9、Results

经过上一节中的并行化优化，Caffe在支持Arm64-v8a平台上的执行速度得到了明显提升。

9.1、以AlexNet为基准，在Arm64-v8a平台上的测试结果

测试平台如下：【Qualcomm 820板子参数】，网络定义选取BVLC提供的AlexNet ProtoTXT配置文件【来源请求】，进行50次迭代的结果对比如下：

未经优化，直接移植的版本给出的输出：

I0101 01:03:32.581118 3664 caffe-time.cpp:87] Average time per layer:

I0101 01:03:32.581224 3664 caffe-time.cpp:90] dataforward: 0.003 ms.

I0101 01:03:32.581422 3664 caffe-time.cpp:93] databackward: 0.00376 ms.

I0101 01:03:32.581624 3664 caffe-time.cpp:90] conv1forward: 195.837 ms.

I0101 01:03:32.581836 3664 caffe-time.cpp:93] conv1backward: 220.601 ms.

I0101 01:03:32.582048 3664 caffe-time.cpp:90] relu1forward: 28.7843 ms.

I0101 01:03:32.582232 3664 caffe-time.cpp:93] relu1backward: 0.0066 ms.

I0101 01:03:32.582423 3664 caffe-time.cpp:90] norm1forward: 63.7093 ms.

I0101 01:03:32.582628 3664 caffe-time.cpp:93] norm1backward: 67.7456 ms.

I0101 01:03:32.582820 3664 caffe-time.cpp:90] pool1forward: 97.4408 ms.

I0101 01:03:32.583016 3664 caffe-time.cpp:93] pool1backward: 0.00378 ms.

I0101 01:03:32.583408 3664 caffe-time.cpp:90] conv2forward: 453.548 ms.

I0101 01:03:32.583599 3664 caffe-time.cpp:93] conv2backward: 393.793 ms.

I0101 01:03:32.583780 3664 caffe-time.cpp:90] relu2forward: 18.3435 ms.

I0101 01:03:32.583960 3664 caffe-time.cpp:93] relu2backward: 0.00406 ms.

I0101 01:03:32.584139 3664 caffe-time.cpp:90] norm2forward: 43.9075 ms.

I0101 01:03:32.584319 3664 caffe-time.cpp:93] norm2backward: 46.2525 ms.

I0101 01:03:32.584511 3664 caffe-time.cpp:90] pool2forward: 61.3481 ms.

I0101 01:03:32.584700 3664 caffe-time.cpp:93] pool2backward: 0.0068 ms.

I0101 01:03:32.584884 3664 caffe-time.cpp:90] conv3forward: 298.601 ms.

I0101 01:03:32.585067 3664 caffe-time.cpp:93] conv3backward: 239.669 ms.

I0101 01:03:32.585241 3664 caffe-time.cpp:90] relu3forward: 6.39392 ms.

I0101 01:03:32.585420 3664 caffe-time.cpp:93] relu3backward: 0.00448 ms.

I0101 01:03:32.585599 3664 caffe-time.cpp:90] conv4forward: 207.621 ms.

I0101 01:03:32.585795 3664 caffe-time.cpp:93] conv4backward: 195.351 ms.

I0101 01:03:32.585981 3664 caffe-time.cpp:90] relu4forward: 6.55944 ms.

I0101 01:03:32.586166 3664 caffe-time.cpp:93] relu4backward: 0.0045 ms.

I0101 01:03:32.586346 3664 caffe-time.cpp:90] conv5forward: 148.897 ms.

I0101 01:03:32.586528 3664 caffe-time.cpp:93] conv5backward: 132.342 ms.

I0101 01:03:32.586711 3664 caffe-time.cpp:90] relu5forward: 4.34668 ms.

I0101 01:03:32.586902 3664 caffe-time.cpp:93] relu5backward: 0.00454 ms.

I0101 01:03:32.587254 3664 caffe-time.cpp:90] pool5forward: 15.0353 ms.

I0101 01:03:32.587550 3664 caffe-time.cpp:93] pool5backward: 0.00376 ms.

I0101 01:03:32.587822 3664 caffe-time.cpp:90] fc6forward: 212.164 ms.

I0101 01:03:32.588100 3664 caffe-time.cpp:93] fc6backward: 75.7722 ms.

I0101 01:03:32.588349 3664 caffe-time.cpp:90] relu6forward: 0.4495 ms.

I0101 01:03:32.588663 3664 caffe-time.cpp:93] relu6backward: 0.00458 ms.

I0101 01:03:32.588904 3664 caffe-time.cpp:90] drop6forward: 0.37002 ms.

I0101 01:03:32.589159 3664 caffe-time.cpp:93] drop6backward: 0.00528 ms.

I0101 01:03:32.589664 3664 caffe-time.cpp:90] fc7forward: 86.0431 ms.

I0101 01:03:32.590066 3664 caffe-time.cpp:93] fc7backward: 36.8438 ms.

I0101 01:03:32.590424 3664 caffe-time.cpp:90] relu7forward: 0.42416 ms.

I0101 01:03:32.590855 3664 caffe-time.cpp:93] relu7backward: 0.00258 ms.

I0101 01:03:32.591332 3664 caffe-time.cpp:90] drop7forward: 0.36584 ms.

I0101 01:03:32.591547 3664 caffe-time.cpp:93] drop7backward: 0.00308 ms.

I0101 01:03:32.591884 3664 caffe-time.cpp:90] fc8forward: 20.1566 ms.

I0101 01:03:32.592472 3664 caffe-time.cpp:93] fc8backward: 9.99 ms.

I0101 01:03:32.592727 3664 caffe-time.cpp:90] probforward: 0.47194 ms.

I0101 01:03:32.592988 3664 caffe-time.cpp:93] probbackward: 0.11646 ms.

I0101 01:03:32.593662 3664 caffe-time.cpp:98] Average Forward pass: 1971.22 ms.

I0101 01:03:32.593865 3664 caffe-time.cpp:100] Average Backward pass: 1418.77 ms.

I0101 01:03:32.594115 3664 caffe-time.cpp:102] Average Forward-Backward: 3390.52 ms.

I0101 01:03:32.594271 3664 caffe-time.cpp:104] Total Time: 169526 ms.

经过优化之后的输出如下：

I0101 01:10:40.450280 3686 caffe-time.cpp:87] Average time per layer:

I0101 01:10:40.450315 3686 caffe-time.cpp:90] dataforward: 0.00376 ms.

I0101 01:10:40.450361 3686 caffe-time.cpp:93] databackward: 0.00446 ms.

I0101 01:10:40.450405 3686 caffe-time.cpp:90] conv1forward: 158.396 ms.

I0101 01:10:40.450447 3686 caffe-time.cpp:93] conv1backward: 157.189 ms.

I0101 01:10:40.450488 3686 caffe-time.cpp:90] relu1forward: 14.4338 ms.

I0101 01:10:40.450694 3686 caffe-time.cpp:93] relu1backward: 0.00406 ms.

I0101 01:10:40.450765 3686 caffe-time.cpp:90] norm1forward: 61.1189 ms.

I0101 01:10:40.450791 3686 caffe-time.cpp:93] norm1backward: 69.6954 ms.

I0101 01:10:40.450812 3686 caffe-time.cpp:90] pool1forward: 104.729 ms.

I0101 01:10:40.450834 3686 caffe-time.cpp:93] pool1backward: 0.00524 ms.

I0101 01:10:40.450855 3686 caffe-time.cpp:90] conv2forward: 316.762 ms.

I0101 01:10:40.450878 3686 caffe-time.cpp:93] conv2backward: 306.659 ms.

I0101 01:10:40.450899 3686 caffe-time.cpp:90] relu2forward: 13.2367 ms.

I0101 01:10:40.450920 3686 caffe-time.cpp:93] relu2backward: 0.00414 ms.

I0101 01:10:40.450942 3686 caffe-time.cpp:90] norm2forward: 47.8888 ms.

I0101 01:10:40.450963 3686 caffe-time.cpp:93] norm2backward: 47.677 ms.

I0101 01:10:40.450985 3686 caffe-time.cpp:90] pool2forward: 64.9354 ms.

I0101 01:10:40.451006 3686 caffe-time.cpp:93] pool2backward: 0.00482 ms.

I0101 01:10:40.451028 3686 caffe-time.cpp:90] conv3forward: 209.004 ms.

I0101 01:10:40.451049 3686 caffe-time.cpp:93] conv3backward: 211.287 ms.

I0101 01:10:40.451070 3686 caffe-time.cpp:90] relu3forward: 3.98946 ms.

I0101 01:10:40.451089 3686 caffe-time.cpp:93] relu3backward: 0.00468 ms.

I0101 01:10:40.451109 3686 caffe-time.cpp:90] conv4forward: 156.937 ms.

I0101 01:10:40.451132 3686 caffe-time.cpp:93] conv4backward: 157.686 ms.

I0101 01:10:40.451151 3686 caffe-time.cpp:90] relu4forward: 3.49588 ms.

I0101 01:10:40.451172 3686 caffe-time.cpp:93] relu4backward: 0.00434 ms.

I0101 01:10:40.451191 3686 caffe-time.cpp:90] conv5forward: 107.479 ms.

I0101 01:10:40.451212 3686 caffe-time.cpp:93] conv5backward: 107.145 ms.

I0101 01:10:40.451232 3686 caffe-time.cpp:90] relu5forward: 2.47902 ms.

I0101 01:10:40.451253 3686 caffe-time.cpp:93] relu5backward: 0.00286 ms.

I0101 01:10:40.451272 3686 caffe-time.cpp:90] pool5forward: 14.9739 ms.

I0101 01:10:40.451293 3686 caffe-time.cpp:93] pool5backward: 0.00368 ms.

I0101 01:10:40.451313 3686 caffe-time.cpp:90] fc6forward: 203.838 ms.

I0101 01:10:40.451333 3686 caffe-time.cpp:93] fc6backward: 74.5167 ms.

I0101 01:10:40.451355 3686 caffe-time.cpp:90] relu6forward: 0.41766 ms.

I0101 01:10:40.451375 3686 caffe-time.cpp:93] relu6backward: 0.00292 ms.

I0101 01:10:40.451395 3686 caffe-time.cpp:90] drop6forward: 0.44218 ms.

I0101 01:10:40.451415 3686 caffe-time.cpp:93] drop6backward: 0.0051 ms.

I0101 01:10:40.451435 3686 caffe-time.cpp:90] fc7forward: 83.049 ms.

I0101 01:10:40.451457 3686 caffe-time.cpp:93] fc7backward: 34.9812 ms.

I0101 01:10:40.451476 3686 caffe-time.cpp:90] relu7forward: 0.26226 ms.

I0101 01:10:40.451497 3686 caffe-time.cpp:93] relu7backward: 0.00266 ms.

I0101 01:10:40.451517 3686 caffe-time.cpp:90] drop7forward: 0.47262 ms.

I0101 01:10:40.451538 3686 caffe-time.cpp:93] drop7backward: 0.00318 ms.

I0101 01:10:40.451557 3686 caffe-time.cpp:90] fc8forward: 21.9401 ms.

I0101 01:10:40.451578 3686 caffe-time.cpp:93] fc8backward: 10.1705 ms.

I0101 01:10:40.451598 3686 caffe-time.cpp:90] probforward: 0.45548 ms.

I0101 01:10:40.451619 3686 caffe-time.cpp:93] probbackward: 0.1202 ms.

I0101 01:10:40.451649 3686 caffe-time.cpp:98] Average Forward pass: 1591.12 ms.

I0101 01:10:40.451672 3686 caffe-time.cpp:100] Average Backward pass: 1177.4 ms.

I0101 01:10:40.451692 3686 caffe-time.cpp:102] Average Forward-Backward: 2768.74 ms.

I0101 01:10:40.451713 3686 caffe-time.cpp:104] Total Time: 138437 ms.

