```
Downloading data from http://www.cs.toronto.edu/~kriz/cifar-10-python.tar.gz
170500096/170498071 [==============================] - 23s
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 32, 32, 192)       14592
_________________________________________________________________
activation_1 (Activation)    (None, 32, 32, 192)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 32, 32, 160)       30880
_________________________________________________________________
activation_2 (Activation)    (None, 32, 32, 160)       0
_________________________________________________________________
conv2d_3 (Conv2D)            (None, 32, 32, 96)        15456
_________________________________________________________________
activation_3 (Activation)    (None, 32, 32, 96)        0
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 16, 16, 96)        0
_________________________________________________________________
dropout_1 (Dropout)          (None, 16, 16, 96)        0
_________________________________________________________________
conv2d_4 (Conv2D)            (None, 16, 16, 192)       460992
_________________________________________________________________
activation_4 (Activation)    (None, 16, 16, 192)       0
_________________________________________________________________
conv2d_5 (Conv2D)            (None, 16, 16, 192)       37056
_________________________________________________________________
activation_5 (Activation)    (None, 16, 16, 192)       0
_________________________________________________________________
conv2d_6 (Conv2D)            (None, 16, 16, 192)       37056
_________________________________________________________________
activation_6 (Activation)    (None, 16, 16, 192)       0
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 8, 8, 192)         0
_________________________________________________________________
dropout_2 (Dropout)          (None, 8, 8, 192)         0
_________________________________________________________________
conv2d_7 (Conv2D)            (None, 8, 8, 192)         331968
_________________________________________________________________
activation_7 (Activation)    (None, 8, 8, 192)         0
_________________________________________________________________
conv2d_8 (Conv2D)            (None, 8, 8, 192)         37056
_________________________________________________________________
activation_8 (Activation)    (None, 8, 8, 192)         0
_________________________________________________________________
conv2d_9 (Conv2D)            (None, 8, 8, 10)          1930
_________________________________________________________________
activation_9 (Activation)    (None, 8, 8, 10)          0
_________________________________________________________________
global_average_pooling2d_1 ( (None, 10)                0
_________________________________________________________________
activation_10 (Activation)   (None, 10)                0
=================================================================
Total params: 966,986
Trainable params: 966,986
Non-trainable params: 0
_________________________________________________________________
None
Using real-time data augmentation.
Epoch 1/80
391/391 [==============================] - 59s - loss: 2.3692 - acc: 0.2099 - val_lo
ss: 2.1462 - val_acc: 0.3292
Epoch 2/80
