Topics in Machine Learning

Project Report

Group Members:

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**Task 1:** Object centric image recognition Task

**Datasets:** Cifar10, Cifar100, Caltech-101, Caltech-256

**Language Used:** Python

**Project Requirements:** GPU based environment, Tensorflow Backend

**Top1 Accuracy:**

|  |  |  |
| --- | --- | --- |
| **Dataset** | **Training Accuracy** | **Testing Accuracy** |
| **Cifar10** | **89.51** | **87.56** |
| **Cifar100** | **79.37** | **68.01** |
| **Caltech101** | **99.34** | **45.40** |
| **Caltech256** | **93.7** | **92.96** |
| **TOP1 ACCURACY** | **90.48** | **73.48** |

**Cifar10:**

Dataset Description:

The CIFAR-10 dataset consists of 60000 32x32 colour images in 10 classes, with 6000 images per class. There are 50000 training images and 10000 test images.

Methods Used:

|  |  |
| --- | --- |
| Training Accuracy | Testing Accuracy |
| 89.51 | 87.56 |

Output:

**Model.summary( )**

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:66: The name tf.get\_default\_graph is deprecated. Please use tf.compat.v1.get\_default\_graph instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:541: The name tf.placeholder is deprecated. Please use tf.compat.v1.placeholder instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:4432: The name tf.random\_uniform is deprecated. Please use tf.random.uniform instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:148: The name tf.placeholder\_with\_default is deprecated. Please use tf.compat.v1.placeholder\_with\_default instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:3733: calling dropout (from tensorflow.python.ops.nn\_ops) with keep\_prob is deprecated and will be removed in a future version.

Instructions for updating:

Please use `rate` instead of `keep\_prob`. Rate should be set to `rate = 1 - keep\_prob`.

Model: "sequential\_1"

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Layer (type) Output Shape Param #

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conv2d\_1 (Conv2D) (None, 32, 32, 96) 2688

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dropout\_1 (Dropout) (None, 32, 32, 96) 0

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conv2d\_2 (Conv2D) (None, 32, 32, 96) 83040

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conv2d\_3 (Conv2D) (None, 16, 16, 96) 83040

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dropout\_2 (Dropout) (None, 16, 16, 96) 0

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conv2d\_4 (Conv2D) (None, 16, 16, 192) 166080

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conv2d\_5 (Conv2D) (None, 16, 16, 192) 331968

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conv2d\_6 (Conv2D) (None, 8, 8, 192) 331968

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dropout\_3 (Dropout) (None, 8, 8, 192) 0

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conv2d\_7 (Conv2D) (None, 8, 8, 192) 331968

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activation\_1 (Activation) (None, 8, 8, 192) 0

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conv2d\_8 (Conv2D) (None, 8, 8, 192) 37056

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activation\_2 (Activation) (None, 8, 8, 192) 0

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conv2d\_9 (Conv2D) (None, 8, 8, 10) 1930

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global\_average\_pooling2d\_1 ( (None, 10) 0

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activation\_3 (Activation) (None, 10) 0

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Total params: 1,369,738

Trainable params: 1,369,738

Non-trainable params: 0

**Accuracy Computation:**

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/tensorflow\_core/python/ops/math\_grad.py:1424: where (from tensorflow.python.ops.array\_ops) is deprecated and will be removed in a future version.

Instructions for updating:

Use tf.where in 2.0, which has the same broadcast rule as np.where

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:1033: The name tf.assign\_add is deprecated. Please use tf.compat.v1.assign\_add instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:1020: The name tf.assign is deprecated. Please use tf.compat.v1.assign instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:3005: The name tf.Session is deprecated. Please use tf.compat.v1.Session instead.

Epoch 1/250

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:190: The name tf.get\_default\_session is deprecated. Please use tf.compat.v1.get\_default\_session instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:197: The name tf.ConfigProto is deprecated. Please use tf.compat.v1.ConfigProto instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:207: The name tf.global\_variables is deprecated. Please use tf.compat.v1.global\_variables instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:216: The name tf.is\_variable\_initialized is deprecated. Please use tf.compat.v1.is\_variable\_initialized instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:223: The name tf.variables\_initializer is deprecated. Please use tf.compat.v1.variables\_initializer instead.

1563/1562 [==============================] - 38s 24ms/step - loss: 1.9591 - acc: 0.2590 - val\_loss: 1.7055 - val\_acc: 0.3734

Epoch 2/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.7211 - acc: 0.3670 - val\_loss: 1.6044 - val\_acc: 0.4220

Epoch 3/250

1563/1562 [==============================] - 30s 19ms/step - loss: 1.6037 - acc: 0.4124 - val\_loss: 1.4036 - val\_acc: 0.4777

Epoch 4/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.5219 - acc: 0.4432 - val\_loss: 1.3424 - val\_acc: 0.5066

Epoch 5/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.4491 - acc: 0.4739 - val\_loss: 1.2826 - val\_acc: 0.5343

Epoch 6/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.3972 - acc: 0.4940 - val\_loss: 1.2990 - val\_acc: 0.5436

Epoch 7/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.3522 - acc: 0.5133 - val\_loss: 1.2023 - val\_acc: 0.5697

Epoch 8/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.3160 - acc: 0.5270 - val\_loss: 1.1888 - val\_acc: 0.5782

Epoch 9/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.2806 - acc: 0.5401 - val\_loss: 1.2773 - val\_acc: 0.5586

Epoch 10/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.2510 - acc: 0.5518 - val\_loss: 1.2229 - val\_acc: 0.5769

Epoch 11/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.2248 - acc: 0.5643 - val\_loss: 1.1883 - val\_acc: 0.5921

Epoch 12/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.2006 - acc: 0.5712 - val\_loss: 1.1433 - val\_acc: 0.6031

Epoch 13/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.1748 - acc: 0.5800 - val\_loss: 1.1560 - val\_acc: 0.6029

Epoch 14/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.1599 - acc: 0.5863 - val\_loss: 1.2100 - val\_acc: 0.6047

Epoch 15/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.1449 - acc: 0.5928 - val\_loss: 1.1078 - val\_acc: 0.6203

Epoch 16/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.1205 - acc: 0.6061 - val\_loss: 0.9933 - val\_acc: 0.6567

Epoch 17/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.1065 - acc: 0.6078 - val\_loss: 0.9848 - val\_acc: 0.6604

Epoch 18/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.0875 - acc: 0.6147 - val\_loss: 0.9708 - val\_acc: 0.6650

Epoch 19/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.0724 - acc: 0.6197 - val\_loss: 1.0390 - val\_acc: 0.6467

Epoch 20/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.0596 - acc: 0.6237 - val\_loss: 1.0169 - val\_acc: 0.6585

Epoch 21/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.0464 - acc: 0.6310 - val\_loss: 0.9593 - val\_acc: 0.6762

Epoch 22/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.0354 - acc: 0.6358 - val\_loss: 1.0224 - val\_acc: 0.6557

Epoch 23/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.0153 - acc: 0.6410 - val\_loss: 0.9106 - val\_acc: 0.6881

Epoch 24/250

1563/1562 [==============================] - 31s 20ms/step - loss: 1.0018 - acc: 0.6448 - val\_loss: 1.1745 - val\_acc: 0.6282

Epoch 25/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9921 - acc: 0.6485 - val\_loss: 0.9651 - val\_acc: 0.6751

Epoch 26/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9768 - acc: 0.6548 - val\_loss: 1.0658 - val\_acc: 0.6587

Epoch 27/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9708 - acc: 0.6584 - val\_loss: 0.9300 - val\_acc: 0.6890

Epoch 28/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9619 - acc: 0.6628 - val\_loss: 0.8501 - val\_acc: 0.7135

Epoch 29/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9490 - acc: 0.6650 - val\_loss: 0.9463 - val\_acc: 0.6864

Epoch 30/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9355 - acc: 0.6698 - val\_loss: 0.8828 - val\_acc: 0.7027

Epoch 31/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9213 - acc: 0.6779 - val\_loss: 0.8672 - val\_acc: 0.7077

Epoch 32/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9132 - acc: 0.6798 - val\_loss: 0.8245 - val\_acc: 0.7224

Epoch 33/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.9062 - acc: 0.6823 - val\_loss: 0.8692 - val\_acc: 0.7125

Epoch 34/250

1563/1562 [==============================] - 30s 20ms/step - loss: 0.8890 - acc: 0.6889 - val\_loss: 0.9223 - val\_acc: 0.6978

Epoch 35/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8833 - acc: 0.6906 - val\_loss: 0.8163 - val\_acc: 0.7245

Epoch 36/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8696 - acc: 0.6945 - val\_loss: 0.8577 - val\_acc: 0.7178

Epoch 37/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8574 - acc: 0.7004 - val\_loss: 0.7620 - val\_acc: 0.7477

Epoch 38/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8462 - acc: 0.7037 - val\_loss: 0.8514 - val\_acc: 0.7201

Epoch 39/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8430 - acc: 0.7050 - val\_loss: 0.7514 - val\_acc: 0.7454

Epoch 40/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8340 - acc: 0.7094 - val\_loss: 0.8111 - val\_acc: 0.7311

Epoch 41/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8208 - acc: 0.7106 - val\_loss: 0.8548 - val\_acc: 0.7215

Epoch 42/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8187 - acc: 0.7131 - val\_loss: 0.8101 - val\_acc: 0.7311

Epoch 43/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8110 - acc: 0.7171 - val\_loss: 0.7577 - val\_acc: 0.7465

Epoch 44/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.8007 - acc: 0.7204 - val\_loss: 0.7789 - val\_acc: 0.7410

Epoch 45/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7965 - acc: 0.7204 - val\_loss: 0.8216 - val\_acc: 0.7354

Epoch 46/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7854 - acc: 0.7269 - val\_loss: 0.7441 - val\_acc: 0.7530

Epoch 47/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7771 - acc: 0.7293 - val\_loss: 0.8069 - val\_acc: 0.7337

Epoch 48/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7692 - acc: 0.7328 - val\_loss: 0.7380 - val\_acc: 0.7555

Epoch 49/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7665 - acc: 0.7319 - val\_loss: 0.7177 - val\_acc: 0.7598

Epoch 50/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7534 - acc: 0.7388 - val\_loss: 0.7882 - val\_acc: 0.7438

Epoch 51/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7475 - acc: 0.7402 - val\_loss: 0.7812 - val\_acc: 0.7502

Epoch 52/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7421 - acc: 0.7413 - val\_loss: 0.7535 - val\_acc: 0.7573

Epoch 53/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7335 - acc: 0.7431 - val\_loss: 0.6942 - val\_acc: 0.7711

Epoch 54/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7265 - acc: 0.7469 - val\_loss: 0.7679 - val\_acc: 0.7483

Epoch 55/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.7245 - acc: 0.7455 - val\_loss: 0.7145 - val\_acc: 0.7682

Epoch 56/250

1563/1562 [==============================] - 30s 19ms/step - loss: 0.7164 - acc: 0.7505 - val\_loss: 0.7614 - val\_acc: 0.7521

Epoch 57/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.7088 - acc: 0.7533 - val\_loss: 0.6927 - val\_acc: 0.7731

Epoch 58/250

1563/1562 [==============================] - 33s 21ms/step - loss: 0.6999 - acc: 0.7577 - val\_loss: 0.6794 - val\_acc: 0.7765

Epoch 59/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6950 - acc: 0.7594 - val\_loss: 0.6969 - val\_acc: 0.7676

Epoch 60/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6907 - acc: 0.7594 - val\_loss: 0.7819 - val\_acc: 0.7524

Epoch 61/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6833 - acc: 0.7603 - val\_loss: 0.7074 - val\_acc: 0.7715

Epoch 62/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.6850 - acc: 0.7598 - val\_loss: 0.6958 - val\_acc: 0.7710

Epoch 63/250

1563/1562 [==============================] - 32s 21ms/step - loss: 0.6704 - acc: 0.7662 - val\_loss: 0.7336 - val\_acc: 0.7675

Epoch 64/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6715 - acc: 0.7667 - val\_loss: 0.6636 - val\_acc: 0.7807

Epoch 65/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.6646 - acc: 0.7690 - val\_loss: 0.6684 - val\_acc: 0.7819

Epoch 66/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6583 - acc: 0.7713 - val\_loss: 0.6579 - val\_acc: 0.7849

Epoch 67/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.6585 - acc: 0.7704 - val\_loss: 0.7054 - val\_acc: 0.7725

Epoch 68/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.6513 - acc: 0.7731 - val\_loss: 0.6150 - val\_acc: 0.7958

Epoch 69/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.6471 - acc: 0.7752 - val\_loss: 0.6019 - val\_acc: 0.7967

Epoch 70/250

1563/1562 [==============================] - 32s 21ms/step - loss: 0.6384 - acc: 0.7782 - val\_loss: 0.7506 - val\_acc: 0.7669

