237 -----  
238 block_1_pad (ZeroPadding2D)
239 [0] (None, 113, 113, 96) 0 block_1_expand_relu[θ][θ]
240 -----  
241 block_1_depthwise (DepthwiseCon (None, 56, 56, 96) 864 block_1_pad[θ][θ]
242 -----  
243 block_1_depthwise_BN (BatchNorm (None, 56, 56, 96) 384 block_1_depthwise[θ][θ]
244 -----  
245 block_1_depthwise_relu (ReLU) (None, 56, 56, 96) 0 block_1_depthwise_BN[θ][θ]
```

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File - model_summary
245 block_1_project (Conv2D)           (None, 56, 56, 24)  2304      block_1_depthwise_relu[θ][
246 block_1_project_BN (BatchNormal (None, 56, 56, 24)) 96       block_1_project[θ][θ]
247 ]                                     block_1_depthwise_relu[θ][θ]
248 block_1_project_BN (BatchNormal (None, 56, 56, 24)) 96       block_1_project[θ][θ]
249 ]                                     block_1_depthwise_relu[θ][θ]
250 block_2_expand (Conv2D)           (None, 56, 56, 144) 3456      block_1_project_BN[θ][θ]
251 ]                                     block_1_depthwise_relu[θ][θ]
252 block_2_expand_BN (BatchNormali (None, 56, 56, 144)) 576      block_2_expand[θ][θ]
253 ]                                     block_2_depthwise[θ][θ]
254 block_2_expand_relu (ReLU)        (None, 56, 56, 144) 0       block_2_expand_BN[θ][θ]
255 ]                                     block_2_depthwise[θ][θ]
256 block_2_depthwise (DepthwiseCon (None, 56, 56, 144)) 1296     block_2_expand_relu[θ][θ]
257 ]                                     block_2_depthwise[θ][θ]
258 block_2_depthwise_BN (BatchNorm (None, 56, 56, 144)) 576      block_2_depthwise[θ][θ]
259 ]                                     block_2_depthwise[θ][θ]
260 block_2_depthwise_relu (ReLU)        (None, 56, 56, 144) 0       block_2_depthwise_BN[θ][θ]
261 ]                                     block_2_depthwise[θ][θ]
```

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File - model_summary
261   block_2_project (Conv2D)           (None, 56, 56, 24) 3456      block_2_depthwise_relu[θ][0]
262
263
264   block_2_project_BN (BatchNormal (None, 56, 56, 24) 96      block_2_project[θ][0]
265 ]
266
267
268
269   block_2_add (Add)                (None, 56, 56, 24) 0       block_1_project_BN[θ][0]
270 ]
271
272
273   block_3_expand (Conv2D)          (None, 56, 56, 144) 3456      block_2_add[θ][0]
274 ]
275
276
277   block_3_depthwise (DepthwiseCon (None, 28, 28, 144) 1296    block_3_pad[θ][0]
```

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File - model_summary
277 ]
278 -----
279 block_3_depthwise_BN (BatchNorm (None, 28, 28, 144) 576      block_3_depthwise[θ][θ]
]
280 -----
281 block_3_depthwise_relu (ReLU)  (None, 28, 28, 144) 0      block_3_depthwise_BN[θ][θ]
]
282 -----
283 block_3_project_Conv2D      (None, 28, 28, 32) 4608      block_3_depthwise_relu[θ][θ]
0]
284 -----
285 block_3_project_BN (BatchNormal (None, 28, 28, 32) 128      block_3_project[θ][θ]
]
286 -----
287 block_4_expand_Conv2D       (None, 28, 28, 192) 6144      block_3_project_BN[θ][θ]
]
288 -----
289 block_4_expand_BN (BatchNormali (None, 28, 28, 192) 768      block_4_expand[θ][θ]
]
290 -----
291 block_4_expand_relu (ReLU)   (None, 28, 28, 192) 0      block_4_expand_BN[θ][θ]
]
292 -----
293 block_4_depthwise_DepthwiseCon (None, 28, 28, 192) 1728      block_4_expand_relu[θ][θ]
```

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File - model_summary
293 ]
294 -----
295 block_4_depthwise_BN (BatchNorm (None, 28, 28, 192) 768      block_4_depthwise[θ][θ]
]
296 -----
297 block_4_depthwise_relu (ReLU)  (None, 28, 28, 192) 0          block_4_depthwise_BN[θ][θ]
]
298 -----
299 block_4_project (Conv2D)      (None, 28, 28, 32) 6144      block_4_depthwise_relu[θ][θ]
0]
300 -----
301 block_4_project_BN (BatchNormal (None, 28, 28, 32) 128      block_4_project[θ][θ]
]
302 -----
303 block_4_add (Add)           (None, 28, 28, 32) 0          block_3_project_BN[θ][θ]
]
304 ]                                block_4_project_BN[θ][θ]
305 -----
306 block_5_expand (Conv2D)      (None, 28, 28, 192) 6144      block_4_add[θ][θ]
]
307 -----
308 block_5_expand_BN (BatchNormali (None, 28, 28, 192) 768      block_5_expand[θ][θ]
]
309 -----
```

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File - model_summary
309 block_5_expand_relu (ReLU)      (None, 28, 28, 192) 0      block_5_expand_BN[0][0]
310 block_5 [0]
311 -----
312 block_5_depthwise (DepthwiseConv (None, 28, 28, 192) 1728      block_5_expand_relu[0][0]
313 block_5 [0]
314 block_5_depthwise_BN (BatchNorm (None, 28, 28, 192) 768      block_5_depthwise[0][0]
315 block_5 [0]
316 block_5_depthwise_relu (ReLU)  (None, 28, 28, 192) 0      block_5_depthwise_BN[0][0]
317 block_5 [0]
318 block_5_project (Conv2D)      (None, 28, 28, 32) 6144      block_5_depthwise_relu[0][0]
319 block_5 [0]
320 block_5_project_BN (BatchNormal (None, 28, 28, 32) 128      block_5_project[0][0]
321 block_5 [0]
322 block_5_add (Add)          (None, 28, 28, 32) 0      block_4_add[0][0]
323 block_5 [0]
324 block_6_expand (Conv2D)      (None, 28, 28, 192) 6144      block_5_add[0][0]
325 block_6 [0]
```