391/391 [==============================] - 60s - loss: 2.0627 - acc: 0.3718 - val_lo
ss: 1.9630 - val_acc: 0.4273
```

```
Epoch 3/80
391/391 [==============================] - 59s - loss: 1.9136 - acc: 0.4369 - val_lo
ss: 1.8022 - val_acc: 0.4562
Epoch 4/80
391/391 [==============================] - 59s - loss: 1.7283 - acc: 0.4761 - val_lo
ss: 1.6801 - val_acc: 0.4980
Epoch 5/80
391/391 [==============================] - 59s - loss: 1.6319 - acc: 0.5076 - val_lo
ss: 1.6222 - val_acc: 0.5266
Epoch 6/80
391/391 [==============================] - 59s - loss: 1.5129 - acc: 0.5520 - val_lo
ss: 1.3350 - val_acc: 0.6019
Epoch 7/80
391/391 [==============================] - 59s - loss: 1.3076 - acc: 0.6089 - val_lo
ss: 1.2604 - val_acc: 0.6233
Epoch 8/80
391/391 [==============================] - 59s - loss: 1.2282 - acc: 0.6397 - val_lo
ss: 1.1276 - val_acc: 0.6707
Epoch 9/80
391/391 [==============================] - 59s - loss: 1.1634 - acc: 0.6634 - val_lo
ss: 1.1101 - val_acc: 0.6825
Epoch 10/80
391/391 [==============================] - 59s - loss: 1.1139 - acc: 0.6813 - val_lo
ss: 1.0388 - val_acc: 0.7113
Epoch 11/80
391/391 [==============================] - 59s - loss: 1.0724 - acc: 0.6964 - val_lo
ss: 1.0070 - val_acc: 0.7205
Epoch 12/80
391/391 [==============================] - 59s - loss: 1.0330 - acc: 0.7113 - val_lo
ss: 1.0162 - val_acc: 0.7142
Epoch 13/80
391/391 [==============================] - 59s - loss: 0.9984 - acc: 0.7212 - val_lo
ss: 1.0225 - val_acc: 0.7167
Epoch 14/80
391/391 [==============================] - 59s - loss: 0.9701 - acc: 0.7327 - val_lo
ss: 0.9941 - val_acc: 0.7340
Epoch 15/80
391/391 [==============================] - 59s - loss: 0.9417 - acc: 0.7448 - val_lo
ss: 0.9299 - val_acc: 0.7483
Epoch 16/80
391/391 [==============================] - 59s - loss: 0.9126 - acc: 0.7557 - val_lo
ss: 0.9443 - val_acc: 0.7475
Epoch 17/80
391/391 [==============================] - 59s - loss: 0.8910 - acc: 0.7599 - val_lo
ss: 0.8889 - val_acc: 0.7666
Epoch 18/80
391/391 [==============================] - 59s - loss: 0.8720 - acc: 0.7697 - val_lo
ss: 0.8567 - val_acc: 0.7769
Epoch 19/80
391/391 [==============================] - 59s - loss: 0.8503 - acc: 0.7733 - val_lo
ss: 0.8921 - val_acc: 0.7634
Epoch 20/80
391/391 [==============================] - 59s - loss: 0.8367 - acc: 0.7793 - val_lo
ss: 0.8060 - val_acc: 0.7892
Epoch 21/80
391/391 [==============================] - 59s - loss: 0.8181 - acc: 0.7856 - val_lo
ss: 0.8319 - val_acc: 0.7832
Epoch 22/80
391/391 [==============================] - 59s - loss: 0.8037 - acc: 0.7915 - val_lo
ss: 0.8100 - val_acc: 0.7915
Epoch 23/80
391/391 [==============================] - 59s - loss: 0.7933 - acc: 0.7953 - val_lo
ss: 0.7636 - val_acc: 0.8053
Epoch 24/80
391/391 [==============================] - 59s - loss: 0.7791 - acc: 0.8007 - val_lo
ss: 0.7833 - val_acc: 0.8064
```

```
Epoch 25/80
391/391 [==============================] - 59s - loss: 0.7630 - acc: 0.8082 - val_lo
ss: 0.8109 - val_acc: 0.7892
Epoch 26/80
391/391 [==============================] - 59s - loss: 0.7522 - acc: 0.8099 - val_lo
ss: 0.7514 - val_acc: 0.8094
Epoch 27/80
391/391 [==============================] - 59s - loss: 0.7425 - acc: 0.8122 - val_lo
ss: 0.7292 - val_acc: 0.8223
Epoch 28/80
391/391 [==============================] - 59s - loss: 0.7327 - acc: 0.8170 - val_lo