Epoch 71/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6378 - acc: 0.7786 - val\_loss: 0.6201 - val\_acc: 0.8000

Epoch 72/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6310 - acc: 0.7794 - val\_loss: 0.6277 - val\_acc: 0.7961

Epoch 73/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6284 - acc: 0.7829 - val\_loss: 0.6879 - val\_acc: 0.7747

Epoch 74/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6217 - acc: 0.7829 - val\_loss: 0.5985 - val\_acc: 0.7998

Epoch 75/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6171 - acc: 0.7879 - val\_loss: 0.6655 - val\_acc: 0.7812

Epoch 76/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6169 - acc: 0.7863 - val\_loss: 0.6269 - val\_acc: 0.7892

Epoch 77/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.6081 - acc: 0.7891 - val\_loss: 0.6777 - val\_acc: 0.7847

Epoch 78/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.6076 - acc: 0.7869 - val\_loss: 0.6461 - val\_acc: 0.7900

Epoch 79/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.6007 - acc: 0.7911 - val\_loss: 0.6013 - val\_acc: 0.8059

Epoch 80/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5956 - acc: 0.7915 - val\_loss: 0.5721 - val\_acc: 0.8116

Epoch 81/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5917 - acc: 0.7942 - val\_loss: 0.5792 - val\_acc: 0.8140

Epoch 82/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5968 - acc: 0.7947 - val\_loss: 0.6535 - val\_acc: 0.7919

Epoch 83/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5847 - acc: 0.7981 - val\_loss: 0.6337 - val\_acc: 0.7963

Epoch 84/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5803 - acc: 0.7983 - val\_loss: 0.5598 - val\_acc: 0.8157

Epoch 85/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5821 - acc: 0.7974 - val\_loss: 0.6028 - val\_acc: 0.8041

Epoch 86/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5712 - acc: 0.8026 - val\_loss: 0.6947 - val\_acc: 0.7879

Epoch 87/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5729 - acc: 0.8023 - val\_loss: 0.5937 - val\_acc: 0.8106

Epoch 88/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5662 - acc: 0.8029 - val\_loss: 0.5921 - val\_acc: 0.8083

Epoch 89/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5634 - acc: 0.8046 - val\_loss: 0.5858 - val\_acc: 0.8108

Epoch 90/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5659 - acc: 0.8039 - val\_loss: 0.6178 - val\_acc: 0.8061

Epoch 91/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5550 - acc: 0.8080 - val\_loss: 0.5609 - val\_acc: 0.8158

Epoch 92/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5519 - acc: 0.8095 - val\_loss: 0.5278 - val\_acc: 0.8267

Epoch 93/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5495 - acc: 0.8093 - val\_loss: 0.5586 - val\_acc: 0.8219

Epoch 94/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5467 - acc: 0.8100 - val\_loss: 0.6103 - val\_acc: 0.8099

Epoch 95/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5450 - acc: 0.8114 - val\_loss: 0.6054 - val\_acc: 0.8106

Epoch 96/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5447 - acc: 0.8105 - val\_loss: 0.6380 - val\_acc: 0.7996

Epoch 97/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5345 - acc: 0.8135 - val\_loss: 0.5362 - val\_acc: 0.8269

Epoch 98/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5302 - acc: 0.8171 - val\_loss: 0.5314 - val\_acc: 0.8250

Epoch 99/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5287 - acc: 0.8147 - val\_loss: 0.5766 - val\_acc: 0.8190

Epoch 100/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5271 - acc: 0.8179 - val\_loss: 0.5226 - val\_acc: 0.8311

Epoch 101/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5288 - acc: 0.8155 - val\_loss: 0.5349 - val\_acc: 0.8249

Epoch 102/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5222 - acc: 0.8178 - val\_loss: 0.5495 - val\_acc: 0.8223

Epoch 103/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5202 - acc: 0.8177 - val\_loss: 0.5882 - val\_acc: 0.8151

Epoch 104/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5191 - acc: 0.8218 - val\_loss: 0.5590 - val\_acc: 0.8230

Epoch 105/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5115 - acc: 0.8216 - val\_loss: 0.5540 - val\_acc: 0.8275

Epoch 106/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5132 - acc: 0.8219 - val\_loss: 0.5097 - val\_acc: 0.8335

Epoch 107/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5129 - acc: 0.8203 - val\_loss: 0.5290 - val\_acc: 0.8308

Epoch 108/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.5093 - acc: 0.8223 - val\_loss: 0.5487 - val\_acc: 0.8271

Epoch 109/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5049 - acc: 0.8244 - val\_loss: 0.5189 - val\_acc: 0.8393

Epoch 110/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.5034 - acc: 0.8246 - val\_loss: 0.5523 - val\_acc: 0.8216

Epoch 111/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4962 - acc: 0.8262 - val\_loss: 0.5082 - val\_acc: 0.8345

Epoch 112/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4962 - acc: 0.8263 - val\_loss: 0.5469 - val\_acc: 0.8280

Epoch 113/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4928 - acc: 0.8300 - val\_loss: 0.4987 - val\_acc: 0.8380

Epoch 114/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4875 - acc: 0.8308 - val\_loss: 0.5107 - val\_acc: 0.8401

Epoch 115/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4831 - acc: 0.8318 - val\_loss: 0.5598 - val\_acc: 0.8246

Epoch 116/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4886 - acc: 0.8306 - val\_loss: 0.5416 - val\_acc: 0.8287

Epoch 117/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4871 - acc: 0.8310 - val\_loss: 0.6099 - val\_acc: 0.8108

Epoch 118/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4815 - acc: 0.8327 - val\_loss: 0.5247 - val\_acc: 0.8335

Epoch 119/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4831 - acc: 0.8317 - val\_loss: 0.5520 - val\_acc: 0.8237

Epoch 120/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4722 - acc: 0.8355 - val\_loss: 0.4830 - val\_acc: 0.8498

Epoch 121/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4713 - acc: 0.8376 - val\_loss: 0.5482 - val\_acc: 0.8330

Epoch 122/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4735 - acc: 0.8367 - val\_loss: 0.5453 - val\_acc: 0.8344

Epoch 123/250

1563/1562 [==============================] - 37s 24ms/step - loss: 0.4649 - acc: 0.8366 - val\_loss: 0.4841 - val\_acc: 0.8436

Epoch 124/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4678 - acc: 0.8387 - val\_loss: 0.4752 - val\_acc: 0.8463

Epoch 125/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4671 - acc: 0.8383 - val\_loss: 0.5085 - val\_acc: 0.8409

Epoch 126/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4627 - acc: 0.8377 - val\_loss: 0.5546 - val\_acc: 0.8335

Epoch 127/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4582 - acc: 0.8398 - val\_loss: 0.5542 - val\_acc: 0.8259

Epoch 128/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4610 - acc: 0.8388 - val\_loss: 0.4981 - val\_acc: 0.8443

Epoch 129/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4571 - acc: 0.8405 - val\_loss: 0.5137 - val\_acc: 0.8382

Epoch 130/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4562 - acc: 0.8431 - val\_loss: 0.4931 - val\_acc: 0.8466

Epoch 131/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4500 - acc: 0.8432 - val\_loss: 0.4762 - val\_acc: 0.8490

Epoch 132/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4457 - acc: 0.8431 - val\_loss: 0.4952 - val\_acc: 0.8427

Epoch 133/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4501 - acc: 0.8433 - val\_loss: 0.4951 - val\_acc: 0.8488

Epoch 134/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4442 - acc: 0.8453 - val\_loss: 0.5175 - val\_acc: 0.8417

Epoch 135/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4430 - acc: 0.8451 - val\_loss: 0.4900 - val\_acc: 0.8501

Epoch 136/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4409 - acc: 0.8453 - val\_loss: 0.5146 - val\_acc: 0.8403

Epoch 137/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4407 - acc: 0.8452 - val\_loss: 0.4493 - val\_acc: 0.8545

Epoch 138/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4408 - acc: 0.8464 - val\_loss: 0.5233 - val\_acc: 0.8422

Epoch 139/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4353 - acc: 0.8484 - val\_loss: 0.4971 - val\_acc: 0.8489

Epoch 140/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4280 - acc: 0.8484 - val\_loss: 0.4698 - val\_acc: 0.8524

Epoch 141/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4300 - acc: 0.8500 - val\_loss: 0.5349 - val\_acc: 0.8369

Epoch 142/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4303 - acc: 0.8483 - val\_loss: 0.4924 - val\_acc: 0.8474

Epoch 143/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4265 - acc: 0.8523 - val\_loss: 0.4728 - val\_acc: 0.8541

Epoch 144/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4273 - acc: 0.8515 - val\_loss: 0.5094 - val\_acc: 0.8480

Epoch 145/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4214 - acc: 0.8532 - val\_loss: 0.5113 - val\_acc: 0.8429

Epoch 146/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4175 - acc: 0.8546 - val\_loss: 0.5175 - val\_acc: 0.8450

Epoch 147/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4161 - acc: 0.8550 - val\_loss: 0.6045 - val\_acc: 0.8223

Epoch 148/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4239 - acc: 0.8520 - val\_loss: 0.4762 - val\_acc: 0.8505

Epoch 149/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4184 - acc: 0.8533 - val\_loss: 0.4808 - val\_acc: 0.8513

Epoch 150/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4156 - acc: 0.8550 - val\_loss: 0.4785 - val\_acc: 0.8479

Epoch 151/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4122 - acc: 0.8561 - val\_loss: 0.4544 - val\_acc: 0.8585

Epoch 152/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4069 - acc: 0.8568 - val\_loss: 0.4648 - val\_acc: 0.8589

Epoch 153/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4108 - acc: 0.8564 - val\_loss: 0.5114 - val\_acc: 0.8451

Epoch 154/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4064 - acc: 0.8581 - val\_loss: 0.4521 - val\_acc: 0.8576

Epoch 155/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4022 - acc: 0.8613 - val\_loss: 0.4821 - val\_acc: 0.8562

Epoch 156/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4094 - acc: 0.8568 - val\_loss: 0.4873 - val\_acc: 0.8499

Epoch 157/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.4045 - acc: 0.8584 - val\_loss: 0.4812 - val\_acc: 0.8496

Epoch 158/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4014 - acc: 0.8590 - val\_loss: 0.4987 - val\_acc: 0.8522

Epoch 159/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.4035 - acc: 0.8599 - val\_loss: 0.5347 - val\_acc: 0.8406

Epoch 160/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3991 - acc: 0.8603 - val\_loss: 0.5147 - val\_acc: 0.8473

Epoch 161/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3976 - acc: 0.8612 - val\_loss: 0.4829 - val\_acc: 0.8535

Epoch 162/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3970 - acc: 0.8603 - val\_loss: 0.4857 - val\_acc: 0.8563

Epoch 163/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3937 - acc: 0.8622 - val\_loss: 0.4873 - val\_acc: 0.8516

Epoch 164/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3947 - acc: 0.8617 - val\_loss: 0.4573 - val\_acc: 0.8591

Epoch 165/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3917 - acc: 0.8627 - val\_loss: 0.4748 - val\_acc: 0.8539

Epoch 166/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3922 - acc: 0.8613 - val\_loss: 0.5007 - val\_acc: 0.8504

Epoch 167/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3788 - acc: 0.8692 - val\_loss: 0.5005 - val\_acc: 0.8506

Epoch 168/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3855 - acc: 0.8636 - val\_loss: 0.4580 - val\_acc: 0.8610

Epoch 169/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3822 - acc: 0.8677 - val\_loss: 0.4523 - val\_acc: 0.8610

Epoch 170/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3827 - acc: 0.8663 - val\_loss: 0.5225 - val\_acc: 0.8490

Epoch 171/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3808 - acc: 0.8661 - val\_loss: 0.5494 - val\_acc: 0.8443

Epoch 172/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3877 - acc: 0.8647 - val\_loss: 0.5132 - val\_acc: 0.8522

Epoch 173/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3767 - acc: 0.8678 - val\_loss: 0.4638 - val\_acc: 0.8601

Epoch 174/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3804 - acc: 0.8671 - val\_loss: 0.4594 - val\_acc: 0.8607

Epoch 175/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3775 - acc: 0.8671 - val\_loss: 0.4814 - val\_acc: 0.8580

Epoch 176/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3767 - acc: 0.8690 - val\_loss: 0.5362 - val\_acc: 0.8441

Epoch 177/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3738 - acc: 0.8697 - val\_loss: 0.4794 - val\_acc: 0.8566

Epoch 178/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3729 - acc: 0.8683 - val\_loss: 0.4714 - val\_acc: 0.8598

Epoch 179/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3741 - acc: 0.8676 - val\_loss: 0.4609 - val\_acc: 0.8648

Epoch 180/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3673 - acc: 0.8708 - val\_loss: 0.5026 - val\_acc: 0.8536