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File - model_summary
325 ]
326 -----
327 block_6_expand_BN (BatchNormali (None, 28, 28, 192) 768
]
328 -----
329 block_6_expand_relu (ReLU) (None, 28, 28, 192) 0
]
330 -----
331 block_6_pad (ZeroPadding2D) (None, 29, 29, 192) 0
]
332 -----
333 block_6_depthwise (DepthwiseCon (None, 14, 14, 192) 1728
]
334 -----
335 block_6_depthwise_BN (BatchNorm (None, 14, 14, 192) 768
]
336 -----
337 block_6_depthwise_relu (ReLU) (None, 14, 14, 192) 0
]
338 -----
339 block_6_project (Conv2D) (None, 14, 14, 64) 12288
]
340 -----
341 block_6_project_BN (BatchNormal (None, 14, 14, 64) 256
]
```

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File - model_summary
341 ]
342 -----
343 block_7_expand (Conv2D)      (None, 14, 14, 384) 24576      block_6_project_BN[0][0]
344 ]
345 block_7_expand_BN (BatchNormali (None, 14, 14, 384) 1536      block_7_expand[0][0]
346 ]
347 block_7_expand_relu (ReLU)   (None, 14, 14, 384) 0          block_7_expand_BN[0][0]
348 ]
349 block_7_depthwise (DepthwiseCon (None, 14, 14, 384) 3456      block_7_expand_relu[0][0]
350 ]
351 block_7_depthwise_BN (BatchNorm (None, 14, 14, 384) 1536      block_7_depthwise[0][0]
352 ]
353 block_7_depthwise_relu (ReLU) (None, 14, 14, 384) 0          block_7_depthwise_BN[0][0]
354 ]
355 block_7_project (Conv2D)    (None, 14, 14, 64) 24576      block_7_depthwise_relu[0][0]
356 ]
357 block_7_project_BN (BatchNormal (None, 14, 14, 64) 256       block_7_project[0][0]
```

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File - model_summary
357 ]
358 -----
359 block_7_add (Add)           (None, 14, 14, 64)  0      block_6_project_BN[θ][0]
360 ]                           block_7_project_BN[θ][0]
361 -----
362 block_8_expand (Conv2D)    (None, 14, 14, 384) 24576   block_7_add[θ][0]
363 -----
364 block_8_expand_BN (BatchNormali (None, 14, 14, 384) 1536   block_8_expand[θ][0]
365 ]
366 block_8_expand_relu (ReLU)  (None, 14, 14, 384)  0      block_8_expand_BN[θ][0]
367 ]
368 block_8_depthwise (DepthwiseCon (None, 14, 14, 384) 3456   block_8_expand_relu[θ][0]
369 ]
370 block_8_depthwise_BN (BatchNorm (None, 14, 14, 384) 1536   block_8_depthwise[θ][0]
371 ]
372 block_8_depthwise_relu (ReLU) (None, 14, 14, 384)  0      block_8_depthwise_BN[θ][0]
373 ]
```

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File - model_summary
373   block_8_project (Conv2D)           (None, 14, 14, 64)  24576      block_8_depthwise_relu[0][0]
374   ]
375   -----
376   block_8_project_BN (BatchNormal (None, 14, 14, 64)  256       block_8_project[0][0]
377   ]
378   block_8_add (Add)                 (None, 14, 14, 64)  0        block_7_add[0][0]
379   ]
380   -----
381   block_9_expand (Conv2D)           (None, 14, 14, 384) 24576      block_8_add[0][0]
382   ]
383   block_9_expand_BN (BatchNormali (None, 14, 14, 384) 1536      block_9_expand[0][0]
384   ]
385   block_9_expand_relu (ReLU)        (None, 14, 14, 384) 0        block_9_expand_BN[0][0]
386   ]
387   block_9_depthwise (DepthwiseCon (None, 14, 14, 384) 3456      block_9_expand_relu[0][0]
388   ]
389   block_9_depthwise_BN (BatchNorm (None, 14, 14, 384) 1536      block_9_depthwise[0][0]
```

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File - model_summary
389 ]
390 -----
391   block_9_depthwise_relu (ReLU)  (None, 14, 14, 384)  0          block_9_depthwise_BN[θ][θ]
392 ]
393   block_9_project (Conv2D)      (None, 14, 14, 64)  24576      block_9_depthwise_relu[θ][θ]
394 ]
395   block_9_project_BN (BatchNormal (None, 14, 14, 64)  256      block_9_project[θ][θ]
396 ]
397   block_9_add (Add)           (None, 14, 14, 64)  0          block_8_add[θ][θ]
398 ]
399 -----
400   block_10_expand (Conv2D)     (None, 14, 14, 384)  24576      block_9_add[θ][θ]
401 ]
402   block_10_expand_BN (BatchNormal (None, 14, 14, 384)  1536      block_10_expand[θ][θ]
403 ]
404   block_10_expand_relu (ReLU)  (None, 14, 14, 384)  0          block_10_expand_BN[θ][θ]
405 ]
```

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File - model_summary
405   block_10_depthwise (DepthwiseCo (None, 14, 14, 384) 3456      block_10_expand_relu[0][0]
406   ]
407   -----
408   block_10_depthwise_BN (BatchNor (None, 14, 14, 384) 1536      block_10_depthwise[0][0]
409   ]
410   block_10_depthwise_relu (ReLU (None, 14, 14, 384) 0      block_10_depthwise_BN[0][0]
411   ]
412   block_10_project (Conv2D (None, 14, 14, 96) 36864      block_10_depthwise_relu[0]
413   ][0]
414   block_10_project_BN (BatchNorma (None, 14, 14, 96) 384      block_10_project[0]
415   ]
416   block_11_expand (Conv2D (None, 14, 14, 576) 55296      block_10_project_BN[0][0]
417   ]
418   block_11_expand_BN (BatchNormal (None, 14, 14, 576) 2304      block_11_expand[0][0]
419   ][0]
420   block_11_expand_relu (ReLU (None, 14, 14, 576) 0      block_11_expand_BN[0][0]
421   ]
```