ss: 0.7591 - val_acc: 0.8139
Epoch 29/80
391/391 [==============================] - 59s - loss: 0.7225 - acc: 0.8193 - val_lo
ss: 0.7293 - val_acc: 0.8220
Epoch 30/80
391/391 [==============================] - 59s - loss: 0.7174 - acc: 0.8208 - val_lo
ss: 0.7240 - val_acc: 0.8244
Epoch 31/80
391/391 [==============================] - 59s - loss: 0.7010 - acc: 0.8262 - val_lo
ss: 0.7590 - val_acc: 0.8099
Epoch 32/80
391/391 [==============================] - 59s - loss: 0.6972 - acc: 0.8285 - val_lo
ss: 0.6977 - val_acc: 0.8288
Epoch 33/80
391/391 [==============================] - 59s - loss: 0.6830 - acc: 0.8321 - val_lo
ss: 0.7423 - val_acc: 0.8217
Epoch 34/80
391/391 [==============================] - 59s - loss: 0.6743 - acc: 0.8367 - val_lo
ss: 0.6654 - val_acc: 0.8409
Epoch 35/80
391/391 [==============================] - 59s - loss: 0.6697 - acc: 0.8353 - val_lo
ss: 0.6607 - val_acc: 0.8400
Epoch 36/80
391/391 [==============================] - 59s - loss: 0.6609 - acc: 0.8400 - val_lo
ss: 0.6868 - val_acc: 0.8339
Epoch 37/80
```

```
391/391 [==============================] - 59s - loss: 0.6585 - acc: 0.8401 - val_lo
ss: 0.6791 - val_acc: 0.8403
Epoch 38/80
391/391 [==============================] - 59s - loss: 0.6525 - acc: 0.8423 - val_lo
ss: 0.6803 - val_acc: 0.8337
Epoch 39/80
391/391 [==============================] - 59s - loss: 0.6430 - acc: 0.8450 - val_lo
ss: 0.6765 - val_acc: 0.8390
Epoch 40/80
391/391 [==============================] - 59s - loss: 0.6341 - acc: 0.8470 - val_lo
ss: 0.7002 - val_acc: 0.8321
Epoch 41/80
391/391 [==============================] - 59s - loss: 0.6331 - acc: 0.8486 - val_lo
ss: 0.6997 - val_acc: 0.8306
Epoch 42/80
391/391 [==============================] - 59s - loss: 0.6246 - acc: 0.8518 - val_lo
ss: 0.6547 - val_acc: 0.8430
Epoch 43/80
391/391 [==============================] - 59s - loss: 0.6206 - acc: 0.8526 - val_lo
ss: 0.6528 - val_acc: 0.8499
Epoch 44/80
391/391 [==============================] - 59s - loss: 0.6142 - acc: 0.8531 - val_lo
ss: 0.6658 - val_acc: 0.8464
Epoch 45/80
391/391 [==============================] - 59s - loss: 0.6083 - acc: 0.8580 - val_lo
ss: 0.6521 - val_acc: 0.8451
Epoch 46/80
391/391 [==============================] - 59s - loss: 0.6023 - acc: 0.8592 - val_lo
ss: 0.7119 - val_acc: 0.8297
Epoch 47/80
391/391 [==============================] - 59s - loss: 0.5973 - acc: 0.8602 - val_lo
ss: 0.6485 - val_acc: 0.8486
Epoch 48/80
391/391 [==============================] - 59s - loss: 0.5927 - acc: 0.8605 - val_lo
ss: 0.6653 - val_acc: 0.8475
Epoch 49/80
391/391 [==============================] - 59s - loss: 0.5846 - acc: 0.8641 - val_lo
ss: 0.6462 - val_acc: 0.8518
Epoch 50/80
391/391 [==============================] - 59s - loss: 0.5819 - acc: 0.8647 - val_lo
ss: 0.6471 - val_acc: 0.8509
Epoch 51/80
391/391 [==============================] - 59s - loss: 0.5766 - acc: 0.8676 - val_lo
ss: 0.6536 - val_acc: 0.8473
Epoch 52/80
391/391 [==============================] - 59s - loss: 0.5732 - acc: 0.8682 - val_lo
ss: 0.6527 - val_acc: 0.8493
Epoch 53/80
391/391 [==============================] - 59s - loss: 0.5709 - acc: 0.8681 - val_lo
ss: 0.6424 - val_acc: 0.8548
Epoch 54/80
391/391 [==============================] - 59s - loss: 0.5663 - acc: 0.8708 - val_lo