Epoch 181/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3735 - acc: 0.8693 - val\_loss: 0.4752 - val\_acc: 0.8558

Epoch 182/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3654 - acc: 0.8730 - val\_loss: 0.4716 - val\_acc: 0.8623

Epoch 183/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3691 - acc: 0.8704 - val\_loss: 0.4975 - val\_acc: 0.8518

Epoch 184/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3663 - acc: 0.8724 - val\_loss: 0.5936 - val\_acc: 0.8397

Epoch 185/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3701 - acc: 0.8698 - val\_loss: 0.5032 - val\_acc: 0.8543

Epoch 186/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3619 - acc: 0.8732 - val\_loss: 0.4375 - val\_acc: 0.8636

Epoch 187/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3582 - acc: 0.8734 - val\_loss: 0.4389 - val\_acc: 0.8691

Epoch 188/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3595 - acc: 0.8745 - val\_loss: 0.4594 - val\_acc: 0.8641

Epoch 189/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3598 - acc: 0.8738 - val\_loss: 0.4407 - val\_acc: 0.8680

Epoch 190/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3582 - acc: 0.8738 - val\_loss: 0.4271 - val\_acc: 0.8685

Epoch 191/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3605 - acc: 0.8739 - val\_loss: 0.5729 - val\_acc: 0.8365

Epoch 192/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3550 - acc: 0.8750 - val\_loss: 0.4614 - val\_acc: 0.8600

Epoch 193/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3593 - acc: 0.8745 - val\_loss: 0.4880 - val\_acc: 0.8580

Epoch 194/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3526 - acc: 0.8754 - val\_loss: 0.4727 - val\_acc: 0.8647

Epoch 195/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3535 - acc: 0.8759 - val\_loss: 0.4795 - val\_acc: 0.8659

Epoch 196/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3576 - acc: 0.8757 - val\_loss: 0.5021 - val\_acc: 0.8581

Epoch 197/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3502 - acc: 0.8770 - val\_loss: 0.4312 - val\_acc: 0.8746

Epoch 198/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3452 - acc: 0.8805 - val\_loss: 0.4817 - val\_acc: 0.8578

Epoch 199/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3474 - acc: 0.8778 - val\_loss: 0.4660 - val\_acc: 0.8659

Epoch 200/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3471 - acc: 0.8783 - val\_loss: 0.4591 - val\_acc: 0.8650

Epoch 201/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3456 - acc: 0.8796 - val\_loss: 0.4325 - val\_acc: 0.8730

Epoch 202/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3449 - acc: 0.8793 - val\_loss: 0.4525 - val\_acc: 0.8681

Epoch 203/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3434 - acc: 0.8796 - val\_loss: 0.4408 - val\_acc: 0.8650

Epoch 204/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3455 - acc: 0.8807 - val\_loss: 0.5007 - val\_acc: 0.8598

Epoch 205/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3376 - acc: 0.8814 - val\_loss: 0.4344 - val\_acc: 0.8785

Epoch 206/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3438 - acc: 0.8796 - val\_loss: 0.4723 - val\_acc: 0.8667

Epoch 207/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3408 - acc: 0.8785 - val\_loss: 0.4919 - val\_acc: 0.8600

Epoch 208/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3401 - acc: 0.8787 - val\_loss: 0.4785 - val\_acc: 0.8635

Epoch 209/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3362 - acc: 0.8820 - val\_loss: 0.4681 - val\_acc: 0.8670

Epoch 210/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3352 - acc: 0.8826 - val\_loss: 0.4240 - val\_acc: 0.8747

Epoch 211/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3323 - acc: 0.8825 - val\_loss: 0.4515 - val\_acc: 0.8680

Epoch 212/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3377 - acc: 0.8815 - val\_loss: 0.4436 - val\_acc: 0.8696

Epoch 213/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3312 - acc: 0.8833 - val\_loss: 0.4399 - val\_acc: 0.8696

Epoch 214/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3336 - acc: 0.8837 - val\_loss: 0.4616 - val\_acc: 0.8669

Epoch 215/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3371 - acc: 0.8839 - val\_loss: 0.4532 - val\_acc: 0.8640

Epoch 216/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3299 - acc: 0.8847 - val\_loss: 0.4990 - val\_acc: 0.8604

Epoch 217/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3330 - acc: 0.8817 - val\_loss: 0.4507 - val\_acc: 0.8664

Epoch 218/250

1563/1562 [==============================] - 32s 21ms/step - loss: 0.3259 - acc: 0.8857 - val\_loss: 0.4495 - val\_acc: 0.8724

Epoch 219/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3251 - acc: 0.8862 - val\_loss: 0.4253 - val\_acc: 0.8711

Epoch 220/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3238 - acc: 0.8860 - val\_loss: 0.4173 - val\_acc: 0.8761

Epoch 221/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3229 - acc: 0.8863 - val\_loss: 0.4328 - val\_acc: 0.8696

Epoch 222/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3261 - acc: 0.8859 - val\_loss: 0.4932 - val\_acc: 0.8617

Epoch 223/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3251 - acc: 0.8850 - val\_loss: 0.4728 - val\_acc: 0.8630

Epoch 224/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3215 - acc: 0.8857 - val\_loss: 0.4936 - val\_acc: 0.8583

Epoch 225/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3191 - acc: 0.8882 - val\_loss: 0.4882 - val\_acc: 0.8603

Epoch 226/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3232 - acc: 0.8869 - val\_loss: 0.4250 - val\_acc: 0.8750

Epoch 227/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3184 - acc: 0.8872 - val\_loss: 0.4809 - val\_acc: 0.8677

Epoch 228/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3208 - acc: 0.8874 - val\_loss: 0.4703 - val\_acc: 0.8655

Epoch 229/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3180 - acc: 0.8891 - val\_loss: 0.4575 - val\_acc: 0.8675

Epoch 230/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3151 - acc: 0.8894 - val\_loss: 0.5131 - val\_acc: 0.8578

Epoch 231/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3203 - acc: 0.8896 - val\_loss: 0.4445 - val\_acc: 0.8740

Epoch 232/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3106 - acc: 0.8907 - val\_loss: 0.4935 - val\_acc: 0.8601

Epoch 233/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3144 - acc: 0.8899 - val\_loss: 0.4845 - val\_acc: 0.8629

Epoch 234/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3112 - acc: 0.8919 - val\_loss: 0.4648 - val\_acc: 0.8702

Epoch 235/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3120 - acc: 0.8926 - val\_loss: 0.4216 - val\_acc: 0.8780

Epoch 236/250

1563/1562 [==============================] - 32s 21ms/step - loss: 0.3137 - acc: 0.8904 - val\_loss: 0.4612 - val\_acc: 0.8625

Epoch 237/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3112 - acc: 0.8923 - val\_loss: 0.4646 - val\_acc: 0.8705

Epoch 238/250

1563/1562 [==============================] - 32s 20ms/step - loss: 0.3102 - acc: 0.8910 - val\_loss: 0.4647 - val\_acc: 0.8688

Epoch 239/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3131 - acc: 0.8904 - val\_loss: 0.4494 - val\_acc: 0.8717

Epoch 240/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3083 - acc: 0.8922 - val\_loss: 0.4409 - val\_acc: 0.8755

Epoch 241/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3080 - acc: 0.8912 - val\_loss: 0.4737 - val\_acc: 0.8688

Epoch 242/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3055 - acc: 0.8937 - val\_loss: 0.4585 - val\_acc: 0.8693

Epoch 243/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3033 - acc: 0.8924 - val\_loss: 0.4891 - val\_acc: 0.8631

Epoch 244/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3089 - acc: 0.8914 - val\_loss: 0.4373 - val\_acc: 0.8723

Epoch 245/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3075 - acc: 0.8937 - val\_loss: 0.4491 - val\_acc: 0.8738

Epoch 246/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3081 - acc: 0.8925 - val\_loss: 0.4549 - val\_acc: 0.8725

Epoch 247/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3001 - acc: 0.8945 - val\_loss: 0.4422 - val\_acc: 0.8740

Epoch 248/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.3020 - acc: 0.8924 - val\_loss: 0.4508 - val\_acc: 0.8678

Epoch 249/250

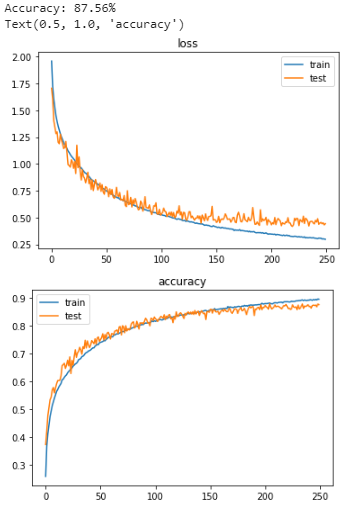
1563/1562 [==============================] - 31s 20ms/step - loss: 0.2999 - acc: 0.8961 - val\_loss: 0.4317 - val\_acc: 0.8779

Epoch 250/250

1563/1562 [==============================] - 31s 20ms/step - loss: 0.2976 - acc: 0.8951 - val\_loss: 0.4428 - val\_acc: 0.8756

Accuracy: 87.56%

Text(0.5, 1.0, 'accuracy')



**Cifar100:**

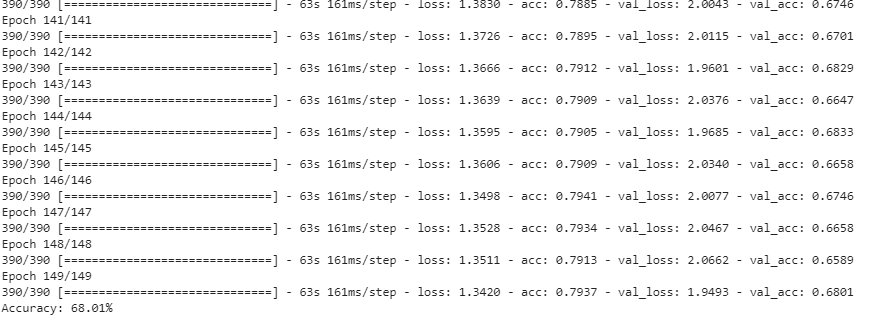
Dataset Description:

This dataset is just like the CIFAR-10, except it has 100 classes containing 600 images each. There are 500 training images and 100 testing images per class. The 100 classes in the CIFAR-100 are grouped into 20 superclasses. Each image comes with a "fine" label (the class to which it belongs) and a "coarse" label (the superclass to which it belongs).

Methods Used: CNN

|  |  |
| --- | --- |
| Training Accuracy | Testing Accuracy |
| 79.37 | 68.01 |

**Output:**



**Accuracy Computation & Model.summary( )**

121.93584

68.38902

Model: "sequential\_3"

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Layer (type) Output Shape Param #

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conv2d\_21 (Conv2D) (None, 64, 32, 32) 1792

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batch\_normalization\_23 (Batc (None, 64, 32, 32) 128

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dropout\_17 (Dropout) (None, 64, 32, 32) 0

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conv2d\_22 (Conv2D) (None, 64, 32, 32) 36928

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batch\_normalization\_24 (Batc (None, 64, 32, 32) 128

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max\_pooling2d\_9 (MaxPooling2 (None, 64, 16, 16) 0

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conv2d\_23 (Conv2D) (None, 128, 16, 16) 73856

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batch\_normalization\_25 (Batc (None, 128, 16, 16) 64

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dropout\_18 (Dropout) (None, 128, 16, 16) 0

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conv2d\_24 (Conv2D) (None, 128, 16, 16) 147584

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batch\_normalization\_26 (Batc (None, 128, 16, 16) 64

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max\_pooling2d\_10 (MaxPooling (None, 128, 8, 8) 0

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conv2d\_25 (Conv2D) (None, 256, 8, 8) 295168

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batch\_normalization\_27 (Batc (None, 256, 8, 8) 32

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dropout\_19 (Dropout) (None, 256, 8, 8) 0

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conv2d\_26 (Conv2D) (None, 256, 8, 8) 590080

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batch\_normalization\_28 (Batc (None, 256, 8, 8) 32

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dropout\_20 (Dropout) (None, 256, 8, 8) 0

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conv2d\_27 (Conv2D) (None, 256, 8, 8) 590080

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batch\_normalization\_29 (Batc (None, 256, 8, 8) 32

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max\_pooling2d\_11 (MaxPooling (None, 256, 4, 4) 0

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conv2d\_28 (Conv2D) (None, 512, 4, 4) 1180160

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batch\_normalization\_30 (Batc (None, 512, 4, 4) 16

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dropout\_21 (Dropout) (None, 512, 4, 4) 0

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conv2d\_29 (Conv2D) (None, 512, 4, 4) 2359808

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batch\_normalization\_31 (Batc (None, 512, 4, 4) 16

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dropout\_22 (Dropout) (None, 512, 4, 4) 0

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conv2d\_30 (Conv2D) (None, 512, 4, 4) 2359808