相比优化之前，总体的执行时间少18%。

9.2、以GoogleNet为基准，在Arm64-v8a平台上的测试结果

GoogleNet【来源请求】是2014年ImageNet ILSVRC图像识别大赛的冠军网络，由22层网络构成。其网络结构较AlexNet大很多，计算量也更贴近近些年来新提出的卷积神经网络模型计算量。使用GoogleNet网络对我们的优化效果做基准测试很有必要。

测试平台同9.1，网络定义选取BVLC提供的GoogleNet ProtoTXT配置文件【来源请求】，进行50次迭代的结果对比如下：

未经优化，直接移植的版本给出的输出：

I0101 01:36:44.598309 3781 caffe-time.cpp:87] Average time per layer:

I0101 01:36:44.598410 3781 caffe-time.cpp:90] dataforward: 0.00298 ms.

I0101 01:36:44.598694 3781 caffe-time.cpp:93] databackward: 0.0035 ms.

I0101 01:36:44.598891 3781 caffe-time.cpp:90] conv1/7x7\_s2forward: 231.938 ms.

I0101 01:36:44.599083 3781 caffe-time.cpp:93] conv1/7x7\_s2backward: 261.58 ms.

I0101 01:36:44.599266 3781 caffe-time.cpp:90] conv1/relu\_7x7forward: 77.9757 ms.

I0101 01:36:44.599454 3781 caffe-time.cpp:93] conv1/relu\_7x7backward: 0.0028 ms.

I0101 01:36:44.599647 3781 caffe-time.cpp:90] pool1/3x3\_s2forward: 283.231 ms.

I0101 01:36:44.599839 3781 caffe-time.cpp:93] pool1/3x3\_s2backward: 0.00394 ms.

I0101 01:36:44.600037 3781 caffe-time.cpp:90] pool1/norm1forward: 346.259 ms.

I0101 01:36:44.600226 3781 caffe-time.cpp:93] pool1/norm1backward: 357.125 ms.

I0101 01:36:44.600418 3781 caffe-time.cpp:90] conv2/3x3\_reduceforward: 51.2008 ms.

I0101 01:36:44.600622 3781 caffe-time.cpp:93] conv2/3x3\_reducebackward: 27.9857 ms.

I0101 01:36:44.600813 3781 caffe-time.cpp:90] conv2/relu\_3x3\_reduceforward: 19.5336 ms.

I0101 01:36:44.601012 3781 caffe-time.cpp:93] conv2/relu\_3x3\_reducebackward: 0.00618 ms.

I0101 01:36:44.601201 3781 caffe-time.cpp:90] conv2/3x3forward: 583.846 ms.

I0101 01:36:44.601394 3781 caffe-time.cpp:93] conv2/3x3backward: 579.652 ms.

I0101 01:36:44.601590 3781 caffe-time.cpp:90] conv2/relu\_3x3forward: 59.099 ms.

I0101 01:36:44.601770 3781 caffe-time.cpp:93] conv2/relu\_3x3backward: 0.00458 ms.

I0101 01:36:44.601959 3781 caffe-time.cpp:90] conv2/norm2forward: 1032.06 ms.

I0101 01:36:44.602139 3781 caffe-time.cpp:93] conv2/norm2backward: 1065.3 ms.

I0101 01:36:44.602336 3781 caffe-time.cpp:90] pool2/3x3\_s2forward: 222.877 ms.

I0101 01:36:44.602534 3781 caffe-time.cpp:93] pool2/3x3\_s2backward: 0.00338 ms.

I0101 01:36:44.602727 3781 caffe-time.cpp:90] pool2/3x3\_s2\_pool2/3x3\_s2\_0\_splitforward: 0.01656 ms.

I0101 01:36:44.602912 3781 caffe-time.cpp:93] pool2/3x3\_s2\_pool2/3x3\_s2\_0\_splitbackward: 0.00432 ms.

I0101 01:36:44.603094 3781 caffe-time.cpp:90] inception\_3a/1x1forward: 43.0498 ms.

I0101 01:36:44.603282 3781 caffe-time.cpp:93] inception\_3a/1x1backward: 18.0928 ms.

I0101 01:36:44.603465 3781 caffe-time.cpp:90] inception\_3a/relu\_1x1forward: 4.93852 ms.

I0101 01:36:44.603663 3781 caffe-time.cpp:93] inception\_3a/relu\_1x1backward: 0.00398 ms.

I0101 01:36:44.603855 3781 caffe-time.cpp:90] inception\_3a/3x3\_reduceforward: 32.537 ms.

I0101 01:36:44.604045 3781 caffe-time.cpp:93] inception\_3a/3x3\_reducebackward: 26.6857 ms.

I0101 01:36:44.604236 3781 caffe-time.cpp:90] inception\_3a/relu\_3x3\_reduceforward: 7.34276 ms.

I0101 01:36:44.604416 3781 caffe-time.cpp:93] inception\_3a/relu\_3x3\_reducebackward: 0.00402 ms.

I0101 01:36:44.604606 3781 caffe-time.cpp:90] inception\_3a/3x3forward: 165.901 ms.

I0101 01:36:44.604787 3781 caffe-time.cpp:93] inception\_3a/3x3backward: 158.891 ms.

I0101 01:36:44.604964 3781 caffe-time.cpp:90] inception\_3a/relu\_3x3forward: 9.78604 ms.

I0101 01:36:44.605139 3781 caffe-time.cpp:93] inception\_3a/relu\_3x3backward: 0.00346 ms.

I0101 01:36:44.605317 3781 caffe-time.cpp:90] inception\_3a/5x5\_reduceforward: 10.896 ms.

I0101 01:36:44.605486 3781 caffe-time.cpp:93] inception\_3a/5x5\_reducebackward: 8.62622 ms.

I0101 01:36:44.605654 3781 caffe-time.cpp:90] inception\_3a/relu\_5x5\_reduceforward: 1.26556 ms.

I0101 01:36:44.605827 3781 caffe-time.cpp:93] inception\_3a/relu\_5x5\_reducebackward: 0.00404 ms.

I0101 01:36:44.606015 3781 caffe-time.cpp:90] inception\_3a/5x5forward: 29.5532 ms.

I0101 01:36:44.606201 3781 caffe-time.cpp:93] inception\_3a/5x5backward: 28.7916 ms.

I0101 01:36:44.606380 3781 caffe-time.cpp:90] inception\_3a/relu\_5x5forward: 2.42484 ms.

I0101 01:36:44.606560 3781 caffe-time.cpp:93] inception\_3a/relu\_5x5backward: 0.00308 ms.

I0101 01:36:44.606734 3781 caffe-time.cpp:90] inception\_3a/poolforward: 209.624 ms.

I0101 01:36:44.606911 3781 caffe-time.cpp:93] inception\_3a/poolbackward: 0.00404 ms.

I0101 01:36:44.607109 3781 caffe-time.cpp:90] inception\_3a/pool\_projforward: 31.8385 ms.

I0101 01:36:44.607288 3781 caffe-time.cpp:93] inception\_3a/pool\_projbackward: 9.63482 ms.

I0101 01:36:44.607465 3781 caffe-time.cpp:90] inception\_3a/relu\_pool\_projforward: 2.4689 ms.

I0101 01:36:44.607645 3781 caffe-time.cpp:93] inception\_3a/relu\_pool\_projbackward: 0.00314 ms.

I0101 01:36:44.607820 3781 caffe-time.cpp:90] inception\_3a/outputforward: 2.12094 ms.

I0101 01:36:44.607997 3781 caffe-time.cpp:93] inception\_3a/outputbackward: 0.26494 ms.

I0101 01:36:44.608183 3781 caffe-time.cpp:90] inception\_3a/output\_inception\_3a/output\_0\_splitforward: 0.00768 ms.

I0101 01:36:44.608366 3781 caffe-time.cpp:93] inception\_3a/output\_inception\_3a/output\_0\_splitbackward: 0.004 ms.

I0101 01:36:44.608670 3781 caffe-time.cpp:90] inception\_3b/1x1forward: 50.4854 ms.

I0101 01:36:44.608855 3781 caffe-time.cpp:93] inception\_3b/1x1backward: 42.9072 ms.

I0101 01:36:44.609038 3781 caffe-time.cpp:90] inception\_3b/relu\_1x1forward: 9.81174 ms.

I0101 01:36:44.609218 3781 caffe-time.cpp:93] inception\_3b/relu\_1x1backward: 0.00412 ms.

I0101 01:36:44.609391 3781 caffe-time.cpp:90] inception\_3b/3x3\_reduceforward: 49.4165 ms.

I0101 01:36:44.609564 3781 caffe-time.cpp:93] inception\_3b/3x3\_reducebackward: 46.6099 ms.

I0101 01:36:44.609738 3781 caffe-time.cpp:90] inception\_3b/relu\_3x3\_reduceforward: 9.85328 ms.

I0101 01:36:44.609919 3781 caffe-time.cpp:93] inception\_3b/relu\_3x3\_reducebackward: 0.0058 ms.

I0101 01:36:44.610102 3781 caffe-time.cpp:90] inception\_3b/3x3forward: 310.235 ms.

I0101 01:36:44.610278 3781 caffe-time.cpp:93] inception\_3b/3x3backward: 288.14 ms.

I0101 01:36:44.610455 3781 caffe-time.cpp:90] inception\_3b/relu\_3x3forward: 14.8827 ms.

I0101 01:36:44.610630 3781 caffe-time.cpp:93] inception\_3b/relu\_3x3backward: 0.00392 ms.

I0101 01:36:44.610807 3781 caffe-time.cpp:90] inception\_3b/5x5\_reduceforward: 14.7158 ms.

I0101 01:36:44.610987 3781 caffe-time.cpp:93] inception\_3b/5x5\_reducebackward: 13.0879 ms.

I0101 01:36:44.611167 3781 caffe-time.cpp:90] inception\_3b/relu\_5x5\_reduceforward: 2.47642 ms.

I0101 01:36:44.611342 3781 caffe-time.cpp:93] inception\_3b/relu\_5x5\_reducebackward: 0.00414 ms.

I0101 01:36:44.611516 3781 caffe-time.cpp:90] inception\_3b/5x5forward: 119.249 ms.

I0101 01:36:44.611699 3781 caffe-time.cpp:93] inception\_3b/5x5backward: 118.854 ms.

I0101 01:36:44.611882 3781 caffe-time.cpp:90] inception\_3b/relu\_5x5forward: 7.44412 ms.

I0101 01:36:44.612065 3781 caffe-time.cpp:93] inception\_3b/relu\_5x5backward: 0.00376 ms.

I0101 01:36:44.612242 3781 caffe-time.cpp:90] inception\_3b/poolforward: 293.74 ms.

I0101 01:36:44.612416 3781 caffe-time.cpp:93] inception\_3b/poolbackward: 0.00452 ms.

I0101 01:36:44.612595 3781 caffe-time.cpp:90] inception\_3b/pool\_projforward: 48.5264 ms.

I0101 01:36:44.612768 3781 caffe-time.cpp:93] inception\_3b/pool\_projbackward: 26.4882 ms.

I0101 01:36:44.612951 3781 caffe-time.cpp:90] inception\_3b/relu\_pool\_projforward: 4.95418 ms.

I0101 01:36:44.613126 3781 caffe-time.cpp:93] inception\_3b/relu\_pool\_projbackward: 0.0035 ms.

I0101 01:36:44.613297 3781 caffe-time.cpp:90] inception\_3b/outputforward: 3.1457 ms.

I0101 01:36:44.613475 3781 caffe-time.cpp:93] inception\_3b/outputbackward: 0.48596 ms.

I0101 01:36:44.613653 3781 caffe-time.cpp:90] pool3/3x3\_s2forward: 131.03 ms.

I0101 01:36:44.613832 3781 caffe-time.cpp:93] pool3/3x3\_s2backward: 0.00378 ms.

I0101 01:36:44.614009 3781 caffe-time.cpp:90] pool3/3x3\_s2\_pool3/3x3\_s2\_0\_splitforward: 0.01508 ms.