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File - model_summary
421 block_11_depthwise (DepthwiseCo (None, 14, 14, 576) 5184      block_11_expand_relu[0][0]
422 ]                                     423 -----
424 block_11_depthwise_BN (BatchNor (None, 14, 14, 576) 2304      block_11_depthwise_BN[0][0]
425 ]
426 block_11_depthwise_relu (ReLU) (None, 14, 14, 576) 0      block_11_depthwise_BN[0][0]
427 ]
428 block_11_project (Conv2D) (None, 14, 14, 96) 55296      block_11_depthwise_relu[0]
429 ][0]
430 block_11_project_BN (BatchNorma (None, 14, 14, 96) 384      block_11_project[0]
431 ]
432 block_11_add (Add) (None, 14, 14, 96) 0      block_10_project_BN[0][0]
433 ]
434 ]
435 block_12_expand (Conv2D) (None, 14, 14, 576) 55296      block_11_add[0][0]
436 ]
437 block_12_expand_BN (BatchNormal (None, 14, 14, 576) 2304      block_12_expand[0][0]
```

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File - model_summary
437 ]
438 -----
439 block_12_expand_relu (ReLU)      (None, 14, 14, 576) 0          block_12_expand_BN[0][0]
]
440 -----
441 block_12_depthwise (DepthwiseCo (None, 14, 14, 576) 5184      block_12_expand_relu[0][0]
]
442 -----
443 block_12_depthwise_BN (BatchNor (None, 14, 14, 576) 2304      block_12_depthwise_BN[0][0]
]
444 -----
445 block_12_depthwise_relu (ReLU) (None, 14, 14, 576) 0          block_12_depthwise_BN[0][0]
]
446 -----
447 block_12_project (Conv2D)      (None, 14, 14, 96) 55296      block_12_depthwise_relu[0][0]
]
448 -----
449 block_12_project_BN (BatchNorma (None, 14, 14, 96) 384        block_12_project[0][0]
]
450 -----
451 block_12_add (Add)           (None, 14, 14, 96) 0          block_11_add[0][0]
]
452 ]                               block_12_project_BN[0][0]
]
453 ]
```

```
File - model_summary
453   block_13_expand (Conv2D)           (None, 14, 14, 576) 55296    block_12_add[0][0]
454   ]
455
456   block_13_expand_BN (BatchNormal (None, 14, 14, 576) 2304    block_13_expand[0][0]
457   ]
458   block_13_expand_relu (ReLU)        (None, 14, 14, 576) 0      block_13_expand_BN[0][0]
459   ]
460   block_13_pad (ZeroPadding2D)     (None, 15, 15, 576) 0      block_13_expand_relu[0][0]
461   ]
462   block_13_depthwise (DepthwiseCo (None, 7, 7, 576) 5184    block_13_pad[0][0]
463   ]
464   block_13_depthwise_BN (BatchNor (None, 7, 7, 576) 2304    block_13_depthwise[0][0]
465   ]
466   block_13_depthwise_relu (ReLU)  (None, 7, 7, 576) 0      block_13_depthwise_BN[0][0]
467   ]
468   block_13_project (Conv2D)        (None, 7, 7, 160) 92160    block_13_depthwise_relu[0]
469
```

```
File - model_summary
469   block_13_project_BN (BatchNorma (None, 7, 7, 160)      640      block_13_project[θ][θ]
470   ]
471
472   block_14_expand (Conv2D)      (None, 7, 7, 960)    153600      block_13_project_BN[θ][θ]
473   ]
474   block_14_expand_BN (BatchNormal (None, 7, 7, 960)    3840      block_14_expand[θ][θ]
475   ]
476   block_14_expand_relu (ReLU)    (None, 7, 7, 960)    0          block_14_expand_BN[θ][θ]
477   ]
478   block_14_depthwise (DepthwiseCo (None, 7, 7, 960)    8640      block_14_expand_relu[θ][θ]
479   ]
480   block_14_depthwise_BN (BatchNor (None, 7, 7, 960)    3840      block_14_depthwise[θ][θ]
481   ]
482   block_14_depthwise_relu (ReLU)  (None, 7, 7, 960)    0          block_14_depthwise_BN[θ][θ]
483   ]
484   block_14_project (Conv2D)     (None, 7, 7, 160)    153600      block_14_depthwise_relu[θ]
485   ][θ]
```

```
File - model_summary
485
486 block_14_project_BN (BatchNorma (None, 7, 7, 160)      640      block_14_project[0][0]
]
487
488 block_14_add (Add)          (None, 7, 7, 160)      0      block_13_project_BN[0][0]
]
489
490
491 block_15_expand (Conv2D)    (None, 7, 7, 960)     153600      block_14_add[0][0]
]
492
493 block_15_expand_BN (BatchNormal (None, 7, 7, 960)     3840      block_15_expand[0][0]
]
494
495 block_15_expand_relu (ReLU)  (None, 7, 7, 960)      0      block_15_expand_BN[0][0]
]
496
497 block_15_depthwise (DepthwiseCo (None, 7, 7, 960)     8640      block_15_expand_relu[0][0]
]
498
499 block_15_depthwise_BN (BatchNor (None, 7, 7, 960)     3840      block_15_depthwise[0][0]
]
500
501 block_15_depthwise_relu (ReLU) (None, 7, 7, 960)      0      block_15_depthwise_BN[0][0]
```

```
File - model_summary
501 ]
502 -----
503 block_15_project (Conv2D)      (None, 7, 7, 160)  153600   block_15_depthwise_relu[0]
504 ] [0]
505 block_15_project_BN (BatchNorma (None, 7, 7, 160)  640      block_15_project[0][0]
506 ]
507 block_15_add (Add)          (None, 7, 7, 160)  0       block_14_add[0][0]
508 ]                                block_15_project_BN[0][0]
509 ]
510 block_16_expand (Conv2D)      (None, 7, 7, 960)  153600   block_15_add[0][0]
511 ] -----
512 block_16_expand_BN (BatchNormal (None, 7, 7, 960)  3840     block_16_expand[0][0]
513 ]
514 block_16_expand_relu (ReLU)    (None, 7, 7, 960)  0       block_16_expand_BN[0][0]
515 ]
516 block_16_depthwise (DepthwiseCo (None, 7, 7, 960)  8640     block_16_expand_relu[0][0]
517 ] -----
```

```
File - model_summary
517   block_16_depthwise_BN (BatchNor (None, 7, 7, 960)      3840      block_16_depthwise[0][0]
518   ]
519
520   block_16_depthwise_relu (ReLU) (None, 7, 7, 960)      0      block_16_depthwise_BN[0][0]
521
522   block_16_project (Conv2D) (None, 7, 7, 320)      307200      block_16_depthwise_relu[0]
523
524   block_16_project_BN (BatchNorma (None, 7, 7, 320)      1280      block_16_project[0][0]
525
526   Conv_1 (Conv2D) (None, 7, 7, 1280)      409600      block_16_project_BN[0][0]
527
528   Conv_1_bn (BatchNormalization) (None, 7, 7, 1280)      5120      Conv_1[0][0]
529
530   out_relu (ReLU) (None, 7, 7, 1280)      0      Conv_1_bn[0][0]
531
532   global_average_pooling2d_1 (Glo (None, 1280)      0      out_relu[0][0]
533
```

```
File - model_summary
533
534   Logits (Dense)           (None, 1000)      1281000    global_average_pooling2d_1
535   =====
536 Total params: 3,538,984
537 Trainable params: 3,504,872
538 Non-trainable params: 34,112
539

540 None
541 =====
542 inception_v3
543

544 Layer (type)                Output Shape       Param #  Connected to
545 =====
546 input_3 (InputLayer)        (None, None, None, 3  0
547
548 conv2d (Conv2D)             (None, None, None, 3  864      input_3[0][0]
549   ]
550 batch_normalization (BatchNorma (None, None, None, 3  96      conv2d[0][0]
551

552 activation (Activation)    (None, None, None, 3  0      batch_normalization[0][0]