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batch\_normalization\_32 (Batc (None, 512, 4, 4) 16

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max\_pooling2d\_12 (MaxPooling (None, 512, 2, 2) 0

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dropout\_23 (Dropout) (None, 512, 2, 2) 0

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flatten\_3 (Flatten) (None, 2048) 0

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dense\_5 (Dense) (None, 512) 1049088

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batch\_normalization\_33 (Batc (None, 512) 2048

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dropout\_24 (Dropout) (None, 512) 0

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dense\_6 (Dense) (None, 100) 51300

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Total params: 8,738,228

Trainable params: 8,736,940

Non-trainable params: 1,288

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Epoch 1/1

390/390 [==============================] - 70s 178ms/step - loss: 7.1836 - acc: 0.0104 - val\_loss: 6.3424 - val\_acc: 0.0100

Epoch 2/2

390/390 [==============================] - 63s 162ms/step - loss: 5.7822 - acc: 0.0099 - val\_loss: 5.4775 - val\_acc: 0.0100

Epoch 3/3

390/390 [==============================] - 63s 162ms/step - loss: 5.1646 - acc: 0.0104 - val\_loss: 4.9812 - val\_acc: 0.0100

Epoch 4/4

390/390 [==============================] - 63s 162ms/step - loss: 4.8872 - acc: 0.0102 - val\_loss: 4.8027 - val\_acc: 0.0100

Epoch 5/5

390/390 [==============================] - 63s 162ms/step - loss: 4.7679 - acc: 0.0095 - val\_loss: 4.7247 - val\_acc: 0.0100

Epoch 6/6

390/390 [==============================] - 63s 162ms/step - loss: 4.7123 - acc: 0.0104 - val\_loss: 5.0559 - val\_acc: 0.0100

Epoch 7/7

390/390 [==============================] - 63s 162ms/step - loss: 4.6829 - acc: 0.0097 - val\_loss: 4.6639 - val\_acc: 0.0100

Epoch 8/8

390/390 [==============================] - 63s 161ms/step - loss: 4.6642 - acc: 0.0095 - val\_loss: 4.8344 - val\_acc: 0.0100

Epoch 9/9

390/390 [==============================] - 63s 161ms/step - loss: 4.6611 - acc: 0.0100 - val\_loss: 4.6469 - val\_acc: 0.0100

Epoch 10/10

390/390 [==============================] - 63s 161ms/step - loss: 4.6581 - acc: 0.0095 - val\_loss: 4.9291 - val\_acc: 0.0100

Epoch 11/11

390/390 [==============================] - 63s 162ms/step - loss: 5.3967 - acc: 0.0193 - val\_loss: 11.0596 - val\_acc: 0.0138

Epoch 12/12

390/390 [==============================] - 63s 161ms/step - loss: 5.7455 - acc: 0.0315 - val\_loss: 7.6256 - val\_acc: 0.0206

Epoch 13/13

390/390 [==============================] - 63s 161ms/step - loss: 5.4280 - acc: 0.0427 - val\_loss: 5.0810 - val\_acc: 0.0427

Epoch 14/14

390/390 [==============================] - 64s 163ms/step - loss: 4.8950 - acc: 0.0583 - val\_loss: 4.9167 - val\_acc: 0.0651

Epoch 15/15

390/390 [==============================] - 63s 163ms/step - loss: 4.5217 - acc: 0.0820 - val\_loss: 4.2471 - val\_acc: 0.1140

Epoch 16/16

390/390 [==============================] - 64s 163ms/step - loss: 4.1859 - acc: 0.1148 - val\_loss: 3.8778 - val\_acc: 0.1611

Epoch 17/17

390/390 [==============================] - 64s 163ms/step - loss: 3.9868 - acc: 0.1387 - val\_loss: 3.8055 - val\_acc: 0.1861

Epoch 18/18

390/390 [==============================] - 64s 163ms/step - loss: 3.9531 - acc: 0.1600 - val\_loss: 3.9060 - val\_acc: 0.1810

Epoch 19/19

390/390 [==============================] - 63s 163ms/step - loss: 3.9096 - acc: 0.1819 - val\_loss: 3.8916 - val\_acc: 0.1858

Epoch 20/20

390/390 [==============================] - 63s 162ms/step - loss: 3.8274 - acc: 0.2034 - val\_loss: 3.5811 - val\_acc: 0.2578

Epoch 21/21

390/390 [==============================] - 63s 161ms/step - loss: 3.7568 - acc: 0.2244 - val\_loss: 3.4823 - val\_acc: 0.2860

Epoch 22/22

390/390 [==============================] - 63s 161ms/step - loss: 3.7502 - acc: 0.2454 - val\_loss: 4.6569 - val\_acc: 0.2192

Epoch 23/23

390/390 [==============================] - 63s 162ms/step - loss: 3.8111 - acc: 0.2657 - val\_loss: 3.6397 - val\_acc: 0.2969

Epoch 24/24

390/390 [==============================] - 64s 163ms/step - loss: 3.6418 - acc: 0.2912 - val\_loss: 3.3987 - val\_acc: 0.3510

Epoch 25/25

390/390 [==============================] - 70s 179ms/step - loss: 3.3127 - acc: 0.3485 - val\_loss: 3.0795 - val\_acc: 0.3914

Epoch 26/26

390/390 [==============================] - 64s 163ms/step - loss: 3.1640 - acc: 0.3665 - val\_loss: 3.0404 - val\_acc: 0.3988

Epoch 27/27

390/390 [==============================] - 64s 163ms/step - loss: 3.1029 - acc: 0.3785 - val\_loss: 3.1048 - val\_acc: 0.3825

Epoch 28/28

390/390 [==============================] - 64s 163ms/step - loss: 3.0748 - acc: 0.3887 - val\_loss: 2.8500 - val\_acc: 0.4361

Epoch 29/29

390/390 [==============================] - 64s 163ms/step - loss: 3.0504 - acc: 0.3973 - val\_loss: 2.8180 - val\_acc: 0.4521

Epoch 30/30

390/390 [==============================] - 64s 163ms/step - loss: 3.0362 - acc: 0.4105 - val\_loss: 3.0546 - val\_acc: 0.4252

Epoch 31/31

390/390 [==============================] - 64s 163ms/step - loss: 3.0347 - acc: 0.4160 - val\_loss: 2.8692 - val\_acc: 0.4593

Epoch 32/32

390/390 [==============================] - 64s 163ms/step - loss: 3.0267 - acc: 0.4240 - val\_loss: 2.8273 - val\_acc: 0.4733

Epoch 33/33

390/390 [==============================] - 64s 163ms/step - loss: 3.0161 - acc: 0.4320 - val\_loss: 3.0187 - val\_acc: 0.4494

Epoch 34/34

390/390 [==============================] - 64s 163ms/step - loss: 3.0195 - acc: 0.4385 - val\_loss: 2.9318 - val\_acc: 0.4652

Epoch 35/35

390/390 [==============================] - 64s 163ms/step - loss: 3.0085 - acc: 0.4448 - val\_loss: 2.9191 - val\_acc: 0.4684

Epoch 36/36

390/390 [==============================] - 64s 163ms/step - loss: 3.0090 - acc: 0.4522 - val\_loss: 2.9872 - val\_acc: 0.4666

Epoch 37/37

390/390 [==============================] - 64s 163ms/step - loss: 3.0145 - acc: 0.4567 - val\_loss: 2.9263 - val\_acc: 0.4808

Epoch 38/38

390/390 [==============================] - 63s 163ms/step - loss: 3.0079 - acc: 0.4616 - val\_loss: 2.9204 - val\_acc: 0.4928

Epoch 39/39

390/390 [==============================] - 64s 163ms/step - loss: 3.0174 - acc: 0.4637 - val\_loss: 2.9109 - val\_acc: 0.4938

Epoch 40/40

390/390 [==============================] - 64s 164ms/step - loss: 3.0115 - acc: 0.4705 - val\_loss: 3.0277 - val\_acc: 0.4766

Epoch 41/41

390/390 [==============================] - 64s 163ms/step - loss: 3.0094 - acc: 0.4732 - val\_loss: 3.0352 - val\_acc: 0.4844

Epoch 42/42

390/390 [==============================] - 63s 163ms/step - loss: 3.0044 - acc: 0.4766 - val\_loss: 2.9597 - val\_acc: 0.5014

Epoch 43/43

390/390 [==============================] - 64s 163ms/step - loss: 3.0212 - acc: 0.4779 - val\_loss: 2.8864 - val\_acc: 0.5139

Epoch 44/44

390/390 [==============================] - 64s 163ms/step - loss: 3.0112 - acc: 0.4837 - val\_loss: 2.9800 - val\_acc: 0.5044

Epoch 45/45

390/390 [==============================] - 64s 163ms/step - loss: 3.0215 - acc: 0.4845 - val\_loss: 2.9281 - val\_acc: 0.5185

Epoch 46/46

390/390 [==============================] - 64s 163ms/step - loss: 3.0168 - acc: 0.4903 - val\_loss: 2.8627 - val\_acc: 0.5295

Epoch 47/47

390/390 [==============================] - 64s 163ms/step - loss: 3.0050 - acc: 0.4940 - val\_loss: 3.0102 - val\_acc: 0.5035

Epoch 48/48

390/390 [==============================] - 64s 163ms/step - loss: 3.0199 - acc: 0.4964 - val\_loss: 2.8743 - val\_acc: 0.5324

Epoch 49/49

390/390 [==============================] - 65s 166ms/step - loss: 3.0122 - acc: 0.4959 - val\_loss: 2.9218 - val\_acc: 0.5260

Epoch 50/50

390/390 [==============================] - 71s 183ms/step - loss: 2.7666 - acc: 0.5437 - val\_loss: 2.6802 - val\_acc: 0.5599

Epoch 51/51

390/390 [==============================] - 64s 164ms/step - loss: 2.6303 - acc: 0.5584 - val\_loss: 2.6799 - val\_acc: 0.5490

Epoch 52/52

390/390 [==============================] - 64s 163ms/step - loss: 2.5820 - acc: 0.5575 - val\_loss: 2.5020 - val\_acc: 0.5719

Epoch 53/53

390/390 [==============================] - 64s 164ms/step - loss: 2.5380 - acc: 0.5620 - val\_loss: 2.6041 - val\_acc: 0.5586

Epoch 54/54

390/390 [==============================] - 64s 163ms/step - loss: 2.5332 - acc: 0.5596 - val\_loss: 2.5597 - val\_acc: 0.5651

Epoch 55/55

390/390 [==============================] - 64s 163ms/step - loss: 2.5177 - acc: 0.5671 - val\_loss: 2.6992 - val\_acc: 0.5381

Epoch 56/56

390/390 [==============================] - 64s 163ms/step - loss: 2.5119 - acc: 0.5671 - val\_loss: 2.5365 - val\_acc: 0.5713

Epoch 57/57

390/390 [==============================] - 64s 163ms/step - loss: 2.5093 - acc: 0.5660 - val\_loss: 2.5713 - val\_acc: 0.5637

Epoch 58/58

390/390 [==============================] - 64s 164ms/step - loss: 2.5149 - acc: 0.5694 - val\_loss: 2.5065 - val\_acc: 0.5759

Epoch 59/59

390/390 [==============================] - 64s 163ms/step - loss: 2.5071 - acc: 0.5694 - val\_loss: 2.6314 - val\_acc: 0.5575

Epoch 60/60

390/390 [==============================] - 64s 163ms/step - loss: 2.5091 - acc: 0.5728 - val\_loss: 2.5992 - val\_acc: 0.5631

Epoch 61/61

390/390 [==============================] - 64s 163ms/step - loss: 2.5213 - acc: 0.5716 - val\_loss: 2.6177 - val\_acc: 0.5581

Epoch 62/62

390/390 [==============================] - 64s 163ms/step - loss: 2.5161 - acc: 0.5726 - val\_loss: 2.5767 - val\_acc: 0.5749

Epoch 63/63

390/390 [==============================] - 64s 163ms/step - loss: 2.5101 - acc: 0.5788 - val\_loss: 2.5071 - val\_acc: 0.5830

Epoch 64/64

390/390 [==============================] - 64s 163ms/step - loss: 2.5138 - acc: 0.5808 - val\_loss: 2.5741 - val\_acc: 0.5750

Epoch 65/65

390/390 [==============================] - 64s 163ms/step - loss: 2.5187 - acc: 0.5797 - val\_loss: 2.5628 - val\_acc: 0.5755

Epoch 66/66

390/390 [==============================] - 64s 163ms/step - loss: 2.5115 - acc: 0.5803 - val\_loss: 2.5253 - val\_acc: 0.5910

Epoch 67/67

390/390 [==============================] - 64s 163ms/step - loss: 2.5212 - acc: 0.5829 - val\_loss: 2.6426 - val\_acc: 0.5625