I0101 01:36:44.614185 3781 caffe-time.cpp:93] pool3/3x3\_s2\_pool3/3x3\_s2\_0\_splitbackward: 0.0049 ms.

I0101 01:36:44.614359 3781 caffe-time.cpp:90] inception\_4a/1x1forward: 61.0385 ms.

I0101 01:36:44.614536 3781 caffe-time.cpp:93] inception\_4a/1x1backward: 32.6978 ms.

I0101 01:36:44.614708 3781 caffe-time.cpp:90] inception\_4a/relu\_1x1forward: 3.733 ms.

I0101 01:36:44.614885 3781 caffe-time.cpp:93] inception\_4a/relu\_1x1backward: 0.00524 ms.

I0101 01:36:44.615063 3781 caffe-time.cpp:90] inception\_4a/3x3\_reduceforward: 17.7674 ms.

I0101 01:36:44.615243 3781 caffe-time.cpp:93] inception\_4a/3x3\_reducebackward: 17.6121 ms.

I0101 01:36:44.615412 3781 caffe-time.cpp:90] inception\_4a/relu\_3x3\_reduceforward: 1.8539 ms.

I0101 01:36:44.615589 3781 caffe-time.cpp:93] inception\_4a/relu\_3x3\_reducebackward: 0.005 ms.

I0101 01:36:44.615764 3781 caffe-time.cpp:90] inception\_4a/3x3forward: 71.8636 ms.

I0101 01:36:44.615942 3781 caffe-time.cpp:93] inception\_4a/3x3backward: 69.6089 ms.

I0101 01:36:44.616119 3781 caffe-time.cpp:90] inception\_4a/relu\_3x3forward: 3.97332 ms.

I0101 01:36:44.616304 3781 caffe-time.cpp:93] inception\_4a/relu\_3x3backward: 0.00478 ms.

I0101 01:36:44.616485 3781 caffe-time.cpp:90] inception\_4a/5x5\_reduceforward: 5.61592 ms.

I0101 01:36:44.616659 3781 caffe-time.cpp:93] inception\_4a/5x5\_reducebackward: 6.11964 ms.

I0101 01:36:44.616836 3781 caffe-time.cpp:90] inception\_4a/relu\_5x5\_reduceforward: 0.31206 ms.

I0101 01:36:44.617016 3781 caffe-time.cpp:93] inception\_4a/relu\_5x5\_reducebackward: 0.00446 ms.

I0101 01:36:44.617199 3781 caffe-time.cpp:90] inception\_4a/5x5forward: 11.8784 ms.

I0101 01:36:44.617378 3781 caffe-time.cpp:93] inception\_4a/5x5backward: 11.6514 ms.

I0101 01:36:44.617558 3781 caffe-time.cpp:90] inception\_4a/relu\_5x5forward: 0.96064 ms.

I0101 01:36:44.617736 3781 caffe-time.cpp:93] inception\_4a/relu\_5x5backward: 0.00468 ms.

I0101 01:36:44.617913 3781 caffe-time.cpp:90] inception\_4a/poolforward: 138.221 ms.

I0101 01:36:44.618097 3781 caffe-time.cpp:93] inception\_4a/poolbackward: 0.00488 ms.

I0101 01:36:44.618273 3781 caffe-time.cpp:90] inception\_4a/pool\_projforward: 29.7331 ms.

I0101 01:36:44.618529 3781 caffe-time.cpp:93] inception\_4a/pool\_projbackward: 12.4278 ms.

I0101 01:36:44.618723 3781 caffe-time.cpp:90] inception\_4a/relu\_pool\_projforward: 1.34412 ms.

I0101 01:36:44.618904 3781 caffe-time.cpp:93] inception\_4a/relu\_pool\_projbackward: 0.00344 ms.

I0101 01:36:44.619093 3781 caffe-time.cpp:90] inception\_4a/outputforward: 1.19038 ms.

I0101 01:36:44.619275 3781 caffe-time.cpp:93] inception\_4a/outputbackward: 0.14432 ms.

I0101 01:36:44.619452 3781 caffe-time.cpp:90] inception\_4a/output\_inception\_4a/output\_0\_splitforward: 0.00922 ms.

I0101 01:36:44.619630 3781 caffe-time.cpp:93] inception\_4a/output\_inception\_4a/output\_0\_splitbackward: 0.00536 ms.

I0101 01:36:44.619804 3781 caffe-time.cpp:90] inception\_4b/1x1forward: 32.4105 ms.

I0101 01:36:44.619982 3781 caffe-time.cpp:93] inception\_4b/1x1backward: 27.5305 ms.

I0101 01:36:44.620155 3781 caffe-time.cpp:90] inception\_4b/relu\_1x1forward: 3.1028 ms.

I0101 01:36:44.620334 3781 caffe-time.cpp:93] inception\_4b/relu\_1x1backward: 0.00478 ms.

I0101 01:36:44.620511 3781 caffe-time.cpp:90] inception\_4b/3x3\_reduceforward: 23.6251 ms.

I0101 01:36:44.620686 3781 caffe-time.cpp:93] inception\_4b/3x3\_reducebackward: 22.6902 ms.

I0101 01:36:44.620866 3781 caffe-time.cpp:90] inception\_4b/relu\_3x3\_reduceforward: 2.22964 ms.

I0101 01:36:44.621043 3781 caffe-time.cpp:93] inception\_4b/relu\_3x3\_reducebackward: 0.00614 ms.

I0101 01:36:44.621223 3781 caffe-time.cpp:90] inception\_4b/3x3forward: 95.7303 ms.

I0101 01:36:44.621399 3781 caffe-time.cpp:93] inception\_4b/3x3backward: 80.4077 ms.

I0101 01:36:44.621577 3781 caffe-time.cpp:90] inception\_4b/relu\_3x3forward: 4.3012 ms.

I0101 01:36:44.621756 3781 caffe-time.cpp:93] inception\_4b/relu\_3x3backward: 0.00472 ms.

I0101 01:36:44.621932 3781 caffe-time.cpp:90] inception\_4b/5x5\_reduceforward: 8.48322 ms.

I0101 01:36:44.622107 3781 caffe-time.cpp:93] inception\_4b/5x5\_reducebackward: 9.87408 ms.

I0101 01:36:44.622285 3781 caffe-time.cpp:90] inception\_4b/relu\_5x5\_reduceforward: 0.51372 ms.

I0101 01:36:44.622464 3781 caffe-time.cpp:93] inception\_4b/relu\_5x5\_reducebackward: 0.00484 ms.

I0101 01:36:44.622644 3781 caffe-time.cpp:90] inception\_4b/5x5forward: 18.2441 ms.

I0101 01:36:44.622820 3781 caffe-time.cpp:93] inception\_4b/5x5backward: 18.9901 ms.

I0101 01:36:44.622996 3781 caffe-time.cpp:90] inception\_4b/relu\_5x5forward: 1.25866 ms.

I0101 01:36:44.623173 3781 caffe-time.cpp:93] inception\_4b/relu\_5x5backward: 0.0039 ms.

I0101 01:36:44.623351 3781 caffe-time.cpp:90] inception\_4b/poolforward: 146.885 ms.

I0101 01:36:44.623531 3781 caffe-time.cpp:93] inception\_4b/poolbackward: 0.00476 ms.

I0101 01:36:44.623708 3781 caffe-time.cpp:90] inception\_4b/pool\_projforward: 31.6042 ms.

I0101 01:36:44.623881 3781 caffe-time.cpp:93] inception\_4b/pool\_projbackward: 13.4599 ms.

I0101 01:36:44.624063 3781 caffe-time.cpp:90] inception\_4b/relu\_pool\_projforward: 1.3047 ms.

I0101 01:36:44.624240 3781 caffe-time.cpp:93] inception\_4b/relu\_pool\_projbackward: 0.00364 ms.

I0101 01:36:44.624416 3781 caffe-time.cpp:90] inception\_4b/outputforward: 1.21444 ms.

I0101 01:36:44.624601 3781 caffe-time.cpp:93] inception\_4b/outputbackward: 0.15394 ms.

I0101 01:36:44.624777 3781 caffe-time.cpp:90] inception\_4b/output\_inception\_4b/output\_0\_splitforward: 0.00918 ms.

I0101 01:36:44.624960 3781 caffe-time.cpp:93] inception\_4b/output\_inception\_4b/output\_0\_splitbackward: 0.00698 ms.

I0101 01:36:44.625138 3781 caffe-time.cpp:90] inception\_4c/1x1forward: 27.1867 ms.

I0101 01:36:44.625316 3781 caffe-time.cpp:93] inception\_4c/1x1backward: 23.2517 ms.

I0101 01:36:44.625500 3781 caffe-time.cpp:90] inception\_4c/relu\_1x1forward: 2.50564 ms.

I0101 01:36:44.625674 3781 caffe-time.cpp:93] inception\_4c/relu\_1x1backward: 0.00498 ms.

I0101 01:36:44.625856 3781 caffe-time.cpp:90] inception\_4c/3x3\_reduceforward: 23.615 ms.

I0101 01:36:44.626032 3781 caffe-time.cpp:93] inception\_4c/3x3\_reducebackward: 25.234 ms.

I0101 01:36:44.626210 3781 caffe-time.cpp:90] inception\_4c/relu\_3x3\_reduceforward: 2.51834 ms.

I0101 01:36:44.626392 3781 caffe-time.cpp:93] inception\_4c/relu\_3x3\_reducebackward: 0.0056 ms.

I0101 01:36:44.626566 3781 caffe-time.cpp:90] inception\_4c/3x3forward: 105.825 ms.

I0101 01:36:44.626744 3781 caffe-time.cpp:93] inception\_4c/3x3backward: 97.1476 ms.

I0101 01:36:44.626921 3781 caffe-time.cpp:90] inception\_4c/relu\_3x3forward: 4.98794 ms.

I0101 01:36:44.627104 3781 caffe-time.cpp:93] inception\_4c/relu\_3x3backward: 0.00428 ms.

I0101 01:36:44.627273 3781 caffe-time.cpp:90] inception\_4c/5x5\_reduceforward: 8.7226 ms.

I0101 01:36:44.627439 3781 caffe-time.cpp:93] inception\_4c/5x5\_reducebackward: 9.88036 ms.

I0101 01:36:44.627606 3781 caffe-time.cpp:90] inception\_4c/relu\_5x5\_reduceforward: 0.50744 ms.

I0101 01:36:44.627771 3781 caffe-time.cpp:93] inception\_4c/relu\_5x5\_reducebackward: 0.00772 ms.

I0101 01:36:44.627947 3781 caffe-time.cpp:90] inception\_4c/5x5forward: 17.23 ms.

I0101 01:36:44.628126 3781 caffe-time.cpp:93] inception\_4c/5x5backward: 18.3403 ms.

I0101 01:36:44.628299 3781 caffe-time.cpp:90] inception\_4c/relu\_5x5forward: 1.25242 ms.

I0101 01:36:44.628643 3781 caffe-time.cpp:93] inception\_4c/relu\_5x5backward: 0.00342 ms.

I0101 01:36:44.628853 3781 caffe-time.cpp:90] inception\_4c/poolforward: 136.773 ms.

I0101 01:36:44.629033 3781 caffe-time.cpp:93] inception\_4c/poolbackward: 0.0047 ms.

I0101 01:36:44.629210 3781 caffe-time.cpp:90] inception\_4c/pool\_projforward: 35.1527 ms.

I0101 01:36:44.629385 3781 caffe-time.cpp:93] inception\_4c/pool\_projbackward: 13.972 ms.

I0101 01:36:44.629565 3781 caffe-time.cpp:90] inception\_4c/relu\_pool\_projforward: 1.29002 ms.

I0101 01:36:44.629739 3781 caffe-time.cpp:93] inception\_4c/relu\_pool\_projbackward: 0.00354 ms.

I0101 01:36:44.629931 3781 caffe-time.cpp:90] inception\_4c/outputforward: 1.22916 ms.