ss: 0.6443 - val_acc: 0.8520
Epoch 55/80
391/391 [==============================] - 59s - loss: 0.5632 - acc: 0.8719 - val_lo
ss: 0.6127 - val_acc: 0.8658
Epoch 56/80
391/391 [==============================] - 59s - loss: 0.5574 - acc: 0.8718 - val_lo
ss: 0.5866 - val_acc: 0.8658
Epoch 57/80
391/391 [==============================] - 59s - loss: 0.5502 - acc: 0.8743 - val_lo
ss: 0.6316 - val_acc: 0.8563
Epoch 58/80
391/391 [==============================] - 59s - loss: 0.5506 - acc: 0.8755 - val_lo
ss: 0.6409 - val_acc: 0.8518
```

```
Epoch 59/80
391/391 [==============================] - 59s - loss: 0.5510 - acc: 0.8748 - val_lo
ss: 0.6126 - val_acc: 0.8621
Epoch 60/80
391/391 [==============================] - 59s - loss: 0.5416 - acc: 0.8782 - val_lo
ss: 0.6099 - val_acc: 0.8613
Epoch 61/80
391/391 [==============================] - 59s - loss: 0.5398 - acc: 0.8770 - val_lo
ss: 0.6382 - val_acc: 0.8577
Epoch 62/80
391/391 [==============================] - 59s - loss: 0.5354 - acc: 0.8799 - val_lo
ss: 0.6290 - val_acc: 0.8592
Epoch 63/80
391/391 [==============================] - 59s - loss: 0.5342 - acc: 0.8818 - val_lo
ss: 0.5896 - val_acc: 0.8661
Epoch 64/80
391/391 [==============================] - 59s - loss: 0.5254 - acc: 0.8840 - val_lo
ss: 0.6263 - val_acc: 0.8605
Epoch 65/80
391/391 [==============================] - 59s - loss: 0.5234 - acc: 0.8835 - val_lo
ss: 0.6400 - val_acc: 0.8558
Epoch 66/80
391/391 [==============================] - 59s - loss: 0.5209 - acc: 0.8852 - val_lo
ss: 0.6071 - val_acc: 0.8645
Epoch 67/80
391/391 [==============================] - 59s - loss: 0.5242 - acc: 0.8847 - val_lo
ss: 0.6170 - val_acc: 0.8601
Epoch 68/80
391/391 [==============================] - 59s - loss: 0.5141 - acc: 0.8868 - val_lo
ss: 0.6413 - val_acc: 0.8553
Epoch 69/80
391/391 [==============================] - 59s - loss: 0.5141 - acc: 0.8872 - val_lo
ss: 0.6302 - val_acc: 0.8560
Epoch 70/80
391/391 [==============================] - 59s - loss: 0.5146 - acc: 0.8861 - val_lo
ss: 0.6094 - val_acc: 0.8656
Epoch 71/80
391/391 [==============================] - 59s - loss: 0.5099 - acc: 0.8876 - val_lo
ss: 0.6239 - val_acc: 0.8628
Epoch 72/80
391/391 [==============================] - 59s - loss: 0.5055 - acc: 0.8888 - val_lo
ss: 0.5704 - val_acc: 0.8717
Epoch 73/80
391/391 [==============================] - 59s - loss: 0.5081 - acc: 0.8894 - val_lo
ss: 0.6021 - val_acc: 0.8601
Epoch 74/80
391/391 [==============================] - 59s - loss: 0.5012 - acc: 0.8908 - val_lo
ss: 0.6050 - val_acc: 0.8679
Epoch 75/80
391/391 [==============================] - 59s - loss: 0.4985 - acc: 0.8915 - val_lo
ss: 0.5868 - val_acc: 0.8687
Epoch 76/80
391/391 [==============================] - 59s - loss: 0.4992 - acc: 0.8935 - val_lo
ss: 0.6157 - val_acc: 0.8670
Epoch 77/80
391/391 [==============================] - 59s - loss: 0.4936 - acc: 0.8940 - val_lo
ss: 0.5936 - val_acc: 0.8699
Epoch 78/80
391/391 [==============================] - 59s - loss: 0.4947 - acc: 0.8933 - val_lo
ss: 0.6098 - val_acc: 0.8620
Epoch 79/80
391/391 [==============================] - 59s - loss: 0.4856 - acc: 0.8960 - val_lo
ss: 0.5644 - val_acc: 0.8738
Epoch 80/80
391/391 [==============================] - 59s - loss: 0.4891 - acc: 0.8939 - val_lo
ss: 0.6044 - val_acc: 0.8663
```