Epoch 68/68

390/390 [==============================] - 64s 163ms/step - loss: 2.5244 - acc: 0.5828 - val\_loss: 2.6438 - val\_acc: 0.5647

Epoch 69/69

390/390 [==============================] - 64s 163ms/step - loss: 2.5261 - acc: 0.5816 - val\_loss: 2.5374 - val\_acc: 0.5827

Epoch 70/70

390/390 [==============================] - 64s 163ms/step - loss: 2.5257 - acc: 0.5858 - val\_loss: 2.5830 - val\_acc: 0.5815

Epoch 71/71

390/390 [==============================] - 64s 164ms/step - loss: 2.5269 - acc: 0.5871 - val\_loss: 2.5844 - val\_acc: 0.5819

Epoch 72/72

390/390 [==============================] - 64s 164ms/step - loss: 2.5199 - acc: 0.5902 - val\_loss: 2.5919 - val\_acc: 0.5806

Epoch 73/73

390/390 [==============================] - 63s 163ms/step - loss: 2.5323 - acc: 0.5884 - val\_loss: 2.5707 - val\_acc: 0.5898

Epoch 74/74

390/390 [==============================] - 63s 163ms/step - loss: 2.5325 - acc: 0.5895 - val\_loss: 2.7193 - val\_acc: 0.5632

Epoch 75/75

390/390 [==============================] - 71s 182ms/step - loss: 2.3259 - acc: 0.6380 - val\_loss: 2.4119 - val\_acc: 0.6163

Epoch 76/76

390/390 [==============================] - 64s 163ms/step - loss: 2.2436 - acc: 0.6474 - val\_loss: 2.4454 - val\_acc: 0.6049

Epoch 77/77

390/390 [==============================] - 63s 161ms/step - loss: 2.1875 - acc: 0.6525 - val\_loss: 2.3124 - val\_acc: 0.6261

Epoch 78/78

390/390 [==============================] - 62s 160ms/step - loss: 2.1670 - acc: 0.6520 - val\_loss: 2.3196 - val\_acc: 0.6221

Epoch 79/79

390/390 [==============================] - 62s 160ms/step - loss: 2.1383 - acc: 0.6527 - val\_loss: 2.2864 - val\_acc: 0.6232

Epoch 80/80

390/390 [==============================] - 62s 160ms/step - loss: 2.1262 - acc: 0.6511 - val\_loss: 2.3174 - val\_acc: 0.6213

Epoch 81/81

390/390 [==============================] - 62s 160ms/step - loss: 2.1112 - acc: 0.6540 - val\_loss: 2.3437 - val\_acc: 0.6131

Epoch 82/82

390/390 [==============================] - 62s 159ms/step - loss: 2.0929 - acc: 0.6573 - val\_loss: 2.2868 - val\_acc: 0.6244

Epoch 83/83

390/390 [==============================] - 62s 160ms/step - loss: 2.0994 - acc: 0.6513 - val\_loss: 2.2995 - val\_acc: 0.6203

Epoch 84/84

390/390 [==============================] - 62s 160ms/step - loss: 2.0795 - acc: 0.6568 - val\_loss: 2.3075 - val\_acc: 0.6155

Epoch 85/85

390/390 [==============================] - 62s 160ms/step - loss: 2.0821 - acc: 0.6562 - val\_loss: 2.2381 - val\_acc: 0.6242

Epoch 86/86

390/390 [==============================] - 62s 160ms/step - loss: 2.0866 - acc: 0.6546 - val\_loss: 2.3211 - val\_acc: 0.6094

Epoch 87/87

390/390 [==============================] - 62s 160ms/step - loss: 2.0785 - acc: 0.6583 - val\_loss: 2.2347 - val\_acc: 0.6354

Epoch 88/88

390/390 [==============================] - 62s 160ms/step - loss: 2.0832 - acc: 0.6561 - val\_loss: 2.2987 - val\_acc: 0.6205

Epoch 89/89

390/390 [==============================] - 63s 160ms/step - loss: 2.0694 - acc: 0.6615 - val\_loss: 2.3034 - val\_acc: 0.6214

Epoch 90/90

390/390 [==============================] - 62s 160ms/step - loss: 2.0778 - acc: 0.6591 - val\_loss: 2.2805 - val\_acc: 0.6282

Epoch 91/91

390/390 [==============================] - 62s 160ms/step - loss: 2.0784 - acc: 0.6604 - val\_loss: 2.3043 - val\_acc: 0.6228

Epoch 92/92

390/390 [==============================] - 62s 160ms/step - loss: 2.0824 - acc: 0.6598 - val\_loss: 2.2701 - val\_acc: 0.6292

Epoch 93/93

390/390 [==============================] - 62s 159ms/step - loss: 2.0775 - acc: 0.6601 - val\_loss: 2.2979 - val\_acc: 0.6243

Epoch 94/94

390/390 [==============================] - 62s 160ms/step - loss: 2.0803 - acc: 0.6591 - val\_loss: 2.2396 - val\_acc: 0.6409

Epoch 95/95

390/390 [==============================] - 62s 160ms/step - loss: 2.0760 - acc: 0.6636 - val\_loss: 2.3342 - val\_acc: 0.6231

Epoch 96/96

390/390 [==============================] - 62s 160ms/step - loss: 2.0710 - acc: 0.6665 - val\_loss: 2.3864 - val\_acc: 0.6109

Epoch 97/97

390/390 [==============================] - 62s 160ms/step - loss: 2.0849 - acc: 0.6631 - val\_loss: 2.2671 - val\_acc: 0.6341

Epoch 98/98

390/390 [==============================] - 62s 160ms/step - loss: 2.0773 - acc: 0.6657 - val\_loss: 2.3539 - val\_acc: 0.6189

Epoch 99/99

390/390 [==============================] - 62s 160ms/step - loss: 2.0703 - acc: 0.6666 - val\_loss: 2.2530 - val\_acc: 0.6389

Epoch 100/100

390/390 [==============================] - 70s 179ms/step - loss: 1.9290 - acc: 0.7041 - val\_loss: 2.2065 - val\_acc: 0.6506

Epoch 101/101

390/390 [==============================] - 62s 160ms/step - loss: 1.8557 - acc: 0.7152 - val\_loss: 2.2285 - val\_acc: 0.6480

Epoch 102/102

390/390 [==============================] - 62s 160ms/step - loss: 1.8363 - acc: 0.7170 - val\_loss: 2.2840 - val\_acc: 0.6348

Epoch 103/103

390/390 [==============================] - 62s 160ms/step - loss: 1.8097 - acc: 0.7184 - val\_loss: 2.1613 - val\_acc: 0.6529

Epoch 104/104

390/390 [==============================] - 63s 161ms/step - loss: 1.7780 - acc: 0.7228 - val\_loss: 2.1515 - val\_acc: 0.6537

Epoch 105/105

390/390 [==============================] - 62s 160ms/step - loss: 1.7693 - acc: 0.7240 - val\_loss: 2.1528 - val\_acc: 0.6541

Epoch 106/106

390/390 [==============================] - 62s 160ms/step - loss: 1.7605 - acc: 0.7249 - val\_loss: 2.1787 - val\_acc: 0.6481

Epoch 107/107

390/390 [==============================] - 62s 160ms/step - loss: 1.7444 - acc: 0.7238 - val\_loss: 2.2564 - val\_acc: 0.6401

Epoch 108/108

390/390 [==============================] - 63s 161ms/step - loss: 1.7375 - acc: 0.7242 - val\_loss: 2.1512 - val\_acc: 0.6458

Epoch 109/109

390/390 [==============================] - 63s 161ms/step - loss: 1.7245 - acc: 0.7288 - val\_loss: 2.1138 - val\_acc: 0.6556

Epoch 110/110

390/390 [==============================] - 63s 161ms/step - loss: 1.7172 - acc: 0.7284 - val\_loss: 2.1366 - val\_acc: 0.6543

Epoch 111/111

390/390 [==============================] - 62s 160ms/step - loss: 1.7148 - acc: 0.7270 - val\_loss: 2.1323 - val\_acc: 0.6521

Epoch 112/112

390/390 [==============================] - 62s 160ms/step - loss: 1.7099 - acc: 0.7268 - val\_loss: 2.1289 - val\_acc: 0.6504

Epoch 113/113

390/390 [==============================] - 63s 160ms/step - loss: 1.7009 - acc: 0.7286 - val\_loss: 2.1319 - val\_acc: 0.6513

Epoch 114/114

390/390 [==============================] - 63s 160ms/step - loss: 1.7050 - acc: 0.7270 - val\_loss: 2.1380 - val\_acc: 0.6510

Epoch 115/115

390/390 [==============================] - 63s 160ms/step - loss: 1.7016 - acc: 0.7250 - val\_loss: 2.1344 - val\_acc: 0.6507

Epoch 116/116

390/390 [==============================] - 62s 160ms/step - loss: 1.7028 - acc: 0.7268 - val\_loss: 2.0695 - val\_acc: 0.6609

Epoch 117/117

390/390 [==============================] - 62s 160ms/step - loss: 1.6905 - acc: 0.7308 - val\_loss: 2.1002 - val\_acc: 0.6607

Epoch 118/118

390/390 [==============================] - 62s 160ms/step - loss: 1.6850 - acc: 0.7308 - val\_loss: 2.1260 - val\_acc: 0.6518

Epoch 119/119

390/390 [==============================] - 62s 160ms/step - loss: 1.6929 - acc: 0.7274 - val\_loss: 2.2376 - val\_acc: 0.6307

Epoch 120/120

390/390 [==============================] - 63s 160ms/step - loss: 1.6954 - acc: 0.7310 - val\_loss: 2.2190 - val\_acc: 0.6364

Epoch 121/121

390/390 [==============================] - 62s 160ms/step - loss: 1.6872 - acc: 0.7290 - val\_loss: 2.0804 - val\_acc: 0.6591

Epoch 122/122

390/390 [==============================] - 62s 160ms/step - loss: 1.6873 - acc: 0.7312 - val\_loss: 2.0106 - val\_acc: 0.6750

Epoch 123/123

390/390 [==============================] - 62s 160ms/step - loss: 1.6865 - acc: 0.7331 - val\_loss: 2.1276 - val\_acc: 0.6537

Epoch 124/124

390/390 [==============================] - 62s 160ms/step - loss: 1.6743 - acc: 0.7348 - val\_loss: 2.1751 - val\_acc: 0.6462

Epoch 125/125

389/390 [============================>.] - ETA: 0s - loss: 1.5656 - acc: 0.7639Epoch 126/126

390/390 [==============================] - 62s 160ms/step - loss: 1.5253 - acc: 0.7704 - val\_loss: 2.0578 - val\_acc: 0.6757

Epoch 127/127

390/390 [==============================] - 62s 160ms/step - loss: 1.4998 - acc: 0.7754 - val\_loss: 2.0560 - val\_acc: 0.6754

Epoch 128/128

390/390 [==============================] - 62s 160ms/step - loss: 1.4832 - acc: 0.7773 - val\_loss: 2.0355 - val\_acc: 0.6758

Epoch 129/129

390/390 [==============================] - 62s 160ms/step - loss: 1.4695 - acc: 0.7789 - val\_loss: 2.0641 - val\_acc: 0.6692

Epoch 130/130

390/390 [==============================] - 62s 160ms/step - loss: 1.4531 - acc: 0.7813 - val\_loss: 2.0887 - val\_acc: 0.6623

Epoch 131/131

390/390 [==============================] - 62s 160ms/step - loss: 1.4397 - acc: 0.7844 - val\_loss: 2.1278 - val\_acc: 0.6536

Epoch 132/132

390/390 [==============================] - 62s 160ms/step - loss: 1.4376 - acc: 0.7847 - val\_loss: 2.0135 - val\_acc: 0.6800

Epoch 133/133

390/390 [==============================] - 63s 160ms/step - loss: 1.4210 - acc: 0.7858 - val\_loss: 2.0629 - val\_acc: 0.6695

Epoch 134/134

390/390 [==============================] - 62s 160ms/step - loss: 1.4136 - acc: 0.7873 - val\_loss: 2.0809 - val\_acc: 0.6676

Epoch 135/135

390/390 [==============================] - 62s 160ms/step - loss: 1.4027 - acc: 0.7864 - val\_loss: 2.0517 - val\_acc: 0.6710

Epoch 136/136

390/390 [==============================] - 62s 160ms/step - loss: 1.3993 - acc: 0.7868 - val\_loss: 1.9777 - val\_acc: 0.6813

Epoch 137/137

390/390 [==============================] - 62s 160ms/step - loss: 1.3966 - acc: 0.7875 - val\_loss: 1.9592 - val\_acc: 0.6832

Epoch 138/138

390/390 [==============================] - 63s 160ms/step - loss: 1.3884 - acc: 0.7856 - val\_loss: 2.0655 - val\_acc: 0.6636