```

```
File - model_summary
552 ]
553
554 conv2d_1 (Conv2D)           (None, None, None, 3 9216      activation[0][0]
]
555
556 batch_normalization_1 (BatchNor (None, None, None, 3 96      conv2d_1[0][0]
]
557
558 activation_1 (Activation)   (None, None, None, 3 0       batch_normalization_1[0][0]
]
559
560 conv2d_2 (Conv2D)           (None, None, None, 6 18432     activation_1[0][0]
]
561
562 batch_normalization_2 (BatchNor (None, None, None, 6 192     conv2d_2[0][0]
]
563
564 activation_2 (Activation)   (None, None, None, 6 0       batch_normalization_2[0][0]
]
565
566 max_pooling2d (MaxPooling2D) (None, None, None, 6 0       activation_2[0][0]
]
567
568 conv2d_3 (Conv2D)           (None, None, None, 8 5120      max_pooling2d[0][0]
```

```
File - model_summary  
568 ]  
569 -----  
570 batch_normalization_3 (BatchNor (None, None, None, 8 240 conv2d_3[0])[0]  
]  
571 -----  
572 activation_3 (Activation) (None, None, None, 8 0 batch_normalization_3[0][0)  
]  
573 -----  
574 conv2d_4 (Conv2D) (None, None, None, 1 138240 activation_3[0][0)  
]  
575 -----  
576 batch_normalization_4 (BatchNor (None, None, None, 1 576 conv2d_4[0])[0)  
]  
577 -----  
578 activation_4 (Activation) (None, None, None, 1 0 batch_normalization_4[0][0)  
]  
579 -----  
580 max_pooling2d_1 (MaxPooling2D) (None, None, None, 1 0 activation_4[0][0)  
]  
581 -----  
582 conv2d_8 (Conv2D) (None, None, None, 6 12288 max_pooling2d_1[0][0)  
]  
583 -----  
584 batch_normalization_8 (BatchNor (None, None, None, 6 192 conv2d_8[0][0)
```

```
File - model_summary  
584 ]  
585 -----  
586 activation_8 (Activation)      (None, None, None, 6 0          batch_normalization_8[0][0]  
]  
587 -----  
588 conv2d_6 (Conv2D)            (None, None, None, 4 9216      max_pooling2d_1[0][0]  
]  
589 -----  
590 conv2d_9 (Conv2D)            (None, None, None, 9 55296    activation_8[0][0]  
]  
591 -----  
592 batch_normalization_6 (BatchNor (None, None, None, 4 144      conv2d_6[0][0]  
]  
593 -----  
594 batch_normalization_9 (BatchNor (None, None, None, 9 288      conv2d_9[0][0]  
]  
595 -----  
596 activation_6 (Activation)    (None, None, None, 4 0          batch_normalization_6[0][0]  
]  
597 -----  
598 activation_9 (Activation)    (None, None, None, 9 0          batch_normalization_9[0][0]  
]  
599 -----  
600 average_pooling2d (AveragePooli (None, None, None, 1 0          max_pooling2d_1[0][0]
```

```
File - model_summary  
600 ]  
601  
602 conv2d_5 (Conv2D) (None, None, None, 6 12288 max_pooling2d_1[0][0]  
]  
603  
604 conv2d_7 (Conv2D) (None, None, None, 6 76800 activation_6[0][0]  
]  
605  
606 conv2d_10 (Conv2D) (None, None, None, 9 82944 activation_9[0][0]  
]  
607  
608 conv2d_11 (Conv2D) (None, None, None, 3 6144 average_pooling2d[0][0]  
]  
609  
610 batch_normalization_5 (BatchNor (None, None, None, 6 192 conv2d_5[0][0]  
]  
611  
612 batch_normalization_7 (BatchNor (None, None, None, 6 192 conv2d_7[0][0]  
]  
613  
614 batch_normalization_10 (BatchNo (None, None, None, 9 288 conv2d_10[0][0]  
]  
615  
616 batch_normalization_11 (BatchNo (None, None, None, 3 96 conv2d_11[0][0]
```

```
File - model_summary  
616 ]  
617 -----  
618 activation_5 (Activation)      (None, None, None, 6 0          batch_normalization_5[0][0]  
]  
619 -----  
620 activation_7 (Activation)      (None, None, None, 6 0          batch_normalization_7[0][0]  
]  
621 -----  
622 activation_10 (Activation)    (None, None, None, 9 0          batch_normalization_10[0][0]  
]  
623 -----  
624 activation_11 (Activation)    (None, None, None, 3 0          batch_normalization_11[0][0]  
]  
625 -----  
626 mixed0 (Concatenate)         (None, None, None, 2 0          activation_5[0][0]  
]  
627 ]  
628 ]  
629 ]  
630 -----  
631 conv2d_15 (Conv2D)           (None, None, None, 6 16384     mixed0[0][0]  
]  
632 -----
```

```
File - model_summary
632 batch_normalization_15 (BatchNo (None, None, None, 6 192
633 ] conv2d_15[0][0]
634
635 activation_15 (Activation) (None, None, None, 6 0 batch_normalization_15[0][0]
636 ]
637 conv2d_13 (Conv2D) (None, None, None, 4 12288 mixed0[0][0]
638 ]
639 conv2d_16 (Conv2D) (None, None, None, 9 55296 activation_15[0][0]
640 ]
641 batch_normalization_13 (BatchNo (None, None, None, 4 144 conv2d_13[0][0]
642 ]
643 batch_normalization_16 (BatchNo (None, None, None, 9 288 conv2d_16[0][0]
644 ]
645 activation_13 (Activation) (None, None, None, 4 0 batch_normalization_13[0][0]
646 ]
647 activation_16 (Activation) (None, None, None, 9 0 batch_normalization_16[0][0]
648 ]
```

```
File - model_summary
648
649 average_pooling2d_1 (AveragePoo (None, None, None, 2 0
]
650
651 conv2d_12 (Conv2D)
652
653 conv2d_14 (Conv2D)
654
655 conv2d_17 (Conv2D)
656
657 conv2d_18 (Conv2D)
658
659 batch_normalization_12 (BatchNo (None, None, None, 6 192
]
660
661 batch_normalization_14 (BatchNo (None, None, None, 6 192
]
662
663 batch_normalization_17 (BatchNo (None, None, None, 9 288
]
664
```

```
File - model_summary
664
665 batch_normalization_18 (BatchNo (None, None, None, 6 192
]
666
667 activation_12 (Activation) (None, None, None, 6 0
batch_normalization_12[0][0]
]
668
669 activation_14 (Activation) (None, None, None, 6 0
batch_normalization_14[0][0]
]
670
671 activation_17 (Activation) (None, None, None, 9 0
batch_normalization_17[0][0]
]
672
673 activation_18 (Activation) (None, None, None, 6 0
batch_normalization_18[0][0]
]
674
675 mixed1 (Concatenate)
[ (None, None, None, 2 0
activation_12[0][0]
activation_14[0][0]
activation_17[0][0]
activation_18[0][0]
]
676 ]
677 ]
678 ]
679 ]
680 conv2d_22 (Conv2D) (None, None, None, 6 18432
mixed1[0][0]
```

```
File - model_summary  
680 ]  
681  
682 batch_normalization_22 (BatchNo (None, None, None, 6 192 conv2d_22[θ][θ]  
]  
683  
684 activation_22 (Activation) (None, None, None, 6 θ batch_normalization_22[θ][θ]  
[θ]  
685  
686 conv2d_20 (Conv2D) (None, None, None, 4 13824 mixed1[θ][θ]  
]  
687  
688 conv2d_23 (Conv2D) (None, None, None, 9 55296 activation_22[θ][θ]  
]  
689  
690 batch_normalization_20 (BatchNo (None, None, None, 4 144 conv2d_20[θ][θ]  
]  
691  
692 batch_normalization_23 (BatchNo (None, None, None, 9 288 conv2d_23[θ][θ]  
]  
693  
694 activation_20 (Activation) (None, None, None, 4 θ batch_normalization_20[θ][θ]  
[θ]  
695  