I0101 01:36:44.630146 3781 caffe-time.cpp:93] inception\_4c/outputbackward: 0.14802 ms.

I0101 01:36:44.630377 3781 caffe-time.cpp:90] inception\_4c/output\_inception\_4c/output\_0\_splitforward: 0.00898 ms.

I0101 01:36:44.630554 3781 caffe-time.cpp:93] inception\_4c/output\_inception\_4c/output\_0\_splitbackward: 0.00522 ms.

I0101 01:36:44.630734 3781 caffe-time.cpp:90] inception\_4d/1x1forward: 26.9608 ms.

I0101 01:36:44.630916 3781 caffe-time.cpp:93] inception\_4d/1x1backward: 22.5975 ms.

I0101 01:36:44.631099 3781 caffe-time.cpp:90] inception\_4d/relu\_1x1forward: 2.19602 ms.

I0101 01:36:44.631272 3781 caffe-time.cpp:93] inception\_4d/relu\_1x1backward: 0.00522 ms.

I0101 01:36:44.631462 3781 caffe-time.cpp:90] inception\_4d/3x3\_reduceforward: 28.5034 ms.

I0101 01:36:44.631644 3781 caffe-time.cpp:93] inception\_4d/3x3\_reducebackward: 29.8084 ms.

I0101 01:36:44.631822 3781 caffe-time.cpp:90] inception\_4d/relu\_3x3\_reduceforward: 2.8147 ms.

I0101 01:36:44.631997 3781 caffe-time.cpp:93] inception\_4d/relu\_3x3\_reducebackward: 0.00588 ms.

I0101 01:36:44.632173 3781 caffe-time.cpp:90] inception\_4d/3x3forward: 136.686 ms.

I0101 01:36:44.632346 3781 caffe-time.cpp:93] inception\_4d/3x3backward: 122.691 ms.

I0101 01:36:44.632523 3781 caffe-time.cpp:90] inception\_4d/relu\_3x3forward: 5.67616 ms.

I0101 01:36:44.632713 3781 caffe-time.cpp:93] inception\_4d/relu\_3x3backward: 0.00618 ms.

I0101 01:36:44.632897 3781 caffe-time.cpp:90] inception\_4d/5x5\_reduceforward: 7.98144 ms.

I0101 01:36:44.633076 3781 caffe-time.cpp:93] inception\_4d/5x5\_reducebackward: 7.46146 ms.

I0101 01:36:44.633254 3781 caffe-time.cpp:90] inception\_4d/relu\_5x5\_reduceforward: 0.64854 ms.

I0101 01:36:44.633429 3781 caffe-time.cpp:93] inception\_4d/relu\_5x5\_reducebackward: 0.00676 ms.

I0101 01:36:44.633604 3781 caffe-time.cpp:90] inception\_4d/5x5forward: 23.9219 ms.

I0101 01:36:44.633780 3781 caffe-time.cpp:93] inception\_4d/5x5backward: 24.8841 ms.

I0101 01:36:44.633965 3781 caffe-time.cpp:90] inception\_4d/relu\_5x5forward: 1.25474 ms.

I0101 01:36:44.634145 3781 caffe-time.cpp:93] inception\_4d/relu\_5x5backward: 0.00362 ms.

I0101 01:36:44.634326 3781 caffe-time.cpp:90] inception\_4d/poolforward: 136.508 ms.

I0101 01:36:44.634498 3781 caffe-time.cpp:93] inception\_4d/poolbackward: 0.00466 ms.

I0101 01:36:44.634677 3781 caffe-time.cpp:90] inception\_4d/pool\_projforward: 34.2753 ms.

I0101 01:36:44.634852 3781 caffe-time.cpp:93] inception\_4d/pool\_projbackward: 11.8501 ms.

I0101 01:36:44.635037 3781 caffe-time.cpp:90] inception\_4d/relu\_pool\_projforward: 1.33828 ms.

I0101 01:36:44.635215 3781 caffe-time.cpp:93] inception\_4d/relu\_pool\_projbackward: 0.00344 ms.

I0101 01:36:44.635387 3781 caffe-time.cpp:90] inception\_4d/outputforward: 1.22956 ms.

I0101 01:36:44.635562 3781 caffe-time.cpp:93] inception\_4d/outputbackward: 0.15034 ms.

I0101 01:36:44.635737 3781 caffe-time.cpp:90] inception\_4d/output\_inception\_4d/output\_0\_splitforward: 0.00984 ms.

I0101 01:36:44.635913 3781 caffe-time.cpp:93] inception\_4d/output\_inception\_4d/output\_0\_splitbackward: 0.0051 ms.

I0101 01:36:44.636097 3781 caffe-time.cpp:90] inception\_4e/1x1forward: 50.3741 ms.

I0101 01:36:44.636278 3781 caffe-time.cpp:93] inception\_4e/1x1backward: 42.8356 ms.

I0101 01:36:44.636453 3781 caffe-time.cpp:90] inception\_4e/relu\_1x1forward: 4.98538 ms.

I0101 01:36:44.636637 3781 caffe-time.cpp:93] inception\_4e/relu\_1x1backward: 0.00502 ms.

I0101 01:36:44.636816 3781 caffe-time.cpp:90] inception\_4e/3x3\_reduceforward: 29.2108 ms.

I0101 01:36:44.636990 3781 caffe-time.cpp:93] inception\_4e/3x3\_reducebackward: 28.8106 ms.

I0101 01:36:44.637177 3781 caffe-time.cpp:90] inception\_4e/relu\_3x3\_reduceforward: 3.11458 ms.

I0101 01:36:44.637361 3781 caffe-time.cpp:93] inception\_4e/relu\_3x3\_reducebackward: 0.00498 ms.

I0101 01:36:44.637539 3781 caffe-time.cpp:90] inception\_4e/3x3forward: 164.441 ms.

I0101 01:36:44.637716 3781 caffe-time.cpp:93] inception\_4e/3x3backward: 146.626 ms.

I0101 01:36:44.637893 3781 caffe-time.cpp:90] inception\_4e/relu\_3x3forward: 6.41196 ms.

I0101 01:36:44.638068 3781 caffe-time.cpp:93] inception\_4e/relu\_3x3backward: 0.00454 ms.

I0101 01:36:44.638240 3781 caffe-time.cpp:90] inception\_4e/5x5\_reduceforward: 8.2356 ms.

I0101 01:36:44.638508 3781 caffe-time.cpp:93] inception\_4e/5x5\_reducebackward: 6.62606 ms.

I0101 01:36:44.638694 3781 caffe-time.cpp:90] inception\_4e/relu\_5x5\_reduceforward: 0.62636 ms.

I0101 01:36:44.638969 3781 caffe-time.cpp:93] inception\_4e/relu\_5x5\_reducebackward: 0.0204 ms.

I0101 01:36:44.639207 3781 caffe-time.cpp:90] inception\_4e/5x5forward: 49.5042 ms.

I0101 01:36:44.639416 3781 caffe-time.cpp:93] inception\_4e/5x5backward: 38.1907 ms.

I0101 01:36:44.639620 3781 caffe-time.cpp:90] inception\_4e/relu\_5x5forward: 2.55234 ms.

I0101 01:36:44.639835 3781 caffe-time.cpp:93] inception\_4e/relu\_5x5backward: 0.00338 ms.

I0101 01:36:44.640043 3781 caffe-time.cpp:90] inception\_4e/poolforward: 140.947 ms.

I0101 01:36:44.640236 3781 caffe-time.cpp:93] inception\_4e/poolbackward: 0.00432 ms.

I0101 01:36:44.640449 3781 caffe-time.cpp:90] inception\_4e/pool\_projforward: 50.4424 ms.

I0101 01:36:44.640645 3781 caffe-time.cpp:93] inception\_4e/pool\_projbackward: 22.2494 ms.

I0101 01:36:44.640843 3781 caffe-time.cpp:90] inception\_4e/relu\_pool\_projforward: 2.4287 ms.

I0101 01:36:44.641026 3781 caffe-time.cpp:93] inception\_4e/relu\_pool\_projbackward: 0.00338 ms.

I0101 01:36:44.641215 3781 caffe-time.cpp:90] inception\_4e/outputforward: 1.84836 ms.

I0101 01:36:44.641397 3781 caffe-time.cpp:93] inception\_4e/outputbackward: 0.21544 ms.

I0101 01:36:44.641584 3781 caffe-time.cpp:90] pool4/3x3\_s2forward: 61.0631 ms.

I0101 01:36:44.641779 3781 caffe-time.cpp:93] pool4/3x3\_s2backward: 0.00514 ms.

I0101 01:36:44.641964 3781 caffe-time.cpp:90] pool4/3x3\_s2\_pool4/3x3\_s2\_0\_splitforward: 0.00986 ms.

I0101 01:36:44.642149 3781 caffe-time.cpp:93] pool4/3x3\_s2\_pool4/3x3\_s2\_0\_splitbackward: 0.00472 ms.

I0101 01:36:44.642338 3781 caffe-time.cpp:90] inception\_5a/1x1forward: 39.8412 ms.

I0101 01:36:44.642522 3781 caffe-time.cpp:93] inception\_5a/1x1backward: 18.5988 ms.

I0101 01:36:44.642702 3781 caffe-time.cpp:90] inception\_5a/relu\_1x1forward: 1.24206 ms.

I0101 01:36:44.642896 3781 caffe-time.cpp:93] inception\_5a/relu\_1x1backward: 0.00436 ms.

I0101 01:36:44.643089 3781 caffe-time.cpp:90] inception\_5a/3x3\_reduceforward: 15.08 ms.

I0101 01:36:44.643297 3781 caffe-time.cpp:93] inception\_5a/3x3\_reducebackward: 12.2697 ms.

I0101 01:36:44.643490 3781 caffe-time.cpp:90] inception\_5a/relu\_3x3\_reduceforward: 0.81268 ms.

I0101 01:36:44.643672 3781 caffe-time.cpp:93] inception\_5a/relu\_3x3\_reducebackward: 0.0044 ms.

I0101 01:36:44.643854 3781 caffe-time.cpp:90] inception\_5a/3x3forward: 49.8886 ms.

I0101 01:36:44.644032 3781 caffe-time.cpp:93] inception\_5a/3x3backward: 43.9685 ms.

I0101 01:36:44.644212 3781 caffe-time.cpp:90] inception\_5a/relu\_3x3forward: 1.54302 ms.

I0101 01:36:44.644394 3781 caffe-time.cpp:93] inception\_5a/relu\_3x3backward: 0.004 ms.

I0101 01:36:44.644575 3781 caffe-time.cpp:90] inception\_5a/5x5\_reduceforward: 3.24386 ms.

I0101 01:36:44.644776 3781 caffe-time.cpp:93] inception\_5a/5x5\_reducebackward: 3.404 ms.

I0101 01:36:44.644965 3781 caffe-time.cpp:90] inception\_5a/relu\_5x5\_reduceforward: 0.17272 ms.

I0101 01:36:44.645155 3781 caffe-time.cpp:93] inception\_5a/relu\_5x5\_reducebackward: 0.00384 ms.

I0101 01:36:44.645337 3781 caffe-time.cpp:90] inception\_5a/5x5forward: 12.5702 ms.

I0101 01:36:44.645523 3781 caffe-time.cpp:93] inception\_5a/5x5backward: 11.0707 ms.

I0101 01:36:44.645700 3781 caffe-time.cpp:90] inception\_5a/relu\_5x5forward: 0.61656 ms.

I0101 01:36:44.645877 3781 caffe-time.cpp:93] inception\_5a/relu\_5x5backward: 0.0032 ms.

I0101 01:36:44.646074 3781 caffe-time.cpp:90] inception\_5a/poolforward: 57.8933 ms.

I0101 01:36:44.646270 3781 caffe-time.cpp:93] inception\_5a/poolbackward: 0.00406 ms.

I0101 01:36:44.646455 3781 caffe-time.cpp:90] inception\_5a/pool\_projforward: 14.7478 ms.