Epoch 139/139

390/390 [==============================] - 62s 160ms/step - loss: 1.3908 - acc: 0.7860 - val\_loss: 2.0428 - val\_acc: 0.6717

Epoch 140/140

390/390 [==============================] - 63s 161ms/step - loss: 1.3830 - acc: 0.7885 - val\_loss: 2.0043 - val\_acc: 0.6746

Epoch 141/141

390/390 [==============================] - 63s 161ms/step - loss: 1.3726 - acc: 0.7895 - val\_loss: 2.0115 - val\_acc: 0.6701

Epoch 142/142

390/390 [==============================] - 63s 161ms/step - loss: 1.3666 - acc: 0.7912 - val\_loss: 1.9601 - val\_acc: 0.6829

Epoch 143/143

390/390 [==============================] - 63s 161ms/step - loss: 1.3639 - acc: 0.7909 - val\_loss: 2.0376 - val\_acc: 0.6647

Epoch 144/144

390/390 [==============================] - 63s 161ms/step - loss: 1.3595 - acc: 0.7905 - val\_loss: 1.9685 - val\_acc: 0.6833

Epoch 145/145

390/390 [==============================] - 63s 161ms/step - loss: 1.3606 - acc: 0.7909 - val\_loss: 2.0340 - val\_acc: 0.6658

Epoch 146/146

390/390 [==============================] - 63s 161ms/step - loss: 1.3498 - acc: 0.7941 - val\_loss: 2.0077 - val\_acc: 0.6746

Epoch 147/147

390/390 [==============================] - 63s 161ms/step - loss: 1.3528 - acc: 0.7934 - val\_loss: 2.0467 - val\_acc: 0.6658

Epoch 148/148

390/390 [==============================] - 63s 161ms/step - loss: 1.3511 - acc: 0.7913 - val\_loss: 2.0662 - val\_acc: 0.6589

Epoch 149/149

390/390 [==============================] - 63s 161ms/step - loss: 1.3420 - acc: 0.7937 - val\_loss: 1.9493 - val\_acc: 0.6801

Accuracy: 68.01%

**Caltech-101:**

Data Description:

Pictures of objects belonging to 101 categories. About 40 to 800 images per category. Most categories have about 50 images. Collected in September 2003 by Fei-Fei Li, Marco Andreetto, and Marc 'Aurelio Ranzato.  The size of each image is roughly 300 x 200 pixels.

Methods Used:

Training Samples: 30% images per class

Testing Samples: 70% images per class

|  |  |
| --- | --- |
| Training Accuracy | Testing Accuracy |
| 48.14% | 46.48% |

**Output:**

Train on 2743 samples, validate on 6401 samples

Epoch 1/300

2743/2743 [==============================] - 17s 6ms/step - loss: 4.5973 - accuracy: 0.0270 - val\_loss: 4.5633 - val\_accuracy: 0.0864

Epoch 2/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.4970 - accuracy: 0.0817 - val\_loss: 4.3127 - val\_accuracy: 0.0865

Epoch 3/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.3388 - accuracy: 0.0926 - val\_loss: 4.2478 - val\_accuracy: 0.0865

Epoch 4/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.2757 - accuracy: 0.1083 - val\_loss: 4.2031 - val\_accuracy: 0.0865

Epoch 5/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.2544 - accuracy: 0.1083 - val\_loss: 4.1759 - val\_accuracy: 0.1030

Epoch 6/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.2158 - accuracy: 0.1188 - val\_loss: 4.1588 - val\_accuracy: 0.1347

Epoch 7/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.1938 - accuracy: 0.1261 - val\_loss: 4.1203 - val\_accuracy: 0.1390

Epoch 8/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.1580 - accuracy: 0.1487 - val\_loss: 4.0903 - val\_accuracy: 0.1514

Epoch 9/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.1211 - accuracy: 0.1604 - val\_loss: 4.0358 - val\_accuracy: 0.1701

Epoch 10/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.0758 - accuracy: 0.1692 - val\_loss: 3.9815 - val\_accuracy: 0.1862

Epoch 11/300

2743/2743 [==============================] - 15s 5ms/step - loss: 4.0123 - accuracy: 0.1881 - val\_loss: 3.9180 - val\_accuracy: 0.2037

Epoch 12/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.9719 - accuracy: 0.1925 - val\_loss: 3.8687 - val\_accuracy: 0.2057

Epoch 13/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.9275 - accuracy: 0.1965 - val\_loss: 3.8289 - val\_accuracy: 0.2164

Epoch 14/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.8873 - accuracy: 0.2012 - val\_loss: 3.7814 - val\_accuracy: 0.2076

Epoch 15/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.8411 - accuracy: 0.2060 - val\_loss: 3.7518 - val\_accuracy: 0.2336

Epoch 16/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.8137 - accuracy: 0.2125 - val\_loss: 3.7146 - val\_accuracy: 0.2190

Epoch 17/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.7624 - accuracy: 0.2122 - val\_loss: 3.6882 - val\_accuracy: 0.2322

Epoch 18/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.7428 - accuracy: 0.2217 - val\_loss: 3.6546 - val\_accuracy: 0.2512

Epoch 19/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.7202 - accuracy: 0.2271 - val\_loss: 3.6330 - val\_accuracy: 0.2478

Epoch 20/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.6810 - accuracy: 0.2304 - val\_loss: 3.6210 - val\_accuracy: 0.2587

Epoch 21/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.6517 - accuracy: 0.2384 - val\_loss: 3.5843 - val\_accuracy: 0.2623

Epoch 22/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.6256 - accuracy: 0.2468 - val\_loss: 3.5552 - val\_accuracy: 0.2654

Epoch 23/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.6023 - accuracy: 0.2461 - val\_loss: 3.5429 - val\_accuracy: 0.2684

Epoch 24/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.5761 - accuracy: 0.2556 - val\_loss: 3.5105 - val\_accuracy: 0.2704

Epoch 25/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.5718 - accuracy: 0.2523 - val\_loss: 3.5086 - val\_accuracy: 0.2762

Epoch 26/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.5434 - accuracy: 0.2599 - val\_loss: 3.4830 - val\_accuracy: 0.2781

Epoch 27/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.5105 - accuracy: 0.2570 - val\_loss: 3.4475 - val\_accuracy: 0.2751

Epoch 28/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.5074 - accuracy: 0.2621 - val\_loss: 3.4377 - val\_accuracy: 0.2835

Epoch 29/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.4880 - accuracy: 0.2669 - val\_loss: 3.4116 - val\_accuracy: 0.2860

Epoch 30/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.4524 - accuracy: 0.2723 - val\_loss: 3.3887 - val\_accuracy: 0.2887

Epoch 31/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.4174 - accuracy: 0.2778 - val\_loss: 3.3649 - val\_accuracy: 0.2876

Epoch 32/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.4038 - accuracy: 0.2825 - val\_loss: 3.3521 - val\_accuracy: 0.2923

Epoch 33/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.3777 - accuracy: 0.2774 - val\_loss: 3.3402 - val\_accuracy: 0.2932

Epoch 34/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.3496 - accuracy: 0.2953 - val\_loss: 3.3159 - val\_accuracy: 0.2982

Epoch 35/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.3465 - accuracy: 0.2865 - val\_loss: 3.3089 - val\_accuracy: 0.2962

Epoch 36/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.3307 - accuracy: 0.2822 - val\_loss: 3.2773 - val\_accuracy: 0.3076

Epoch 37/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.2867 - accuracy: 0.2898 - val\_loss: 3.2630 - val\_accuracy: 0.3023

Epoch 38/300

2743/2743 [==============================] - 15s 5ms/step - loss: 3.2717 - accuracy: 0.2946 - val\_loss: 3.2470 - val\_accuracy: 0.3081

Epoch 39/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.2371 - accuracy: 0.3019 - val\_loss: 3.2271 - val\_accuracy: 0.3068

Epoch 40/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.2218 - accuracy: 0.3030 - val\_loss: 3.2246 - val\_accuracy: 0.3175

Epoch 41/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.1880 - accuracy: 0.3070 - val\_loss: 3.1931 - val\_accuracy: 0.3212

Epoch 42/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.1776 - accuracy: 0.3092 - val\_loss: 3.1669 - val\_accuracy: 0.3307

Epoch 43/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.1683 - accuracy: 0.3124 - val\_loss: 3.1526 - val\_accuracy: 0.3312

Epoch 44/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.1321 - accuracy: 0.3259 - val\_loss: 3.1397 - val\_accuracy: 0.3329

Epoch 45/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.0905 - accuracy: 0.3241 - val\_loss: 3.1311 - val\_accuracy: 0.3356

Epoch 46/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.0792 - accuracy: 0.3288 - val\_loss: 3.0967 - val\_accuracy: 0.3393

Epoch 47/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.0351 - accuracy: 0.3358 - val\_loss: 3.0748 - val\_accuracy: 0.3476

Epoch 48/300

2743/2743 [==============================] - 15s 6ms/step - loss: 3.0255 - accuracy: 0.3350 - val\_loss: 3.0689 - val\_accuracy: 0.3532

Epoch 49/300

2743/2743 [==============================] - 15s 6ms/step - loss: 2.9828 - accuracy: 0.3565 - val\_loss: 3.0608 - val\_accuracy: 0.3471

Epoch 50/300

2743/2743 [==============================] - 15s 6ms/step - loss: 2.9535 - accuracy: 0.3412 - val\_loss: 3.0253 - val\_accuracy: 0.3485

Epoch 51/300

2743/2743 [==============================] - 15s 6ms/step - loss: 2.9441 - accuracy: 0.3496 - val\_loss: 3.0156 - val\_accuracy: 0.3578

Epoch 52/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.9091 - accuracy: 0.3555 - val\_loss: 3.0142 - val\_accuracy: 0.3585

Epoch 53/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.8877 - accuracy: 0.3565 - val\_loss: 2.9854 - val\_accuracy: 0.3646

Epoch 54/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.8265 - accuracy: 0.3737 - val\_loss: 2.9570 - val\_accuracy: 0.3709

Epoch 55/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.7847 - accuracy: 0.3722 - val\_loss: 2.9709 - val\_accuracy: 0.3649

Epoch 56/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.8038 - accuracy: 0.3729 - val\_loss: 2.9723 - val\_accuracy: 0.3640

Epoch 57/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.7957 - accuracy: 0.3802 - val\_loss: 2.9328 - val\_accuracy: 0.3724

Epoch 58/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.6984 - accuracy: 0.3861 - val\_loss: 2.9328 - val\_accuracy: 0.3703

Epoch 59/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.7098 - accuracy: 0.3843 - val\_loss: 2.9674 - val\_accuracy: 0.3693

Epoch 60/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.6701 - accuracy: 0.3963 - val\_loss: 2.9035 - val\_accuracy: 0.3756

Epoch 61/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.6473 - accuracy: 0.4043 - val\_loss: 2.9091 - val\_accuracy: 0.3754

Epoch 62/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.5978 - accuracy: 0.4087 - val\_loss: 2.8829 - val\_accuracy: 0.3787

Epoch 63/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.5652 - accuracy: 0.4083 - val\_loss: 2.8643 - val\_accuracy: 0.3835

Epoch 64/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.5125 - accuracy: 0.4178 - val\_loss: 2.8752 - val\_accuracy: 0.3828

Epoch 65/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.4988 - accuracy: 0.4306 - val\_loss: 2.8629 - val\_accuracy: 0.3824

Epoch 66/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.4335 - accuracy: 0.4397 - val\_loss: 2.8341 - val\_accuracy: 0.3907

Epoch 67/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.4064 - accuracy: 0.4393 - val\_loss: 2.8237 - val\_accuracy: 0.3929

Epoch 68/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.3913 - accuracy: 0.4397 - val\_loss: 2.8334 - val\_accuracy: 0.3878

Epoch 69/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.3581 - accuracy: 0.4499 - val\_loss: 2.8298 - val\_accuracy: 0.3887

Epoch 70/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.3380 - accuracy: 0.4553 - val\_loss: 2.8047 - val\_accuracy: 0.3965

Epoch 71/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.3157 - accuracy: 0.4546 - val\_loss: 2.8027 - val\_accuracy: 0.3979

Epoch 72/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.2238 - accuracy: 0.4637 - val\_loss: 2.7861 - val\_accuracy: 0.4007

Epoch 73/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.1989 - accuracy: 0.4710 - val\_loss: 2.7776 - val\_accuracy: 0.4009

Epoch 74/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.1815 - accuracy: 0.4725 - val\_loss: 2.7754 - val\_accuracy: 0.4052

Epoch 75/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.1695 - accuracy: 0.4889 - val\_loss: 2.7754 - val\_accuracy: 0.4048

Epoch 76/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.1428 - accuracy: 0.4885 - val\_loss: 2.7794 - val\_accuracy: 0.4035

Epoch 77/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.0868 - accuracy: 0.4962 - val\_loss: 2.7622 - val\_accuracy: 0.4037