696 activation_23 (Activation) (None, None, None, 9 θ batch_normalization_23[θ][θ]  
[θ]
```

```
File - model_summary  
696 0]  
697  
698 average_pooling2d_2 (AveragePoo (None, None, None, 2 0 mixed1[0][0]  
]  
699  
700 conv2d_19 (Conv2D)  
]  
701  
702 conv2d_21 (Conv2D)  
]  
703  
704 conv2d_24 (Conv2D)  
]  
705  
706 conv2d_25 (Conv2D)  
]  
707  
708 batch_normalization_19 (BatchNo (None, None, None, 6 192 conv2d_19[0][0]  
]  
709  
710 batch_normalization_21 (BatchNo (None, None, None, 6 192 conv2d_21[0][0]  
]  
711  
712 batch_normalization_24 (BatchNo (None, None, None, 9 288 conv2d_24[0][0]
```

```
File - model_summary  
712 ]  
713 -----  
714 batch_normalization_25 (BatchNo (None, None, None, 6 192 conv2d_25[θ])[θ]  
]  
715 -----  
716 activation_19 (Activation) (None, None, None, 6 0 batch_normalization_19[θ][θ]  
0]  
717 -----  
718 activation_21 (Activation) (None, None, None, 6 0 batch_normalization_21[θ][θ]  
0]  
719 -----  
720 activation_24 (Activation) (None, None, None, 9 0 batch_normalization_24[θ][θ]  
0]  
721 -----  
722 activation_25 (Activation) (None, None, None, 6 0 batch_normalization_25[θ][θ]  
0]  
723 -----  
724 mixed2 (Concatenate) (None, None, None, 2 0 activation_19[θ][θ]  
]  
725 ] activation_21[θ][θ]  
726 ] activation_24[θ][θ]  
727 ] activation_25[θ][θ]  
728 ]
```

```
File - model_summary
728   conv2d_27 (Conv2D)           (None, None, None, 6 18432      mixed2[0][0]
729     ]
730   -----
731   batch_normalization_27 (BatchNo (None, None, None, 6 192      conv2d_27[0][0]
732     ]
733   activation_27 (Activation)  (None, None, None, 6 0          batch_normalization_27[0][0]
734     ]
735   conv2d_28 (Conv2D)         (None, None, None, 9 55296      activation_27[0][0]
736     ]
737   batch_normalization_28 (BatchNo (None, None, None, 9 288      conv2d_28[0][0]
738     ]
739   activation_28 (Activation)  (None, None, None, 9 0          batch_normalization_28[0][0]
740     ]
741   conv2d_26 (Conv2D)         (None, None, None, 3 995328      mixed2[0][0]
742     ]
743   conv2d_29 (Conv2D)         (None, None, None, 9 82944       activation_28[0][0]
744     ]
```

```
File - model_summary
744   [batch_normalization_26 (BatchNo (None, None, None, 3 1152
745     ] conv2d_26[0][0]
746
747   [batch_normalization_29 (BatchNo (None, None, None, 9 288
748     ] conv2d_29[0][0]
749   [activation_26 (Activation) (None, None, None, 3 0
750     ] batch_normalization_26[0][0]
751   [activation_29 (Activation) (None, None, None, 9 0
752     ] batch_normalization_29[0][0]
753   [max_pooling2d_2 (MaxPooling2D) (None, None, None, 2 0
754     ] mixed2[0][0]
755   [mixed3 (Concatenate)
756     ] activation_26[0][0]
757     ] activation_29[0][0]
758     ] max_pooling2d_2[0][0]
759   [conv2d_34 (Conv2D) (None, None, None, 1 98304
760     ] mixed3[0][0]
```

```
File - model_summary
760
761 batch_normalization_34 (BatchNo (None, None, None, 1 384
    ]
762
763 activation_34 (Activation) (None, None, None, 1 0
    ]
764
765 conv2d_35 (Conv2D) (None, None, None, 1 114688 activation_34[0][0]
    ]
766
767 batch_normalization_35 (BatchNo (None, None, None, 1 384
    ]
768
769 activation_35 (Activation) (None, None, None, 1 0
    ]
770
771 conv2d_31 (Conv2D) (None, None, None, 1 98304 mixed3[0][0]
    ]
772
773 conv2d_36 (Conv2D) (None, None, None, 1 114688 activation_35[0][0]
    ]
774
775 batch_normalization_31 (BatchNo (None, None, None, 1 384 conv2d_31[0][0]
    ]
776
```

```
File - model_summary
776 -----
777 batch_normalization_36 (BatchNo (None, None, None, 1 384
778 ]
779 activation_31 (Activation) (None, None, None, 1 0
780 ]
781 activation_36 (Activation) (None, None, None, 1 0
782 ]
783 conv2d_32 (Conv2D) (None, None, None, 1 114688
784 ]
785 conv2d_37 (Conv2D) (None, None, None, 1 114688
786 ]
787 batch_normalization_32 (BatchNo (None, None, None, 1 384
788 ]
789 batch_normalization_37 (BatchNo (None, None, None, 1 384
790 ]
791 activation_32 (Activation) (None, None, None, 1 0
792 ]
```

```
File - model_summary
792 activation_37 (Activation)      (None, None, None, 1 0
0]
793
794
795 average_pooling2d_3 (AveragePoo (None, None, None, 7 0
]
796
797 conv2d_30 (Conv2D)          (None, None, None, 1 147456
mixed3[0][0
]
798
799 conv2d_33 (Conv2D)          (None, None, None, 1 172032
activation_32[0][0
]
800
801 conv2d_38 (Conv2D)          (None, None, None, 1 172032
activation_37[0][0
]
802
803 conv2d_39 (Conv2D)          (None, None, None, 1 147456
average_pooling2d_3[0][0
]
804
805 batch_normalization_30 (BatchNo (None, None, None, 1 576
conv2d_30[0][0
]
806
807 batch_normalization_33 (BatchNo (None, None, None, 1 576
conv2d_33[0][0
]
808
```

```
File - model_summary
808   [-----]
809   batch_normalization_38 (BatchNo (None, None, None, 1 576
     ]
810   conv2d_38[0][0]
-----]
811   batch_normalization_39 (BatchNo (None, None, None, 1 576
     ]
812   conv2d_39[0][0]
-----]
813   activation_30 (Activation) (None, None, None, 1 0
     ]
814   batch_normalization_30[0][0]
-----]
815   activation_33 (Activation) (None, None, None, 1 0
     ]
816   batch_normalization_33[0][0]
-----]
817   activation_38 (Activation) (None, None, None, 1 0
     ]
818   batch_normalization_38[0][0]
-----]
819   activation_39 (Activation) (None, None, None, 1 0
     ]
820   batch_normalization_39[0][0]
-----]
821   mixed4 (Concatenate) (None, None, None, 7 0
     ]
822   activation_30[0][0]
     ]
823   activation_38[0][0]
     ]
824   activation_39[0][0]
```

```
File - model_summary
824 ]
825 -----
826 conv2d_44 (Conv2D)           (None, None, None, 1 122880      mixed4[0][0]
]
827 -----
828 batch_normalization_44 (BatchNo (None, None, None, 1 480      conv2d_44[0][0]
]
829 -----
830 activation_44 (Activation)   (None, None, None, 1 0          batch_normalization_44[0][0]
]
831 -----
832 conv2d_45 (Conv2D)           (None, None, None, 1 179200      activation_44[0][0]
]
833 -----
834 batch_normalization_45 (BatchNo (None, None, None, 1 480      conv2d_45[0][0]
]
835 -----
836 activation_45 (Activation)   (None, None, None, 1 0          batch_normalization_45[0][0]
]
837 -----
838 conv2d_41 (Conv2D)           (None, None, None, 1 122880      mixed4[0][0]
]
839 -----
840 conv2d_46 (Conv2D)           (None, None, None, 1 179200      activation_45[0][0]
```

```
File - model_summary  
840 ]  
841 -----  
842 batch_normalization_41 (BatchNo (None, None, None, 1 480  
] conv2d_41[θ][0]  