I0101 01:36:44.646638 3781 caffe-time.cpp:93] inception\_5a/pool\_projbackward: 8.98876 ms.

I0101 01:36:44.646827 3781 caffe-time.cpp:90] inception\_5a/relu\_pool\_projforward: 0.6495 ms.

I0101 01:36:44.647007 3781 caffe-time.cpp:93] inception\_5a/relu\_pool\_projbackward: 0.00312 ms.

I0101 01:36:44.647187 3781 caffe-time.cpp:90] inception\_5a/outputforward: 0.51896 ms.

I0101 01:36:44.647384 3781 caffe-time.cpp:93] inception\_5a/outputbackward: 0.05874 ms.

I0101 01:36:44.647581 3781 caffe-time.cpp:90] inception\_5a/output\_inception\_5a/output\_0\_splitforward: 0.00942 ms.

I0101 01:36:44.647766 3781 caffe-time.cpp:93] inception\_5a/output\_inception\_5a/output\_0\_splitbackward: 0.0042 ms.

I0101 01:36:44.647949 3781 caffe-time.cpp:90] inception\_5b/1x1forward: 33.1265 ms.

I0101 01:36:44.648129 3781 caffe-time.cpp:93] inception\_5b/1x1backward: 25.376 ms.

I0101 01:36:44.648307 3781 caffe-time.cpp:90] inception\_5b/relu\_1x1forward: 1.8646 ms.

I0101 01:36:44.648610 3781 caffe-time.cpp:93] inception\_5b/relu\_1x1backward: 0.0104 ms.

I0101 01:36:44.648857 3781 caffe-time.cpp:90] inception\_5b/3x3\_reduceforward: 14.5933 ms.

I0101 01:36:44.649054 3781 caffe-time.cpp:93] inception\_5b/3x3\_reducebackward: 13.6233 ms.

I0101 01:36:44.649719 3781 caffe-time.cpp:90] inception\_5b/relu\_3x3\_reduceforward: 0.96102 ms.

I0101 01:36:44.650297 3781 caffe-time.cpp:93] inception\_5b/relu\_3x3\_reducebackward: 0.00404 ms.

I0101 01:36:44.650851 3781 caffe-time.cpp:90] inception\_5b/3x3forward: 70.1438 ms.

I0101 01:36:44.651124 3781 caffe-time.cpp:93] inception\_5b/3x3backward: 60 ms.

I0101 01:36:44.651700 3781 caffe-time.cpp:90] inception\_5b/relu\_3x3forward: 1.88846 ms.

I0101 01:36:44.652083 3781 caffe-time.cpp:93] inception\_5b/relu\_3x3backward: 0.0031 ms.

I0101 01:36:44.652626 3781 caffe-time.cpp:90] inception\_5b/5x5\_reduceforward: 5.25516 ms.

I0101 01:36:44.652869 3781 caffe-time.cpp:93] inception\_5b/5x5\_reducebackward: 4.68248 ms.

I0101 01:36:44.653357 3781 caffe-time.cpp:90] inception\_5b/relu\_5x5\_reduceforward: 0.2551 ms.

I0101 01:36:44.653598 3781 caffe-time.cpp:93] inception\_5b/relu\_5x5\_reducebackward: 0.00334 ms.

I0101 01:36:44.654063 3781 caffe-time.cpp:90] inception\_5b/5x5forward: 19.1404 ms.

I0101 01:36:44.654301 3781 caffe-time.cpp:93] inception\_5b/5x5backward: 17.577 ms.

I0101 01:36:44.654805 3781 caffe-time.cpp:90] inception\_5b/relu\_5x5forward: 0.67078 ms.

I0101 01:36:44.655046 3781 caffe-time.cpp:93] inception\_5b/relu\_5x5backward: 0.00276 ms.

I0101 01:36:44.655523 3781 caffe-time.cpp:90] inception\_5b/poolforward: 52.8823 ms.

I0101 01:36:44.655762 3781 caffe-time.cpp:93] inception\_5b/poolbackward: 0.00314 ms.

I0101 01:36:44.656328 3781 caffe-time.cpp:90] inception\_5b/pool\_projforward: 14.7734 ms.

I0101 01:36:44.656565 3781 caffe-time.cpp:93] inception\_5b/pool\_projbackward: 10.8734 ms.

I0101 01:36:44.657121 3781 caffe-time.cpp:90] inception\_5b/relu\_pool\_projforward: 0.63066 ms.

I0101 01:36:44.657634 3781 caffe-time.cpp:93] inception\_5b/relu\_pool\_projbackward: 0.00254 ms.

I0101 01:36:44.657876 3781 caffe-time.cpp:90] inception\_5b/outputforward: 0.57506 ms.

I0101 01:36:44.658349 3781 caffe-time.cpp:93] inception\_5b/outputbackward: 0.06198 ms.

I0101 01:36:44.659009 3781 caffe-time.cpp:90] pool5/7x7\_s1forward: 5.2621 ms.

I0101 01:36:44.659622 3781 caffe-time.cpp:93] pool5/7x7\_s1backward: 0.00244 ms.

I0101 01:36:44.659960 3781 caffe-time.cpp:90] pool5/drop\_7x7\_s1forward: 0.1053 ms.

I0101 01:36:44.660412 3781 caffe-time.cpp:93] pool5/drop\_7x7\_s1backward: 0.00302 ms.

I0101 01:36:44.660980 3781 caffe-time.cpp:90] loss3/classifierforward: 7.97882 ms.

I0101 01:36:44.661287 3781 caffe-time.cpp:93] loss3/classifierbackward: 3.78294 ms.

I0101 01:36:44.662018 3781 caffe-time.cpp:90] probforward: 0.7155 ms.

I0101 01:36:44.662357 3781 caffe-time.cpp:93] probbackward: 0.12322 ms.

I0101 01:36:44.662608 3781 caffe-time.cpp:98] Average Forward pass: 7039.31 ms.

I0101 01:36:44.662745 3781 caffe-time.cpp:100] Average Backward pass: 4331.88 ms.

I0101 01:36:44.662867 3781 caffe-time.cpp:102] Average Forward-Backward: 11372.7 ms.

I0101 01:36:44.662983 3781 caffe-time.cpp:104] Total Time: 568637 ms.

经过优化之后的输出如下：

I0101 01:48:43.386760 3803 caffe-time.cpp:87] Average time per layer:

I0101 01:48:43.387052 3803 caffe-time.cpp:90] dataforward: 0.00374 ms.

I0101 01:48:43.387263 3803 caffe-time.cpp:93] databackward: 0.00428 ms.

I0101 01:48:43.387441 3803 caffe-time.cpp:90] conv1/7x7\_s2forward: 187.331 ms.

I0101 01:48:43.387617 3803 caffe-time.cpp:93] conv1/7x7\_s2backward: 185.875 ms.

I0101 01:48:43.387796 3803 caffe-time.cpp:90] conv1/relu\_7x7forward: 38.711 ms.

I0101 01:48:43.387985 3803 caffe-time.cpp:93] conv1/relu\_7x7backward: 0.00252 ms.

I0101 01:48:43.388161 3803 caffe-time.cpp:90] pool1/3x3\_s2forward: 310.125 ms.

I0101 01:48:43.388349 3803 caffe-time.cpp:93] pool1/3x3\_s2backward: 0.00392 ms.

I0101 01:48:43.388732 3803 caffe-time.cpp:90] pool1/norm1forward: 344.829 ms.

I0101 01:48:43.388923 3803 caffe-time.cpp:93] pool1/norm1backward: 358.501 ms.

I0101 01:48:43.389170 3803 caffe-time.cpp:90] conv2/3x3\_reduceforward: 44.4983 ms.

I0101 01:48:43.389397 3803 caffe-time.cpp:93] conv2/3x3\_reducebackward: 25.4692 ms.

I0101 01:48:43.389577 3803 caffe-time.cpp:90] conv2/relu\_3x3\_reduceforward: 11.551 ms.

I0101 01:48:43.389764 3803 caffe-time.cpp:93] conv2/relu\_3x3\_reducebackward: 0.00744 ms.

I0101 01:48:43.389944 3803 caffe-time.cpp:90] conv2/3x3forward: 484.63 ms.

I0101 01:48:43.390120 3803 caffe-time.cpp:93] conv2/3x3backward: 465.751 ms.

I0101 01:48:43.390296 3803 caffe-time.cpp:90] conv2/relu\_3x3forward: 39.7259 ms.

I0101 01:48:43.390467 3803 caffe-time.cpp:93] conv2/relu\_3x3backward: 0.00408 ms.

I0101 01:48:43.390649 3803 caffe-time.cpp:90] conv2/norm2forward: 1040.97 ms.

I0101 01:48:43.390825 3803 caffe-time.cpp:93] conv2/norm2backward: 1065.77 ms.

I0101 01:48:43.391009 3803 caffe-time.cpp:90] pool2/3x3\_s2forward: 206.902 ms.

I0101 01:48:43.391184 3803 caffe-time.cpp:93] pool2/3x3\_s2backward: 0.0031 ms.

I0101 01:48:43.391362 3803 caffe-time.cpp:90] pool2/3x3\_s2\_pool2/3x3\_s2\_0\_splitforward: 0.01046 ms.

I0101 01:48:43.391537 3803 caffe-time.cpp:93] pool2/3x3\_s2\_pool2/3x3\_s2\_0\_splitbackward: 0.00428 ms.

I0101 01:48:43.391710 3803 caffe-time.cpp:90] inception\_3a/1x1forward: 38.4937 ms.

I0101 01:48:43.391888 3803 caffe-time.cpp:93] inception\_3a/1x1backward: 14.7072 ms.

I0101 01:48:43.392065 3803 caffe-time.cpp:90] inception\_3a/relu\_1x1forward: 4.11074 ms.

I0101 01:48:43.392245 3803 caffe-time.cpp:93] inception\_3a/relu\_1x1backward: 0.00392 ms.

I0101 01:48:43.392417 3803 caffe-time.cpp:90] inception\_3a/3x3\_reduceforward: 28.8858 ms.

I0101 01:48:43.392594 3803 caffe-time.cpp:93] inception\_3a/3x3\_reducebackward: 21.9888 ms.

I0101 01:48:43.392766 3803 caffe-time.cpp:90] inception\_3a/relu\_3x3\_reduceforward: 3.61424 ms.

I0101 01:48:43.392941 3803 caffe-time.cpp:93] inception\_3a/relu\_3x3\_reducebackward: 0.00388 ms.

I0101 01:48:43.393121 3803 caffe-time.cpp:90] inception\_3a/3x3forward: 120.471 ms.

I0101 01:48:43.393294 3803 caffe-time.cpp:93] inception\_3a/3x3backward: 117.861 ms.

I0101 01:48:43.393474 3803 caffe-time.cpp:90] inception\_3a/relu\_3x3forward: 4.3821 ms.

I0101 01:48:43.393647 3803 caffe-time.cpp:93] inception\_3a/relu\_3x3backward: 0.00346 ms.

I0101 01:48:43.393825 3803 caffe-time.cpp:90] inception\_3a/5x5\_reduceforward: 5.39266 ms.

I0101 01:48:43.394008 3803 caffe-time.cpp:93] inception\_3a/5x5\_reducebackward: 5.0409 ms.

I0101 01:48:43.394193 3803 caffe-time.cpp:90] inception\_3a/relu\_5x5\_reduceforward: 0.94756 ms.

I0101 01:48:43.394378 3803 caffe-time.cpp:93] inception\_3a/relu\_5x5\_reducebackward: 0.00416 ms.

I0101 01:48:43.394569 3803 caffe-time.cpp:90] inception\_3a/5x5forward: 16.8154 ms.

I0101 01:48:43.394750 3803 caffe-time.cpp:93] inception\_3a/5x5backward: 16.9819 ms.

I0101 01:48:43.394932 3803 caffe-time.cpp:90] inception\_3a/relu\_5x5forward: 1.34212 ms.