Epoch 78/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.0204 - accuracy: 0.5078 - val\_loss: 2.7740 - val\_accuracy: 0.4106

Epoch 79/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.0200 - accuracy: 0.5104 - val\_loss: 2.7203 - val\_accuracy: 0.4126

Epoch 80/300

2743/2743 [==============================] - 15s 5ms/step - loss: 2.0226 - accuracy: 0.5071 - val\_loss: 2.7339 - val\_accuracy: 0.4174

Epoch 81/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.9557 - accuracy: 0.5253 - val\_loss: 2.7363 - val\_accuracy: 0.4140

Epoch 82/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.9395 - accuracy: 0.5213 - val\_loss: 2.7051 - val\_accuracy: 0.4206

Epoch 83/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.8515 - accuracy: 0.5541 - val\_loss: 2.7450 - val\_accuracy: 0.4159

Epoch 84/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.8721 - accuracy: 0.5421 - val\_loss: 2.7225 - val\_accuracy: 0.4217

Epoch 85/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.8146 - accuracy: 0.5567 - val\_loss: 2.7409 - val\_accuracy: 0.4223

Epoch 86/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.7944 - accuracy: 0.5574 - val\_loss: 2.7505 - val\_accuracy: 0.4212

Epoch 87/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.7723 - accuracy: 0.5505 - val\_loss: 2.7057 - val\_accuracy: 0.4210

Epoch 88/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.6863 - accuracy: 0.5760 - val\_loss: 2.7451 - val\_accuracy: 0.4199

Epoch 89/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.6736 - accuracy: 0.5778 - val\_loss: 2.7534 - val\_accuracy: 0.4246

Epoch 90/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.6394 - accuracy: 0.5899 - val\_loss: 2.7248 - val\_accuracy: 0.4271

Epoch 91/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.6005 - accuracy: 0.5866 - val\_loss: 2.7786 - val\_accuracy: 0.4290

Epoch 92/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.5948 - accuracy: 0.5902 - val\_loss: 2.7673 - val\_accuracy: 0.4292

Epoch 93/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.4808 - accuracy: 0.6085 - val\_loss: 2.8643 - val\_accuracy: 0.4215

Epoch 94/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.4671 - accuracy: 0.6216 - val\_loss: 2.7971 - val\_accuracy: 0.4274

Epoch 95/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.4483 - accuracy: 0.6227 - val\_loss: 2.7480 - val\_accuracy: 0.4249

Epoch 96/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.4408 - accuracy: 0.6172 - val\_loss: 2.7972 - val\_accuracy: 0.4270

Epoch 97/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.3668 - accuracy: 0.6507 - val\_loss: 2.7439 - val\_accuracy: 0.4381

Epoch 98/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.3359 - accuracy: 0.6533 - val\_loss: 2.8104 - val\_accuracy: 0.4292

Epoch 99/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.2995 - accuracy: 0.6657 - val\_loss: 2.8985 - val\_accuracy: 0.4260

Epoch 100/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.2895 - accuracy: 0.6533 - val\_loss: 2.9344 - val\_accuracy: 0.4204

Epoch 101/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.2545 - accuracy: 0.6723 - val\_loss: 2.7952 - val\_accuracy: 0.4382

Epoch 102/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.2217 - accuracy: 0.6854 - val\_loss: 2.8307 - val\_accuracy: 0.4346

Epoch 103/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.2192 - accuracy: 0.6730 - val\_loss: 2.8294 - val\_accuracy: 0.4349

Epoch 104/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.1440 - accuracy: 0.7003 - val\_loss: 2.8726 - val\_accuracy: 0.4342

Epoch 105/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.1376 - accuracy: 0.7029 - val\_loss: 2.8655 - val\_accuracy: 0.4335

Epoch 106/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.0592 - accuracy: 0.7109 - val\_loss: 2.9044 - val\_accuracy: 0.4359

Epoch 107/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.0501 - accuracy: 0.7127 - val\_loss: 2.8285 - val\_accuracy: 0.4374

Epoch 108/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.0025 - accuracy: 0.7288 - val\_loss: 2.9211 - val\_accuracy: 0.4326

Epoch 109/300

2743/2743 [==============================] - 15s 5ms/step - loss: 1.0490 - accuracy: 0.7200 - val\_loss: 2.9360 - val\_accuracy: 0.4381

Epoch 110/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.9916 - accuracy: 0.7346 - val\_loss: 2.9709 - val\_accuracy: 0.4324

Epoch 111/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.9392 - accuracy: 0.7386 - val\_loss: 2.9422 - val\_accuracy: 0.4327

Epoch 112/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.9993 - accuracy: 0.7251 - val\_loss: 2.9525 - val\_accuracy: 0.4396

Epoch 113/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.8949 - accuracy: 0.7528 - val\_loss: 2.9893 - val\_accuracy: 0.4370

Epoch 114/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.8859 - accuracy: 0.7554 - val\_loss: 2.9096 - val\_accuracy: 0.4335

Epoch 115/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.8557 - accuracy: 0.7619 - val\_loss: 2.9742 - val\_accuracy: 0.4384

Epoch 116/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.8353 - accuracy: 0.7656 - val\_loss: 2.9368 - val\_accuracy: 0.4438

Epoch 117/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.7929 - accuracy: 0.7838 - val\_loss: 3.1229 - val\_accuracy: 0.4438

Epoch 118/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.8010 - accuracy: 0.7838 - val\_loss: 3.1150 - val\_accuracy: 0.4393

Epoch 119/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.7217 - accuracy: 0.7988 - val\_loss: 3.1946 - val\_accuracy: 0.4432

Epoch 120/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.7071 - accuracy: 0.7999 - val\_loss: 3.1379 - val\_accuracy: 0.4423

Epoch 121/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.7571 - accuracy: 0.7933 - val\_loss: 3.1077 - val\_accuracy: 0.4376

Epoch 122/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.6573 - accuracy: 0.8104 - val\_loss: 3.2348 - val\_accuracy: 0.4409

Epoch 123/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.7234 - accuracy: 0.7955 - val\_loss: 3.1754 - val\_accuracy: 0.4401

Epoch 124/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.6820 - accuracy: 0.8159 - val\_loss: 3.1698 - val\_accuracy: 0.4396

Epoch 125/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.6609 - accuracy: 0.8064 - val\_loss: 3.2956 - val\_accuracy: 0.4387

Epoch 126/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.6256 - accuracy: 0.8243 - val\_loss: 3.1877 - val\_accuracy: 0.4451

Epoch 127/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.5964 - accuracy: 0.8323 - val\_loss: 3.2662 - val\_accuracy: 0.4409

Epoch 128/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.5262 - accuracy: 0.8421 - val\_loss: 3.2822 - val\_accuracy: 0.4441

Epoch 129/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.5549 - accuracy: 0.8443 - val\_loss: 3.2588 - val\_accuracy: 0.4435

Epoch 130/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.5843 - accuracy: 0.8403 - val\_loss: 3.2149 - val\_accuracy: 0.4416

Epoch 131/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.6038 - accuracy: 0.8334 - val\_loss: 3.1326 - val\_accuracy: 0.4460

Epoch 132/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.5262 - accuracy: 0.8498 - val\_loss: 3.2846 - val\_accuracy: 0.4474

Epoch 133/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4991 - accuracy: 0.8600 - val\_loss: 3.3704 - val\_accuracy: 0.4431

Epoch 134/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.5386 - accuracy: 0.8524 - val\_loss: 3.2650 - val\_accuracy: 0.4423

Epoch 135/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4375 - accuracy: 0.8768 - val\_loss: 3.5539 - val\_accuracy: 0.4471

Epoch 136/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.5337 - accuracy: 0.8491 - val\_loss: 3.3544 - val\_accuracy: 0.4438

Epoch 137/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4540 - accuracy: 0.8691 - val\_loss: 3.4835 - val\_accuracy: 0.4395

Epoch 138/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4514 - accuracy: 0.8724 - val\_loss: 3.3396 - val\_accuracy: 0.4477

Epoch 139/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4264 - accuracy: 0.8779 - val\_loss: 3.5615 - val\_accuracy: 0.4460

Epoch 140/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4523 - accuracy: 0.8793 - val\_loss: 3.4913 - val\_accuracy: 0.4440

Epoch 141/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4059 - accuracy: 0.8797 - val\_loss: 3.4793 - val\_accuracy: 0.4502

Epoch 142/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3430 - accuracy: 0.8979 - val\_loss: 3.6208 - val\_accuracy: 0.4470

Epoch 143/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3699 - accuracy: 0.8884 - val\_loss: 3.7776 - val\_accuracy: 0.4463

Epoch 144/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3622 - accuracy: 0.8976 - val\_loss: 3.5748 - val\_accuracy: 0.4424

Epoch 145/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3474 - accuracy: 0.8965 - val\_loss: 3.7537 - val\_accuracy: 0.4470

Epoch 146/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4015 - accuracy: 0.8859 - val\_loss: 3.4825 - val\_accuracy: 0.4482

Epoch 147/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4221 - accuracy: 0.8812 - val\_loss: 3.3813 - val\_accuracy: 0.4434

Epoch 148/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.4056 - accuracy: 0.8873 - val\_loss: 3.3552 - val\_accuracy: 0.4516

Epoch 149/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3656 - accuracy: 0.9019 - val\_loss: 3.4535 - val\_accuracy: 0.4473

Epoch 150/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3432 - accuracy: 0.9001 - val\_loss: 3.6055 - val\_accuracy: 0.4457

Epoch 151/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3399 - accuracy: 0.9038 - val\_loss: 3.5353 - val\_accuracy: 0.4484

Epoch 152/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3323 - accuracy: 0.9012 - val\_loss: 3.7798 - val\_accuracy: 0.4470

Epoch 153/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3212 - accuracy: 0.9070 - val\_loss: 3.7374 - val\_accuracy: 0.4498

Epoch 154/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3457 - accuracy: 0.8932 - val\_loss: 3.7171 - val\_accuracy: 0.4429

Epoch 155/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3132 - accuracy: 0.9045 - val\_loss: 3.6272 - val\_accuracy: 0.4445

Epoch 156/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2901 - accuracy: 0.9147 - val\_loss: 3.7121 - val\_accuracy: 0.4506

Epoch 157/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2852 - accuracy: 0.9191 - val\_loss: 3.6927 - val\_accuracy: 0.4457

Epoch 158/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2561 - accuracy: 0.9256 - val\_loss: 3.5636 - val\_accuracy: 0.4477

Epoch 159/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2853 - accuracy: 0.9136 - val\_loss: 3.7362 - val\_accuracy: 0.4485

Epoch 160/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2553 - accuracy: 0.9304 - val\_loss: 3.7880 - val\_accuracy: 0.4462

Epoch 161/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2658 - accuracy: 0.9216 - val\_loss: 3.8492 - val\_accuracy: 0.4515

Epoch 162/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.3345 - accuracy: 0.9052 - val\_loss: 3.4769 - val\_accuracy: 0.4463

Epoch 163/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2723 - accuracy: 0.9147 - val\_loss: 3.7174 - val\_accuracy: 0.4498

Epoch 164/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1905 - accuracy: 0.9431 - val\_loss: 3.9523 - val\_accuracy: 0.4521

Epoch 165/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2483 - accuracy: 0.9264 - val\_loss: 3.8739 - val\_accuracy: 0.4481

Epoch 166/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2468 - accuracy: 0.9253 - val\_loss: 3.7837 - val\_accuracy: 0.4477

Epoch 167/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2130 - accuracy: 0.9402 - val\_loss: 3.7296 - val\_accuracy: 0.4468

Epoch 168/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2354 - accuracy: 0.9289 - val\_loss: 3.8212 - val\_accuracy: 0.4465

Epoch 169/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2151 - accuracy: 0.9340 - val\_loss: 3.8109 - val\_accuracy: 0.4502

Epoch 170/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2228 - accuracy: 0.9369 - val\_loss: 3.9088 - val\_accuracy: 0.4479

Epoch 171/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2059 - accuracy: 0.9355 - val\_loss: 4.1254 - val\_accuracy: 0.4460

Epoch 172/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2116 - accuracy: 0.9398 - val\_loss: 3.9729 - val\_accuracy: 0.4496

Epoch 173/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2124 - accuracy: 0.9402 - val\_loss: 4.2082 - val\_accuracy: 0.4459

Epoch 174/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2370 - accuracy: 0.9304 - val\_loss: 3.7414 - val\_accuracy: 0.4506

Epoch 175/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1791 - accuracy: 0.9522 - val\_loss: 4.0127 - val\_accuracy: 0.4463

Epoch 176/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1544 - accuracy: 0.9563 - val\_loss: 3.9801 - val\_accuracy: 0.4556

Epoch 177/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1688 - accuracy: 0.9515 - val\_loss: 4.0877 - val\_accuracy: 0.4541