843 -----  
844 batch_normalization_46 (BatchNo (None, None, None, 1 480  
] conv2d_46[θ][0]  
845 -----  
846 activation_41 (Activation) (None, None, None, 1 0  
] batch_normalization_41[θ][0]  
847 -----  
848 activation_46 (Activation) (None, None, None, 1 0  
] batch_normalization_46[θ][0]  
849 -----  
850 conv2d_42 (Conv2D) (None, None, None, 1 179200  
] activation_41[θ][0]  
851 -----  
852 conv2d_47 (Conv2D) (None, None, None, 1 179200  
] activation_46[θ][0]  
853 -----  
854 batch_normalization_42 (BatchNo (None, None, None, 1 480  
] conv2d_42[θ][0]  
855 -----  
856 batch_normalization_47 (BatchNo (None, None, None, 1 480  
] conv2d_47[θ][0]
```

```
File - model_summary  
856 ]  
857 -----  
858 activation_42 (Activation) (None, None, None, 1 0 batch_normalization_42[0][0]  
859 -----  
860 activation_47 (Activation) (None, None, None, 1 0 batch_normalization_47[0][0]  
861 -----  
862 average_pooling2d_4 (AveragePool (None, None, None, 7 0 mixed4[0][0]  
] 863 -----  
864 conv2d_40 (Conv2D) (None, None, None, 1 147456 mixed4[0][0]  
] 865 -----  
866 conv2d_43 (Conv2D) (None, None, None, 1 215040 activation_42[0][0]  
] 867 -----  
868 conv2d_48 (Conv2D) (None, None, None, 1 215040 activation_47[0][0]  
] 869 -----  
870 conv2d_49 (Conv2D) (None, None, None, 1 147456 average_pooling2d_4[0][0]  
] 871 -----  
872 batch_normalization_40 (BatchNorm (None, None, None, 1 576 conv2d_40[0][0]
```

```
File - model_summary
872 ]
873 -----
874 batch_normalization_43 (BatchNo (None, None, None, 1 576 conv2d_43[θ][0]
]
875 -----
876 batch_normalization_48 (BatchNo (None, None, None, 1 576 conv2d_48[θ][0]
]
877 -----
878 batch_normalization_49 (BatchNo (None, None, None, 1 576 conv2d_49[θ][0]
]
879 -----
880 activation_40 (Activation) (None, None, None, 1 0 batch_normalization_40[θ][0]
]
881 -----
882 activation_43 (Activation) (None, None, None, 1 0 batch_normalization_43[θ][0]
]
883 -----
884 activation_48 (Activation) (None, None, None, 1 0 batch_normalization_48[θ][0]
]
885 -----
886 activation_49 (Activation) (None, None, None, 1 0 batch_normalization_49[θ][0]
]
887 -----
888 mixed5 (Concatenate) (None, None, None, 7 0 activation_4θ[θ][0]
```

```
File - model_summary
888 ] activation_43[0][0]
889 ]
890 ] activation_48[0][0]
891 ]
892 ]
893 conv2d_54 (Conv2D) (None, None, None, 1 122880 mixed5[0][0]
894 ]
895 batch_normalization_54 (BatchNo (None, None, None, 1 480 conv2d_54[0][0]
896 ]
897 activation_54 (Activation) (None, None, None, 1 0 batch_normalization_54[0][0]
898 ]
899 conv2d_55 (Conv2D) (None, None, None, 1 179200 activation_54[0][0]
900 ]
901 batch_normalization_55 (BatchNo (None, None, None, 1 480 conv2d_55[0][0]
902 ]
903 activation_55 (Activation) (None, None, None, 1 0 batch_normalization_55[0][0]
904 ]
```

```
File - model_summary
904   conv2d_51 (Conv2D)
905     (None, None, None, 1 122880
906       mixed5[0][0]
907   conv2d_56 (Conv2D)
908     (None, None, None, 1 179200
909     activation_55[0][0]
910   batch_normalization_51 (BatchNo
911     (None, None, None, 1 480
912   batch_normalization_56 (BatchNo
913   activation_51 (Activation)
914     (None, None, None, 1 0
915     batch_normalization_51[0][0]
916   activation_56 (Activation)
917     (None, None, None, 1 179200
918   activation_55[0][0]
919   conv2d_57 (Conv2D)
920     (None, None, None, 1 179200
921   activation_56[0][0]
```

```
File - model_summary
920
921 batch_normalization_52 (BatchNo (None, None, None, 1 480
922 ]
923 batch_normalization_57 (BatchNo (None, None, None, 1 480
924 ]
925 activation_52 (Activation) (None, None, None, 1 0
926 ]
927 activation_57 (Activation) (None, None, None, 1 0
928 ]
929 average_pooling2d_5 (AveragePoo (None, None, None, 7 0
930 ]
931 conv2d_50 (Conv2D) (None, None, None, 1 147456
932 ]
933 conv2d_53 (Conv2D) (None, None, None, 1 215040
934 ]
935 conv2d_58 (Conv2D) (None, None, None, 1 215040
936 ]
```

```
File - model_summary
936   conv2d_59 (Conv2D)
937     (None, None, None, 1 147456
938   ]
939   batch_normalization_50 (BatchNo (None, None, None, 1 576
940   ]
941   batch_normalization_53 (BatchNo (None, None, None, 1 576
942   ]
943   batch_normalization_58 (BatchNo (None, None, None, 1 576
944   ]
945   batch_normalization_59 (BatchNo (None, None, None, 1 576
946   ]
947   activation_50 (Activation) (None, None, None, 1 0
948   ]
949   activation_53 (Activation) (None, None, None, 1 0
950   ]
951   activation_58 (Activation) (None, None, None, 1 0
952   ]
```

```
File - model_summary
952
953 activation_59 (Activation)      (None, None, None, 1 0
0]
954
955 mixed6 (Concatenate)
956   [
957     ]
958   ]
959
960 conv2d_64 (Conv2D)
961   [
962     batch_normalization_64 (BatchNo (None, None, None, 1 576
963
964 activation_64 (Activation)
965   [
966     conv2d_65 (Conv2D)
967   ]
968 batch_normalization_65 (BatchNo (None, None, None, 1 576
969
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File - model_summary  
968 ]  
969 -----  
970 activation_65 (Activation) (None, None, None, 1 0 batch_normalization_65[0][0]  
971 ]  
972 conv2d_61 (Conv2D) (None, None, None, 1 147456 mixed6[0][0]  
973 ]  
974 conv2d_66 (Conv2D) (None, None, None, 1 258048 activation_65[0][0]  
975 ]  
976 batch_normalization_61 (BatchNo (None, None, None, 1 576 conv2d_61[0][0]  
977 ]  
978 batch_normalization_66 (BatchNo (None, None, None, 1 576 conv2d_66[0][0]  
979 ]  
980 activation_61 (Activation) (None, None, None, 1 0 batch_normalization_61[0][0]  
981 ]  
982 activation_66 (Activation) (None, None, None, 1 0 batch_normalization_66[0][0]  
983 ]  
984 conv2d_62 (Conv2D) (None, None, None, 1 258048 activation_61[0][0]
```

```
File - model_summary  
984 ]  
985 -----  
986 conv2d_67 (Conv2D) (None, None, None, 1 258048 activation_66[0][0]  
987 ]  
988 batch_normalization_62 (BatchNo (None, None, None, 1 576 conv2d_62[0][0]  
989 ]  
990 batch_normalization_67 (BatchNo (None, None, None, 1 576 conv2d_67[0][0]  
991 ]  
992 activation_62 (Activation) (None, None, None, 1 0 batch_normalization_62[0  
993 ][0])  
994 activation_67 (Activation) (None, None, None, 1 0 batch_normalization_67[0  
995 ][0])  
996 average_pooling2d_6 (AveragePoo (None, None, None, 7 0 mixed6[0][0]  
997 ]  
998 conv2d_60 (Conv2D) (None, None, None, 1 147456 mixed6[0][0]  
999 ]  
1000 conv2d_63 (Conv2D) (None, None, None, 1 258048 activation_62[0][0]
```