I0101 01:48:43.395112 3803 caffe-time.cpp:93] inception\_3a/relu\_5x5backward: 0.003 ms.

I0101 01:48:43.395290 3803 caffe-time.cpp:90] inception\_3a/poolforward: 216.516 ms.

I0101 01:48:43.395469 3803 caffe-time.cpp:93] inception\_3a/poolbackward: 0.00356 ms.

I0101 01:48:43.395644 3803 caffe-time.cpp:90] inception\_3a/pool\_projforward: 23.8757 ms.

I0101 01:48:43.395829 3803 caffe-time.cpp:93] inception\_3a/pool\_projbackward: 8.19398 ms.

I0101 01:48:43.396003 3803 caffe-time.cpp:90] inception\_3a/relu\_pool\_projforward: 2.62234 ms.

I0101 01:48:43.396182 3803 caffe-time.cpp:93] inception\_3a/relu\_pool\_projbackward: 0.00318 ms.

I0101 01:48:43.396358 3803 caffe-time.cpp:90] inception\_3a/outputforward: 1.47226 ms.

I0101 01:48:43.396537 3803 caffe-time.cpp:93] inception\_3a/outputbackward: 0.28714 ms.

I0101 01:48:43.396711 3803 caffe-time.cpp:90] inception\_3a/output\_inception\_3a/output\_0\_splitforward: 0.00896 ms.

I0101 01:48:43.396893 3803 caffe-time.cpp:93] inception\_3a/output\_inception\_3a/output\_0\_splitbackward: 0.00388 ms.

I0101 01:48:43.397069 3803 caffe-time.cpp:90] inception\_3b/1x1forward: 45.287 ms.

I0101 01:48:43.397245 3803 caffe-time.cpp:93] inception\_3b/1x1backward: 36.7529 ms.

I0101 01:48:43.397420 3803 caffe-time.cpp:90] inception\_3b/relu\_1x1forward: 4.33294 ms.

I0101 01:48:43.397600 3803 caffe-time.cpp:93] inception\_3b/relu\_1x1backward: 0.00384 ms.

I0101 01:48:43.397780 3803 caffe-time.cpp:90] inception\_3b/3x3\_reduceforward: 37.2391 ms.

I0101 01:48:43.397954 3803 caffe-time.cpp:93] inception\_3b/3x3\_reducebackward: 39.5971 ms.

I0101 01:48:43.398134 3803 caffe-time.cpp:90] inception\_3b/relu\_3x3\_reduceforward: 3.9764 ms.

I0101 01:48:43.398314 3803 caffe-time.cpp:93] inception\_3b/relu\_3x3\_reducebackward: 0.0042 ms.

I0101 01:48:43.398634 3803 caffe-time.cpp:90] inception\_3b/3x3forward: 234.038 ms.

I0101 01:48:43.398846 3803 caffe-time.cpp:93] inception\_3b/3x3backward: 238.604 ms.

I0101 01:48:43.399046 3803 caffe-time.cpp:90] inception\_3b/relu\_3x3forward: 8.4522 ms.

I0101 01:48:43.399233 3803 caffe-time.cpp:93] inception\_3b/relu\_3x3backward: 0.00362 ms.

I0101 01:48:43.399413 3803 caffe-time.cpp:90] inception\_3b/5x5\_reduceforward: 12.4112 ms.

I0101 01:48:43.399590 3803 caffe-time.cpp:93] inception\_3b/5x5\_reducebackward: 11.1145 ms.

I0101 01:48:43.399767 3803 caffe-time.cpp:90] inception\_3b/relu\_5x5\_reduceforward: 1.45514 ms.

I0101 01:48:43.399953 3803 caffe-time.cpp:93] inception\_3b/relu\_5x5\_reducebackward: 0.004 ms.

I0101 01:48:43.400126 3803 caffe-time.cpp:90] inception\_3b/5x5forward: 86.3383 ms.

I0101 01:48:43.400306 3803 caffe-time.cpp:93] inception\_3b/5x5backward: 84.9092 ms.

I0101 01:48:43.400486 3803 caffe-time.cpp:90] inception\_3b/relu\_5x5forward: 3.38822 ms.

I0101 01:48:43.400665 3803 caffe-time.cpp:93] inception\_3b/relu\_5x5backward: 0.00302 ms.

I0101 01:48:43.400839 3803 caffe-time.cpp:90] inception\_3b/poolforward: 284.395 ms.

I0101 01:48:43.401029 3803 caffe-time.cpp:93] inception\_3b/poolbackward: 0.00372 ms.

I0101 01:48:43.401208 3803 caffe-time.cpp:90] inception\_3b/pool\_projforward: 40.9203 ms.

I0101 01:48:43.401390 3803 caffe-time.cpp:93] inception\_3b/pool\_projbackward: 19.0901 ms.

I0101 01:48:43.401598 3803 caffe-time.cpp:90] inception\_3b/relu\_pool\_projforward: 3.5366 ms.

I0101 01:48:43.401856 3803 caffe-time.cpp:93] inception\_3b/relu\_pool\_projbackward: 0.00306 ms.

I0101 01:48:43.402165 3803 caffe-time.cpp:90] inception\_3b/outputforward: 3.18288 ms.

I0101 01:48:43.402376 3803 caffe-time.cpp:93] inception\_3b/outputbackward: 0.46004 ms.

I0101 01:48:43.402615 3803 caffe-time.cpp:90] pool3/3x3\_s2forward: 146.144 ms.

I0101 01:48:43.402876 3803 caffe-time.cpp:93] pool3/3x3\_s2backward: 0.00328 ms.

I0101 01:48:43.403142 3803 caffe-time.cpp:90] pool3/3x3\_s2\_pool3/3x3\_s2\_0\_splitforward: 0.01094 ms.

I0101 01:48:43.403410 3803 caffe-time.cpp:93] pool3/3x3\_s2\_pool3/3x3\_s2\_0\_splitbackward: 0.00416 ms.

I0101 01:48:43.403675 3803 caffe-time.cpp:90] inception\_4a/1x1forward: 55.6795 ms.

I0101 01:48:43.403942 3803 caffe-time.cpp:93] inception\_4a/1x1backward: 25.2603 ms.

I0101 01:48:43.404129 3803 caffe-time.cpp:90] inception\_4a/relu\_1x1forward: 2.76552 ms.

I0101 01:48:43.404453 3803 caffe-time.cpp:93] inception\_4a/relu\_1x1backward: 0.0038 ms.

I0101 01:48:43.404771 3803 caffe-time.cpp:90] inception\_4a/3x3\_reduceforward: 17.4297 ms.

I0101 01:48:43.404988 3803 caffe-time.cpp:93] inception\_4a/3x3\_reducebackward: 13.3647 ms.

I0101 01:48:43.405304 3803 caffe-time.cpp:90] inception\_4a/relu\_3x3\_reduceforward: 1.31726 ms.

I0101 01:48:43.405565 3803 caffe-time.cpp:93] inception\_4a/relu\_3x3\_reducebackward: 0.00422 ms.

I0101 01:48:43.405802 3803 caffe-time.cpp:90] inception\_4a/3x3forward: 51.4599 ms.

I0101 01:48:43.406117 3803 caffe-time.cpp:93] inception\_4a/3x3backward: 50.0939 ms.

I0101 01:48:43.406400 3803 caffe-time.cpp:90] inception\_4a/relu\_3x3forward: 1.80784 ms.

I0101 01:48:43.406680 3803 caffe-time.cpp:93] inception\_4a/relu\_3x3backward: 0.00364 ms.

I0101 01:48:43.406983 3803 caffe-time.cpp:90] inception\_4a/5x5\_reduceforward: 3.11874 ms.

I0101 01:48:43.407256 3803 caffe-time.cpp:93] inception\_4a/5x5\_reducebackward: 3.06576 ms.

I0101 01:48:43.407514 3803 caffe-time.cpp:90] inception\_4a/relu\_5x5\_reduceforward: 0.3105 ms.

I0101 01:48:43.407758 3803 caffe-time.cpp:93] inception\_4a/relu\_5x5\_reducebackward: 0.00382 ms.

I0101 01:48:43.407983 3803 caffe-time.cpp:90] inception\_4a/5x5forward: 6.31618 ms.

I0101 01:48:43.408300 3803 caffe-time.cpp:93] inception\_4a/5x5backward: 6.99598 ms.

I0101 01:48:43.408781 3803 caffe-time.cpp:90] inception\_4a/relu\_5x5forward: 0.63118 ms.

I0101 01:48:43.408973 3803 caffe-time.cpp:93] inception\_4a/relu\_5x5backward: 0.00284 ms.

I0101 01:48:43.409266 3803 caffe-time.cpp:90] inception\_4a/poolforward: 124.428 ms.

I0101 01:48:43.409474 3803 caffe-time.cpp:93] inception\_4a/poolbackward: 0.00376 ms.

I0101 01:48:43.409705 3803 caffe-time.cpp:90] inception\_4a/pool\_projforward: 31.0486 ms.

I0101 01:48:43.409909 3803 caffe-time.cpp:93] inception\_4a/pool\_projbackward: 9.13092 ms.

I0101 01:48:43.410119 3803 caffe-time.cpp:90] inception\_4a/relu\_pool\_projforward: 1.46524 ms.

I0101 01:48:43.410309 3803 caffe-time.cpp:93] inception\_4a/relu\_pool\_projbackward: 0.00276 ms.

I0101 01:48:43.410536 3803 caffe-time.cpp:90] inception\_4a/outputforward: 1.073 ms.

I0101 01:48:43.410786 3803 caffe-time.cpp:93] inception\_4a/outputbackward: 0.12928 ms.

I0101 01:48:43.410987 3803 caffe-time.cpp:90] inception\_4a/output\_inception\_4a/output\_0\_splitforward: 0.01144 ms.

I0101 01:48:43.411167 3803 caffe-time.cpp:93] inception\_4a/output\_inception\_4a/output\_0\_splitbackward: 0.00388 ms.

I0101 01:48:43.411387 3803 caffe-time.cpp:90] inception\_4b/1x1forward: 31.1682 ms.

I0101 01:48:43.411577 3803 caffe-time.cpp:93] inception\_4b/1x1backward: 22.5441 ms.

I0101 01:48:43.411761 3803 caffe-time.cpp:90] inception\_4b/relu\_1x1forward: 1.9817 ms.

I0101 01:48:43.411952 3803 caffe-time.cpp:93] inception\_4b/relu\_1x1backward: 0.00376 ms.

I0101 01:48:43.412137 3803 caffe-time.cpp:90] inception\_4b/3x3\_reduceforward: 18.4484 ms.

I0101 01:48:43.412325 3803 caffe-time.cpp:93] inception\_4b/3x3\_reducebackward: 16.4729 ms.

I0101 01:48:43.412510 3803 caffe-time.cpp:90] inception\_4b/relu\_3x3\_reduceforward: 1.10498 ms.

I0101 01:48:43.412706 3803 caffe-time.cpp:93] inception\_4b/relu\_3x3\_reducebackward: 0.00404 ms.

I0101 01:48:43.412894 3803 caffe-time.cpp:90] inception\_4b/3x3forward: 62.5335 ms.

I0101 01:48:43.413083 3803 caffe-time.cpp:93] inception\_4b/3x3backward: 60.1829 ms.

I0101 01:48:43.413277 3803 caffe-time.cpp:90] inception\_4b/relu\_3x3forward: 1.9028 ms.

I0101 01:48:43.413482 3803 caffe-time.cpp:93] inception\_4b/relu\_3x3backward: 0.0035 ms.

I0101 01:48:43.413680 3803 caffe-time.cpp:90] inception\_4b/5x5\_reduceforward: 4.1866 ms.

I0101 01:48:43.413864 3803 caffe-time.cpp:93] inception\_4b/5x5\_reducebackward: 4.19622 ms.

I0101 01:48:43.414054 3803 caffe-time.cpp:90] inception\_4b/relu\_5x5\_reduceforward: 0.39174 ms.