File - model_summary

1000]
1001 -----
1002 conv2d_68 (Conv2D) (None, None, None, 1 258048 activation_67[0][0]
]
1003 -----
1004 conv2d_69 (Conv2D) (None, None, None, 1 147456 average_pooling2d_6[0][0]
]
1005 -----
1006 batch_normalization_60 (BatchNo (None, None, None, 1 576 conv2d_60[0][0]
]
1007 -----
1008 batch_normalization_63 (BatchNo (None, None, None, 1 576 conv2d_63[0][0]
]
1009 -----
1010 batch_normalization_68 (BatchNo (None, None, None, 1 576 conv2d_68[0][0]
]
1011 -----
1012 batch_normalization_69 (BatchNo (None, None, None, 1 576 conv2d_69[0][0]
]
1013 -----
1014 activation_60 (Activation) (None, None, None, 1 0 batch_normalization_60[0]
][0]
1015 -----
1016 activation_63 (Activation) (None, None, None, 1 0 batch_normalization_63[0]

File - model_summary

1016] [0]
1017 -----
1018 activation_68 (Activation) (None, None, None, 1 0 batch_normalization_68[0]
] [0]
1019 -----
1020 activation_69 (Activation) (None, None, None, 1 0 batch_normalization_69[0]
] [0]
1021 -----
1022 mixed7 (Concatenate) (None, None, None, 7 0 activation_60[0][0]
]
1023] activation_63[0][0]
]
1024] activation_68[0][0]
]
1025] activation_69[0][0]
]
1026 -----
1027 conv2d_72 (Conv2D) (None, None, None, 1 147456 mixed7[0][0]
]
1028 -----
1029 batch_normalization_72 (BatchNo (None, None, None, 1 576 conv2d_72[0][0]
]
1030 -----
1031 activation_72 (Activation) (None, None, None, 1 0 batch_normalization_72[0]
]
1032 -----

File - model_summary

```
1032 conv2d_73 (Conv2D)           (None, None, None, 1 258048 activation_72[0][0]
1033   ]
1034   
```

```
1035 batch_normalization_73 (BatchNo (None, None, None, 1 576 conv2d_73[0][0]
1036   ]
```

```
1037 activation_73 (Activation) (None, None, None, 1 0 batch_normalization_73[0
1038   ][0]
```

```
1039 conv2d_70 (Conv2D)         (None, None, None, 1 147456 mixed7[0][0]
1040   ]
```

```
1041 conv2d_74 (Conv2D)         (None, None, None, 1 258048 activation_73[0][0]
1042   ]
```

```
1043 batch_normalization_70 (BatchNo (None, None, None, 1 576 conv2d_70[0][0]
1044   ]
```

```
1045 batch_normalization_74 (BatchNo (None, None, None, 1 576 conv2d_74[0][0]
1046   ]
```

```
1047 activation_70 (Activation) (None, None, None, 1 0 batch_normalization_70[0
1048   ][0]
```

```
File - model_summary
1048 activation_74 (Activation) (None, None, None, 1 0      batch_normalization_74[0]
1049 ] [0]
1050 -----
1051 conv2d_71 (Conv2D)      (None, None, None, 3 552960    activation_70[0][0]
1052 ]
1053 conv2d_75 (Conv2D)      (None, None, None, 1 331776    activation_74[0][0]
1054 ]
1055 batch_normalization_71 (BatchNo (None, None, None, 3 960 conv2d_71[0][0]
1056 ]
1057 batch_normalization_75 (BatchNo (None, None, None, 1 576 conv2d_75[0][0]
1058 ]
1059 activation_71 (Activation) (None, None, None, 3 0      batch_normalization_71[0]
1060 ] [0]
1061 activation_75 (Activation) (None, None, None, 1 0      batch_normalization_75[0]
1062 ]
1063 max_pooling2d_3 (MaxPooling2D) (None, None, None, 7 0      mixed7[0][0]
1064 ]
```

```
File - model_summary
1064 mixed8 (Concatenate)
1065   (None, None, None, 1 0
1066   ]
1067   ]
1068   ]
1069   conv2d_80 (Conv2D)
1070     (None, None, None, 4 573440
1071     mixed8[0][0]
1072   ]
1073   activation_80 (Activation)
1074     (None, None, None, 4 0
1075     batch_normalization_80[0][0]
1076     batch_normalization_80[0][0]
1077   conv2d_81 (Conv2D)
1078     (None, None, None, 3 1548288
1079     activation_80[0][0]
1080     conv2d_77[0][0]
```

File - model_summary

1080 batch_normalization_81 (BatchNo (None, None, None, 3 1152 conv2d_81[0][0])
1081]

1082 -----

1083 activation_77 (Activation (None, None, None, 3 0 batch_normalization_77[0])
1084]

1085 activation_81 (Activation (None, None, None, 3 0 batch_normalization_81[0])
1086]