I0101 01:48:43.414244 3803 caffe-time.cpp:93] inception\_4b/relu\_5x5\_reducebackward: 0.00362 ms.

I0101 01:48:43.414433 3803 caffe-time.cpp:90] inception\_4b/5x5forward: 11.671 ms.

I0101 01:48:43.414621 3803 caffe-time.cpp:93] inception\_4b/5x5backward: 11.8478 ms.

I0101 01:48:43.414820 3803 caffe-time.cpp:90] inception\_4b/relu\_5x5forward: 0.85786 ms.

I0101 01:48:43.414996 3803 caffe-time.cpp:93] inception\_4b/relu\_5x5backward: 0.003 ms.

I0101 01:48:43.415192 3803 caffe-time.cpp:90] inception\_4b/poolforward: 133.456 ms.

I0101 01:48:43.415382 3803 caffe-time.cpp:93] inception\_4b/poolbackward: 0.0037 ms.

I0101 01:48:43.415570 3803 caffe-time.cpp:90] inception\_4b/pool\_projforward: 29.1515 ms.

I0101 01:48:43.415759 3803 caffe-time.cpp:93] inception\_4b/pool\_projbackward: 10.1976 ms.

I0101 01:48:43.415952 3803 caffe-time.cpp:90] inception\_4b/relu\_pool\_projforward: 1.41782 ms.

I0101 01:48:43.416132 3803 caffe-time.cpp:93] inception\_4b/relu\_pool\_projbackward: 0.0031 ms.

I0101 01:48:43.416333 3803 caffe-time.cpp:90] inception\_4b/outputforward: 1.15674 ms.

I0101 01:48:43.416521 3803 caffe-time.cpp:93] inception\_4b/outputbackward: 0.1213 ms.

I0101 01:48:43.416707 3803 caffe-time.cpp:90] inception\_4b/output\_inception\_4b/output\_0\_splitforward: 0.01348 ms.

I0101 01:48:43.416897 3803 caffe-time.cpp:93] inception\_4b/output\_inception\_4b/output\_0\_splitbackward: 0.00384 ms.

I0101 01:48:43.417088 3803 caffe-time.cpp:90] inception\_4c/1x1forward: 24.9995 ms.

I0101 01:48:43.417265 3803 caffe-time.cpp:93] inception\_4c/1x1backward: 18.4232 ms.

I0101 01:48:43.417462 3803 caffe-time.cpp:90] inception\_4c/relu\_1x1forward: 1.96118 ms.

I0101 01:48:43.417652 3803 caffe-time.cpp:93] inception\_4c/relu\_1x1backward: 0.00374 ms.

I0101 01:48:43.417841 3803 caffe-time.cpp:90] inception\_4c/3x3\_reduceforward: 20.4581 ms.

I0101 01:48:43.418028 3803 caffe-time.cpp:93] inception\_4c/3x3\_reducebackward: 18.9911 ms.

I0101 01:48:43.418221 3803 caffe-time.cpp:90] inception\_4c/relu\_3x3\_reduceforward: 1.46406 ms.

I0101 01:48:43.418400 3803 caffe-time.cpp:93] inception\_4c/relu\_3x3\_reducebackward: 0.0042 ms.

I0101 01:48:43.418646 3803 caffe-time.cpp:90] inception\_4c/3x3forward: 81.7979 ms.

I0101 01:48:43.418842 3803 caffe-time.cpp:93] inception\_4c/3x3backward: 80.6715 ms.

I0101 01:48:43.419044 3803 caffe-time.cpp:90] inception\_4c/relu\_3x3forward: 2.5567 ms.

I0101 01:48:43.419245 3803 caffe-time.cpp:93] inception\_4c/relu\_3x3backward: 0.00354 ms.

I0101 01:48:43.419788 3803 caffe-time.cpp:90] inception\_4c/5x5\_reduceforward: 4.5239 ms.

I0101 01:48:43.420097 3803 caffe-time.cpp:93] inception\_4c/5x5\_reducebackward: 4.39322 ms.

I0101 01:48:43.420376 3803 caffe-time.cpp:90] inception\_4c/relu\_5x5\_reduceforward: 0.46452 ms.

I0101 01:48:43.420658 3803 caffe-time.cpp:93] inception\_4c/relu\_5x5\_reducebackward: 0.00364 ms.

I0101 01:48:43.420924 3803 caffe-time.cpp:90] inception\_4c/5x5forward: 11.4168 ms.

I0101 01:48:43.421172 3803 caffe-time.cpp:93] inception\_4c/5x5backward: 12.7911 ms.

I0101 01:48:43.421432 3803 caffe-time.cpp:90] inception\_4c/relu\_5x5forward: 0.86476 ms.

I0101 01:48:43.421688 3803 caffe-time.cpp:93] inception\_4c/relu\_5x5backward: 0.00304 ms.

I0101 01:48:43.421953 3803 caffe-time.cpp:90] inception\_4c/poolforward: 147.224 ms.

I0101 01:48:43.422216 3803 caffe-time.cpp:93] inception\_4c/poolbackward: 0.00366 ms.

I0101 01:48:43.422483 3803 caffe-time.cpp:90] inception\_4c/pool\_projforward: 28.6744 ms.

I0101 01:48:43.422732 3803 caffe-time.cpp:93] inception\_4c/pool\_projbackward: 9.90288 ms.

I0101 01:48:43.422985 3803 caffe-time.cpp:90] inception\_4c/relu\_pool\_projforward: 1.66302 ms.

I0101 01:48:43.423236 3803 caffe-time.cpp:93] inception\_4c/relu\_pool\_projbackward: 0.0029 ms.

I0101 01:48:43.423584 3803 caffe-time.cpp:90] inception\_4c/outputforward: 1.13974 ms.

I0101 01:48:43.423855 3803 caffe-time.cpp:93] inception\_4c/outputbackward: 0.17314 ms.

I0101 01:48:43.424100 3803 caffe-time.cpp:90] inception\_4c/output\_inception\_4c/output\_0\_splitforward: 0.0117 ms.

I0101 01:48:43.424519 3803 caffe-time.cpp:93] inception\_4c/output\_inception\_4c/output\_0\_splitbackward: 0.00376 ms.

I0101 01:48:43.424759 3803 caffe-time.cpp:90] inception\_4d/1x1forward: 22.2651 ms.

I0101 01:48:43.424956 3803 caffe-time.cpp:93] inception\_4d/1x1backward: 16.2288 ms.

I0101 01:48:43.425151 3803 caffe-time.cpp:90] inception\_4d/relu\_1x1forward: 1.57478 ms.

I0101 01:48:43.425342 3803 caffe-time.cpp:93] inception\_4d/relu\_1x1backward: 0.00388 ms.

I0101 01:48:43.425527 3803 caffe-time.cpp:90] inception\_4d/3x3\_reduceforward: 23.4336 ms.

I0101 01:48:43.425717 3803 caffe-time.cpp:93] inception\_4d/3x3\_reducebackward: 21.6938 ms.

I0101 01:48:43.425921 3803 caffe-time.cpp:90] inception\_4d/relu\_3x3\_reduceforward: 1.4525 ms.

I0101 01:48:43.426364 3803 caffe-time.cpp:93] inception\_4d/relu\_3x3\_reducebackward: 0.00612 ms.

I0101 01:48:43.426558 3803 caffe-time.cpp:90] inception\_4d/3x3forward: 101.646 ms.

I0101 01:48:43.426743 3803 caffe-time.cpp:93] inception\_4d/3x3backward: 101.044 ms.

I0101 01:48:43.426932 3803 caffe-time.cpp:90] inception\_4d/relu\_3x3forward: 2.7887 ms.

I0101 01:48:43.427131 3803 caffe-time.cpp:93] inception\_4d/relu\_3x3backward: 0.0034 ms.

I0101 01:48:43.427322 3803 caffe-time.cpp:90] inception\_4d/5x5\_reduceforward: 6.04286 ms.

I0101 01:48:43.427505 3803 caffe-time.cpp:93] inception\_4d/5x5\_reducebackward: 5.26326 ms.

I0101 01:48:43.427687 3803 caffe-time.cpp:90] inception\_4d/relu\_5x5\_reduceforward: 0.67134 ms.

I0101 01:48:43.427875 3803 caffe-time.cpp:93] inception\_4d/relu\_5x5\_reducebackward: 0.00372 ms.

I0101 01:48:43.428062 3803 caffe-time.cpp:90] inception\_4d/5x5forward: 15.7074 ms.

I0101 01:48:43.428253 3803 caffe-time.cpp:93] inception\_4d/5x5backward: 15.9083 ms.

I0101 01:48:43.428571 3803 caffe-time.cpp:90] inception\_4d/relu\_5x5forward: 0.63938 ms.

I0101 01:48:43.428826 3803 caffe-time.cpp:93] inception\_4d/relu\_5x5backward: 0.00308 ms.

I0101 01:48:43.429070 3803 caffe-time.cpp:90] inception\_4d/poolforward: 148.356 ms.

I0101 01:48:43.429287 3803 caffe-time.cpp:93] inception\_4d/poolbackward: 0.00364 ms.

I0101 01:48:43.429475 3803 caffe-time.cpp:90] inception\_4d/pool\_projforward: 29.276 ms.

I0101 01:48:43.429665 3803 caffe-time.cpp:93] inception\_4d/pool\_projbackward: 10.6448 ms.

I0101 01:48:43.429858 3803 caffe-time.cpp:90] inception\_4d/relu\_pool\_projforward: 1.56024 ms.

I0101 01:48:43.430352 3803 caffe-time.cpp:93] inception\_4d/relu\_pool\_projbackward: 0.0031 ms.

I0101 01:48:43.430741 3803 caffe-time.cpp:90] inception\_4d/outputforward: 1.20414 ms.

I0101 01:48:43.431125 3803 caffe-time.cpp:93] inception\_4d/outputbackward: 0.13654 ms.

I0101 01:48:43.431158 3803 caffe-time.cpp:90] inception\_4d/output\_inception\_4d/output\_0\_splitforward: 0.01022 ms.

I0101 01:48:43.431181 3803 caffe-time.cpp:93] inception\_4d/output\_inception\_4d/output\_0\_splitbackward: 0.00444 ms.

I0101 01:48:43.431386 3803 caffe-time.cpp:90] inception\_4e/1x1forward: 46.341 ms.

I0101 01:48:43.431603 3803 caffe-time.cpp:93] inception\_4e/1x1backward: 37.9452 ms.

I0101 01:48:43.431798 3803 caffe-time.cpp:90] inception\_4e/relu\_1x1forward: 2.71888 ms.

I0101 01:48:43.431995 3803 caffe-time.cpp:93] inception\_4e/relu\_1x1backward: 0.00384 ms.

I0101 01:48:43.432181 3803 caffe-time.cpp:90] inception\_4e/3x3\_reduceforward: 25.1886 ms.

I0101 01:48:43.432366 3803 caffe-time.cpp:93] inception\_4e/3x3\_reducebackward: 25.4141 ms.

I0101 01:48:43.432551 3803 caffe-time.cpp:90] inception\_4e/relu\_3x3\_reduceforward: 1.46734 ms.

I0101 01:48:43.432747 3803 caffe-time.cpp:93] inception\_4e/relu\_3x3\_reducebackward: 0.0042 ms.

I0101 01:48:43.432936 3803 caffe-time.cpp:90] inception\_4e/3x3forward: 123.154 ms.

I0101 01:48:43.433119 3803 caffe-time.cpp:93] inception\_4e/3x3backward: 120.602 ms.

I0101 01:48:43.433306 3803 caffe-time.cpp:90] inception\_4e/relu\_3x3forward: 2.87038 ms.

I0101 01:48:43.433496 3803 caffe-time.cpp:93] inception\_4e/relu\_3x3backward: 0.0038 ms.

I0101 01:48:43.433681 3803 caffe-time.cpp:90] inception\_4e/5x5\_reduceforward: 6.16672 ms.