1087 conv2d_78 (Conv2D (None, None, None, 3 442368 activation_77[0][0])
1088]

1089 conv2d_79 (Conv2D (None, None, None, 3 442368 activation_77[0][0])
1090]

1091 conv2d_82 (Conv2D (None, None, None, 3 442368 activation_81[0][0])
1092]

1093 conv2d_83 (Conv2D (None, None, None, 3 442368 activation_81[0][0])
1094]

1095 average_pooling2d_7 (AveragePool (None, None, None, 1 0 mixed8[0][0])
1096]

```
File - model_summary
1096 conv2d_76 (Conv2D)
1097   [
1098     (None, None, None, 3 409600) mixed8[0][0]
1099   batch_normalization_78 (BatchNo (None, None, None, 3 1152) conv2d_78[0][0]
1100   ]
1101   batch_normalization_79 (BatchNo (None, None, None, 3 1152) conv2d_79[0][0]
1102   ]
1103   batch_normalization_82 (BatchNo (None, None, None, 3 1152) conv2d_82[0][0]
1104   ]
1105   batch_normalization_83 (BatchNo (None, None, None, 3 1152) conv2d_83[0][0]
1106   ]
1107   conv2d_84 (Conv2D) (None, None, None, 1 245760) average_pooling2d_7[0][0]
1108   ]
1109   batch_normalization_76 (BatchNo (None, None, None, 3 960) conv2d_76[0][0]
1110   ]
1111   activation_78 (Activation) (None, None, None, 3 0) batch_normalization_78[0]
1112   ]
```

```
File - model_summary
1112 activation_79 (Activation) (None, None, None, 3 0      batch_normalization_79[0]
1113 activation_79] [0]
1114
1115 activation_82 (Activation) (None, None, None, 3 0      batch_normalization_82[0]
1116 ]
1117 activation_83 (Activation) (None, None, None, 3 0      batch_normalization_83[0]
1118 ]
1119 batch_normalization_84 (BatchNo (None, None, None, 1 576 conv2d_84[0][0]
1120 ]
1121 activation_76 (Activation) (None, None, None, 3 0      batch_normalization_76[0]
1122 ]
1123 mixed9_0 (Concatenate) (None, None, None, 7 0      activation_78[0][0]
1124 ]
1125
1126 concatenate (Concatenate) (None, None, None, 7 0      activation_82[0][0]
1127 ]
1128 ]
```

```
File - model_summary
1128 activation_84 (Activation)
1129   ] [0]                                         (None, None, None, 1 0      batch_normalization_84[0]
1130
1131 mixed9 (Concatenate)                         (None, None, None, 2 0      activation_76[0][0]
1132   ]                                         mixed9_0[0][0]
1133   ]                                         concatenate[0][0]
1134   ]                                         activation_84[0][0]
1135
1136 conv2d_89 (Conv2D)                         (None, None, None, 4 917504  mixed9[0][0]
1137   ]
1138 batch_normalization_89 (BatchNo (None, None, None, 4 1344      conv2d_89[0][0]
1139   ]
1140 activation_89 (Activation)                   (None, None, None, 4 0      batch_normalization_89[0]
1141   ] [0]
1142 conv2d_86 (Conv2D)                         (None, None, None, 3 786432  mixed9[0][0]
1143
1144 conv2d_90 (Conv2D)                         (None, None, None, 3 1548288 activation_89[0][0]
```

File - model_summary

1144]

1145 -----

1146 batch_normalization_86 (BatchNo (None, None, None, 3 1152 conv2d_86[0])[0]
1147] -----

1148 batch_normalization_90 (BatchNo (None, None, None, 3 1152 conv2d_90[0])[0)
1149] -----

1150 activation_86 (Activation) (None, None, None, 3 0 batch_normalization_86[0)
1151] [0] -----

1152 activation_90 (Activation) (None, None, None, 3 0 batch_normalization_90[0)
1153] [0] -----

1154 conv2d_87 (Conv2D) (None, None, None, 3 442368 activation_86[0])[0)
1155] -----

1156 conv2d_88 (Conv2D) (None, None, None, 3 442368 activation_86[0])[0)
1157] -----

1158 conv2d_91 (Conv2D) (None, None, None, 3 442368 activation_90[0])[0)
1159] -----

1160 conv2d_92 (Conv2D) (None, None, None, 3 442368 activation_90[0])[0)

File - model_summary

1160]

1161 -----

1162 average_pooling2d_8 (AveragePool (None, None, None, 2 0
] mixed9[0][0]

1163 -----

1164 conv2d_85 (Conv2D
]
1165 -----

1166 -----

batch_normalization_87 (BatchNorm (None, None, None, 3 1152
]
1167 -----

1168 -----

batch_normalization_88 (BatchNorm (None, None, None, 3 1152
]
1169 -----

1170 -----

batch_normalization_91 (BatchNorm (None, None, None, 3 1152
]
1171 -----

1172 -----

batch_normalization_92 (BatchNorm (None, None, None, 3 1152
]
1173 -----

1174 -----

conv2d_93 (Conv2D
]
1175 -----

1176 -----

batch_normalization_85 (BatchNorm (None, None, None, 3 960
]
1177 -----

```
File - model_summary  
1176 ]  
1177 -----  
1178 activation_87 (Activation) (None, None, None, 3 0 batch_normalization_87[0]  
] [0]  
1179 -----  
1180 activation_88 (Activation) (None, None, None, 3 0 batch_normalization_88[0]  
] [0]  
1181 -----  
1182 activation_91 (Activation) (None, None, None, 3 0 batch_normalization_91[0]  
] [0]  
1183 -----  
1184 activation_92 (Activation) (None, None, None, 3 0 batch_normalization_92[0]  
] [0]  
1185 -----  
1186 batch_normalization_93 (BatchNo (None, None, None, 1 576 conv2d_93[0])[0]  
]  
1187 -----  
1188 activation_85 (Activation) (None, None, None, 3 0 batch_normalization_85[0]  
] [0]  
1189 -----  
1190 mixed9_1 (Concatenate) (None, None, None, 7 0 activation_87[0])[0]  
]  
1191 ] activation_88[0][0]  
1192 ]
```

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File - model_summary
1192   _____
1193   concatenate_1 (Concatenate)      (None, None, None, 7 0          activation_91[0][0]
1194   ]
1195   _____
1196   activation_93 (Activation)     (None, None, None, 1 0          batch_normalization_93[0
1197   ]
1198   mixed10 (Concatenate)        (None, None, None, 2 0          activation_85[0][0]
1199   ]
1200   ]
1201   ]
1202   _____
1203   avg_pool (GlobalAveragePooling2 (None, 2048)    0          mixed10[0][0
1204   ]
1205   predictions (Dense)         (None, 1000)       20490000      avg_pool[0][0
1206   =====
1207 Total params: 23,851,784
1208 Trainable params: 23,817,352
1209 Non-trainable params: 34,432
```

File - model_summary
1210

1211 None
1212 =====
1213
1214 Process finished with exit code 0
1215