I0101 01:48:43.433871 3803 caffe-time.cpp:93] inception\_4e/5x5\_reducebackward: 5.60326 ms.

I0101 01:48:43.434058 3803 caffe-time.cpp:90] inception\_4e/relu\_5x5\_reduceforward: 0.46496 ms.

I0101 01:48:43.434353 3803 caffe-time.cpp:93] inception\_4e/relu\_5x5\_reducebackward: 0.00384 ms.

I0101 01:48:43.434549 3803 caffe-time.cpp:90] inception\_4e/5x5forward: 28.5778 ms.

I0101 01:48:43.434738 3803 caffe-time.cpp:93] inception\_4e/5x5backward: 28.2221 ms.

I0101 01:48:43.434936 3803 caffe-time.cpp:90] inception\_4e/relu\_5x5forward: 1.30898 ms.

I0101 01:48:43.435123 3803 caffe-time.cpp:93] inception\_4e/relu\_5x5backward: 0.00304 ms.

I0101 01:48:43.435314 3803 caffe-time.cpp:90] inception\_4e/poolforward: 152.589 ms.

I0101 01:48:43.435504 3803 caffe-time.cpp:93] inception\_4e/poolbackward: 0.00456 ms.

I0101 01:48:43.435685 3803 caffe-time.cpp:90] inception\_4e/pool\_projforward: 44.3708 ms.

I0101 01:48:43.436104 3803 caffe-time.cpp:93] inception\_4e/pool\_projbackward: 18.4494 ms.

I0101 01:48:43.436329 3803 caffe-time.cpp:90] inception\_4e/relu\_pool\_projforward: 2.31104 ms.

I0101 01:48:43.436523 3803 caffe-time.cpp:93] inception\_4e/relu\_pool\_projbackward: 0.00292 ms.

I0101 01:48:43.436745 3803 caffe-time.cpp:90] inception\_4e/outputforward: 1.83364 ms.

I0101 01:48:43.436944 3803 caffe-time.cpp:93] inception\_4e/outputbackward: 0.24192 ms.

I0101 01:48:43.437139 3803 caffe-time.cpp:90] pool4/3x3\_s2forward: 67.5753 ms.

I0101 01:48:43.437341 3803 caffe-time.cpp:93] pool4/3x3\_s2backward: 0.00296 ms.

I0101 01:48:43.437543 3803 caffe-time.cpp:90] pool4/3x3\_s2\_pool4/3x3\_s2\_0\_splitforward: 0.0106 ms.

I0101 01:48:43.437740 3803 caffe-time.cpp:93] pool4/3x3\_s2\_pool4/3x3\_s2\_0\_splitbackward: 0.004 ms.

I0101 01:48:43.437926 3803 caffe-time.cpp:90] inception\_5a/1x1forward: 36.2513 ms.

I0101 01:48:43.438113 3803 caffe-time.cpp:93] inception\_5a/1x1backward: 16.1411 ms.

I0101 01:48:43.438301 3803 caffe-time.cpp:90] inception\_5a/relu\_1x1forward: 1.50972 ms.

I0101 01:48:43.438618 3803 caffe-time.cpp:93] inception\_5a/relu\_1x1backward: 0.00354 ms.

I0101 01:48:43.438828 3803 caffe-time.cpp:90] inception\_5a/3x3\_reduceforward: 13.853 ms.

I0101 01:48:43.439022 3803 caffe-time.cpp:93] inception\_5a/3x3\_reducebackward: 10.1677 ms.

I0101 01:48:43.439387 3803 caffe-time.cpp:90] inception\_5a/relu\_3x3\_reduceforward: 1.03888 ms.

I0101 01:48:43.439908 3803 caffe-time.cpp:93] inception\_5a/relu\_3x3\_reducebackward: 0.00392 ms.

I0101 01:48:43.440098 3803 caffe-time.cpp:90] inception\_5a/3x3forward: 36.7799 ms.

I0101 01:48:43.440297 3803 caffe-time.cpp:93] inception\_5a/3x3backward: 32.5346 ms.

I0101 01:48:43.440486 3803 caffe-time.cpp:90] inception\_5a/relu\_3x3forward: 1.00172 ms.

I0101 01:48:43.440678 3803 caffe-time.cpp:93] inception\_5a/relu\_3x3backward: 0.00346 ms.

I0101 01:48:43.440862 3803 caffe-time.cpp:90] inception\_5a/5x5\_reduceforward: 2.58226 ms.

I0101 01:48:43.441054 3803 caffe-time.cpp:93] inception\_5a/5x5\_reducebackward: 2.4267 ms.

I0101 01:48:43.441240 3803 caffe-time.cpp:90] inception\_5a/relu\_5x5\_reduceforward: 0.27646 ms.

I0101 01:48:43.441433 3803 caffe-time.cpp:93] inception\_5a/relu\_5x5\_reducebackward: 0.0039 ms.

I0101 01:48:43.441640 3803 caffe-time.cpp:90] inception\_5a/5x5forward: 8.16236 ms.

I0101 01:48:43.441828 3803 caffe-time.cpp:93] inception\_5a/5x5backward: 7.90602 ms.

I0101 01:48:43.442014 3803 caffe-time.cpp:90] inception\_5a/relu\_5x5forward: 0.45138 ms.

I0101 01:48:43.442199 3803 caffe-time.cpp:93] inception\_5a/relu\_5x5backward: 0.00294 ms.

I0101 01:48:43.442404 3803 caffe-time.cpp:90] inception\_5a/poolforward: 53.7552 ms.

I0101 01:48:43.442605 3803 caffe-time.cpp:93] inception\_5a/poolbackward: 0.00368 ms.

I0101 01:48:43.442790 3803 caffe-time.cpp:90] inception\_5a/pool\_projforward: 12.6307 ms.

I0101 01:48:43.442979 3803 caffe-time.cpp:93] inception\_5a/pool\_projbackward: 8.2476 ms.

I0101 01:48:43.443170 3803 caffe-time.cpp:90] inception\_5a/relu\_pool\_projforward: 1.09898 ms.

I0101 01:48:43.443368 3803 caffe-time.cpp:93] inception\_5a/relu\_pool\_projbackward: 0.0027 ms.

I0101 01:48:43.443554 3803 caffe-time.cpp:90] inception\_5a/outputforward: 0.45554 ms.

I0101 01:48:43.443739 3803 caffe-time.cpp:93] inception\_5a/outputbackward: 0.0597 ms.

I0101 01:48:43.443926 3803 caffe-time.cpp:90] inception\_5a/output\_inception\_5a/output\_0\_splitforward: 0.00894 ms.

I0101 01:48:43.444109 3803 caffe-time.cpp:93] inception\_5a/output\_inception\_5a/output\_0\_splitbackward: 0.00412 ms.

I0101 01:48:43.444300 3803 caffe-time.cpp:90] inception\_5b/1x1forward: 28.5361 ms.

I0101 01:48:43.444508 3803 caffe-time.cpp:93] inception\_5b/1x1backward: 23.1113 ms.

I0101 01:48:43.444704 3803 caffe-time.cpp:90] inception\_5b/relu\_1x1forward: 1.46102 ms.

I0101 01:48:43.444895 3803 caffe-time.cpp:93] inception\_5b/relu\_1x1backward: 0.0036 ms.

I0101 01:48:43.445083 3803 caffe-time.cpp:90] inception\_5b/3x3\_reduceforward: 12.1475 ms.

I0101 01:48:43.445268 3803 caffe-time.cpp:93] inception\_5b/3x3\_reducebackward: 12.097 ms.

I0101 01:48:43.445458 3803 caffe-time.cpp:90] inception\_5b/relu\_3x3\_reduceforward: 0.6599 ms.

I0101 01:48:43.445643 3803 caffe-time.cpp:93] inception\_5b/relu\_3x3\_reducebackward: 0.00416 ms.

I0101 01:48:43.445831 3803 caffe-time.cpp:90] inception\_5b/3x3forward: 48.82 ms.

I0101 01:48:43.446022 3803 caffe-time.cpp:93] inception\_5b/3x3backward: 49.6856 ms.

I0101 01:48:43.446208 3803 caffe-time.cpp:90] inception\_5b/relu\_3x3forward: 1.02826 ms.

I0101 01:48:43.446401 3803 caffe-time.cpp:93] inception\_5b/relu\_3x3backward: 0.00346 ms.

I0101 01:48:43.446586 3803 caffe-time.cpp:90] inception\_5b/5x5\_reduceforward: 3.30868 ms.

I0101 01:48:43.446772 3803 caffe-time.cpp:93] inception\_5b/5x5\_reducebackward: 3.89156 ms.

I0101 01:48:43.446962 3803 caffe-time.cpp:90] inception\_5b/relu\_5x5\_reduceforward: 0.26898 ms.

I0101 01:48:43.447155 3803 caffe-time.cpp:93] inception\_5b/relu\_5x5\_reducebackward: 0.00416 ms.

I0101 01:48:43.447344 3803 caffe-time.cpp:90] inception\_5b/5x5forward: 11.4633 ms.

I0101 01:48:43.447532 3803 caffe-time.cpp:93] inception\_5b/5x5backward: 14.0187 ms.

I0101 01:48:43.447729 3803 caffe-time.cpp:90] inception\_5b/relu\_5x5forward: 0.4582 ms.

I0101 01:48:43.447914 3803 caffe-time.cpp:93] inception\_5b/relu\_5x5backward: 0.00356 ms.

I0101 01:48:43.448097 3803 caffe-time.cpp:90] inception\_5b/poolforward: 59.4869 ms.

I0101 01:48:43.448290 3803 caffe-time.cpp:93] inception\_5b/poolbackward: 0.00398 ms.

I0101 01:48:43.448527 3803 caffe-time.cpp:90] inception\_5b/pool\_projforward: 12.1032 ms.

I0101 01:48:43.448754 3803 caffe-time.cpp:93] inception\_5b/pool\_projbackward: 10.9429 ms.

I0101 01:48:43.448953 3803 caffe-time.cpp:90] inception\_5b/relu\_pool\_projforward: 0.82214 ms.

I0101 01:48:43.449481 3803 caffe-time.cpp:93] inception\_5b/relu\_pool\_projbackward: 0.0026 ms.

I0101 01:48:43.449701 3803 caffe-time.cpp:90] inception\_5b/outputforward: 0.5921 ms.

I0101 01:48:43.449892 3803 caffe-time.cpp:93] inception\_5b/outputbackward: 0.06298 ms.

I0101 01:48:43.450079 3803 caffe-time.cpp:90] pool5/7x7\_s1forward: 5.55792 ms.

I0101 01:48:43.450265 3803 caffe-time.cpp:93] pool5/7x7\_s1backward: 0.00254 ms.

I0101 01:48:43.450452 3803 caffe-time.cpp:90] pool5/drop\_7x7\_s1forward: 0.11492 ms.

I0101 01:48:43.450635 3803 caffe-time.cpp:93] pool5/drop\_7x7\_s1backward: 0.0061 ms.

I0101 01:48:43.450829 3803 caffe-time.cpp:90] loss3/classifierforward: 7.00046 ms.

I0101 01:48:43.451019 3803 caffe-time.cpp:93] loss3/classifierbackward: 3.47928 ms.

I0101 01:48:43.451205 3803 caffe-time.cpp:90] probforward: 0.74496 ms.

I0101 01:48:43.451406 3803 caffe-time.cpp:93] probbackward: 0.11576 ms.

I0101 01:48:43.451630 3803 caffe-time.cpp:98] Average Forward pass: 6251.23 ms.

I0101 01:48:43.451734 3803 caffe-time.cpp:100] Average Backward pass: 3699.81 ms.

I0101 01:48:43.451839 3803 caffe-time.cpp:102] Average Forward-Backward: 9952.54 ms.

I0101 01:48:43.451954 3803 caffe-time.cpp:104] Total Time: 497627 ms.

所用时间减少12.5%。

【各层并列柱状图、表格】

【对卷积层的评估】