Epoch 178/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1828 - accuracy: 0.9450 - val\_loss: 3.9892 - val\_accuracy: 0.4512

Epoch 179/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2209 - accuracy: 0.9362 - val\_loss: 4.0036 - val\_accuracy: 0.4495

Epoch 180/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1772 - accuracy: 0.9468 - val\_loss: 3.9353 - val\_accuracy: 0.4527

Epoch 181/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1535 - accuracy: 0.9490 - val\_loss: 4.1224 - val\_accuracy: 0.4515

Epoch 182/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1664 - accuracy: 0.9533 - val\_loss: 4.0019 - val\_accuracy: 0.4493

Epoch 183/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1553 - accuracy: 0.9541 - val\_loss: 4.2073 - val\_accuracy: 0.4435

Epoch 184/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1441 - accuracy: 0.9588 - val\_loss: 4.2833 - val\_accuracy: 0.4516

Epoch 185/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.2110 - accuracy: 0.9409 - val\_loss: 3.8308 - val\_accuracy: 0.4540

Epoch 186/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1872 - accuracy: 0.9504 - val\_loss: 3.8697 - val\_accuracy: 0.4516

Epoch 187/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1682 - accuracy: 0.9486 - val\_loss: 4.0000 - val\_accuracy: 0.4504

Epoch 188/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1662 - accuracy: 0.9537 - val\_loss: 4.0192 - val\_accuracy: 0.4546

Epoch 189/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1436 - accuracy: 0.9563 - val\_loss: 4.2100 - val\_accuracy: 0.4565

Epoch 190/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1474 - accuracy: 0.9515 - val\_loss: 4.1132 - val\_accuracy: 0.4527

Epoch 191/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1643 - accuracy: 0.9497 - val\_loss: 3.9787 - val\_accuracy: 0.4538

Epoch 192/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1365 - accuracy: 0.9650 - val\_loss: 4.2423 - val\_accuracy: 0.4523

Epoch 193/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1419 - accuracy: 0.9566 - val\_loss: 4.2363 - val\_accuracy: 0.4526

Epoch 194/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1431 - accuracy: 0.9555 - val\_loss: 4.0471 - val\_accuracy: 0.4545

Epoch 195/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1197 - accuracy: 0.9635 - val\_loss: 4.2409 - val\_accuracy: 0.4556

Epoch 196/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1642 - accuracy: 0.9475 - val\_loss: 4.0339 - val\_accuracy: 0.4509

Epoch 197/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1324 - accuracy: 0.9606 - val\_loss: 4.1722 - val\_accuracy: 0.4506

Epoch 198/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.1384 - accuracy: 0.9584 - val\_loss: 4.1032 - val\_accuracy: 0.4524

Epoch 199/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1174 - accuracy: 0.9683 - val\_loss: 4.1731 - val\_accuracy: 0.4554

Epoch 200/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1604 - accuracy: 0.9526 - val\_loss: 4.2318 - val\_accuracy: 0.4571

Epoch 201/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1180 - accuracy: 0.9635 - val\_loss: 4.1295 - val\_accuracy: 0.4493

Epoch 202/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1091 - accuracy: 0.9672 - val\_loss: 4.3379 - val\_accuracy: 0.4559

Epoch 203/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1153 - accuracy: 0.9654 - val\_loss: 4.0832 - val\_accuracy: 0.4552

Epoch 204/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0936 - accuracy: 0.9716 - val\_loss: 4.4618 - val\_accuracy: 0.4527

Epoch 205/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1113 - accuracy: 0.9686 - val\_loss: 4.4168 - val\_accuracy: 0.4543

Epoch 206/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1119 - accuracy: 0.9672 - val\_loss: 4.4074 - val\_accuracy: 0.4495

Epoch 207/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1199 - accuracy: 0.9661 - val\_loss: 4.3492 - val\_accuracy: 0.4532

Epoch 208/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1113 - accuracy: 0.9723 - val\_loss: 4.2881 - val\_accuracy: 0.4518

Epoch 209/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1015 - accuracy: 0.9712 - val\_loss: 4.2505 - val\_accuracy: 0.4548

Epoch 210/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0926 - accuracy: 0.9741 - val\_loss: 4.2414 - val\_accuracy: 0.4523

Epoch 211/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1339 - accuracy: 0.9610 - val\_loss: 4.0983 - val\_accuracy: 0.4557

Epoch 212/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0925 - accuracy: 0.9748 - val\_loss: 4.4600 - val\_accuracy: 0.4526

Epoch 213/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1064 - accuracy: 0.9668 - val\_loss: 4.5865 - val\_accuracy: 0.4498

Epoch 214/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1187 - accuracy: 0.9639 - val\_loss: 4.2842 - val\_accuracy: 0.4482

Epoch 215/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1252 - accuracy: 0.9606 - val\_loss: 4.3208 - val\_accuracy: 0.4479

Epoch 216/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1143 - accuracy: 0.9665 - val\_loss: 4.3172 - val\_accuracy: 0.4485

Epoch 217/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1099 - accuracy: 0.9672 - val\_loss: 4.2835 - val\_accuracy: 0.4521

Epoch 218/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1080 - accuracy: 0.9701 - val\_loss: 4.2878 - val\_accuracy: 0.4562

Epoch 219/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1005 - accuracy: 0.9690 - val\_loss: 4.1826 - val\_accuracy: 0.4549

Epoch 220/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0896 - accuracy: 0.9708 - val\_loss: 4.5616 - val\_accuracy: 0.4507

Epoch 221/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0937 - accuracy: 0.9734 - val\_loss: 4.3675 - val\_accuracy: 0.4506

Epoch 222/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0982 - accuracy: 0.9719 - val\_loss: 4.4112 - val\_accuracy: 0.4501

Epoch 223/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1097 - accuracy: 0.9679 - val\_loss: 4.2287 - val\_accuracy: 0.4481

Epoch 224/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1246 - accuracy: 0.9668 - val\_loss: 4.1958 - val\_accuracy: 0.4507

Epoch 225/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0888 - accuracy: 0.9745 - val\_loss: 4.3284 - val\_accuracy: 0.4531

Epoch 226/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0938 - accuracy: 0.9708 - val\_loss: 4.5361 - val\_accuracy: 0.4496

Epoch 227/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0763 - accuracy: 0.9789 - val\_loss: 4.4223 - val\_accuracy: 0.4495

Epoch 228/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0599 - accuracy: 0.9814 - val\_loss: 4.5942 - val\_accuracy: 0.4510

Epoch 229/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0905 - accuracy: 0.9767 - val\_loss: 4.4880 - val\_accuracy: 0.4540

Epoch 230/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0882 - accuracy: 0.9727 - val\_loss: 4.4080 - val\_accuracy: 0.4543

Epoch 231/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0894 - accuracy: 0.9741 - val\_loss: 4.3987 - val\_accuracy: 0.4568

Epoch 232/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0842 - accuracy: 0.9763 - val\_loss: 4.2361 - val\_accuracy: 0.4541

Epoch 233/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0779 - accuracy: 0.9767 - val\_loss: 4.5806 - val\_accuracy: 0.4531

Epoch 234/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0869 - accuracy: 0.9778 - val\_loss: 4.5096 - val\_accuracy: 0.4524

Epoch 235/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0837 - accuracy: 0.9785 - val\_loss: 4.2921 - val\_accuracy: 0.4531

Epoch 236/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0727 - accuracy: 0.9778 - val\_loss: 4.2906 - val\_accuracy: 0.4574

Epoch 237/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0696 - accuracy: 0.9796 - val\_loss: 4.4261 - val\_accuracy: 0.4546

Epoch 238/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0598 - accuracy: 0.9825 - val\_loss: 4.5908 - val\_accuracy: 0.4471

Epoch 239/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0810 - accuracy: 0.9778 - val\_loss: 4.3657 - val\_accuracy: 0.4548

Epoch 240/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0700 - accuracy: 0.9810 - val\_loss: 4.3521 - val\_accuracy: 0.4538

Epoch 241/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0753 - accuracy: 0.9829 - val\_loss: 4.2839 - val\_accuracy: 0.4540

Epoch 242/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0566 - accuracy: 0.9821 - val\_loss: 4.5750 - val\_accuracy: 0.4557

Epoch 243/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0434 - accuracy: 0.9854 - val\_loss: 4.8982 - val\_accuracy: 0.4526

Epoch 244/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0620 - accuracy: 0.9829 - val\_loss: 4.7504 - val\_accuracy: 0.4496

Epoch 245/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1059 - accuracy: 0.9690 - val\_loss: 4.5571 - val\_accuracy: 0.4506

Epoch 246/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0729 - accuracy: 0.9789 - val\_loss: 4.5991 - val\_accuracy: 0.4501

Epoch 247/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0718 - accuracy: 0.9763 - val\_loss: 4.6111 - val\_accuracy: 0.4513

Epoch 248/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0881 - accuracy: 0.9730 - val\_loss: 4.5328 - val\_accuracy: 0.4476

Epoch 249/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0872 - accuracy: 0.9785 - val\_loss: 4.4820 - val\_accuracy: 0.4535

Epoch 250/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0652 - accuracy: 0.9807 - val\_loss: 4.5461 - val\_accuracy: 0.4541

Epoch 251/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0541 - accuracy: 0.9814 - val\_loss: 4.5710 - val\_accuracy: 0.4507

Epoch 252/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0628 - accuracy: 0.9796 - val\_loss: 4.5546 - val\_accuracy: 0.4520

Epoch 253/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0678 - accuracy: 0.9792 - val\_loss: 4.6476 - val\_accuracy: 0.4507

Epoch 254/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.1045 - accuracy: 0.9723 - val\_loss: 4.4061 - val\_accuracy: 0.4568

Epoch 255/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0856 - accuracy: 0.9759 - val\_loss: 4.4311 - val\_accuracy: 0.4560

Epoch 256/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0618 - accuracy: 0.9821 - val\_loss: 4.5388 - val\_accuracy: 0.4540

Epoch 257/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0756 - accuracy: 0.9759 - val\_loss: 4.3842 - val\_accuracy: 0.4526

Epoch 258/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0551 - accuracy: 0.9865 - val\_loss: 4.2931 - val\_accuracy: 0.4557

Epoch 259/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0554 - accuracy: 0.9840 - val\_loss: 4.3486 - val\_accuracy: 0.4570

Epoch 260/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0547 - accuracy: 0.9840 - val\_loss: 4.5872 - val\_accuracy: 0.4526

Epoch 261/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0599 - accuracy: 0.9803 - val\_loss: 4.6309 - val\_accuracy: 0.4577

Epoch 262/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0408 - accuracy: 0.9880 - val\_loss: 4.7600 - val\_accuracy: 0.4613

Epoch 263/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0540 - accuracy: 0.9840 - val\_loss: 4.5831 - val\_accuracy: 0.4531

Epoch 264/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0641 - accuracy: 0.9803 - val\_loss: 4.6504 - val\_accuracy: 0.4523

Epoch 265/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0552 - accuracy: 0.9821 - val\_loss: 4.6309 - val\_accuracy: 0.4541

Epoch 266/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0431 - accuracy: 0.9894 - val\_loss: 4.6407 - val\_accuracy: 0.4552

Epoch 267/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0547 - accuracy: 0.9851 - val\_loss: 4.6505 - val\_accuracy: 0.4566

Epoch 268/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0458 - accuracy: 0.9851 - val\_loss: 4.5412 - val\_accuracy: 0.4546

Epoch 269/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0829 - accuracy: 0.9785 - val\_loss: 4.5229 - val\_accuracy: 0.4504

Epoch 270/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0579 - accuracy: 0.9847 - val\_loss: 4.7226 - val\_accuracy: 0.4576

Epoch 271/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0531 - accuracy: 0.9847 - val\_loss: 4.4833 - val\_accuracy: 0.4554

Epoch 272/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0447 - accuracy: 0.9880 - val\_loss: 4.6966 - val\_accuracy: 0.4563

Epoch 273/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0421 - accuracy: 0.9872 - val\_loss: 4.7035 - val\_accuracy: 0.4549

Epoch 274/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0495 - accuracy: 0.9836 - val\_loss: 4.7916 - val\_accuracy: 0.4570

Epoch 275/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0605 - accuracy: 0.9840 - val\_loss: 4.5368 - val\_accuracy: 0.4559

Epoch 276/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0813 - accuracy: 0.9770 - val\_loss: 4.4238 - val\_accuracy: 0.4452

Epoch 277/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0764 - accuracy: 0.9785 - val\_loss: 4.3549 - val\_accuracy: 0.4562

Epoch 278/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0576 - accuracy: 0.9865 - val\_loss: 4.4594 - val\_accuracy: 0.4576

Epoch 279/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0445 - accuracy: 0.9865 - val\_loss: 4.5350 - val\_accuracy: 0.4543

Epoch 280/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0434 - accuracy: 0.9872 - val\_loss: 4.5116 - val\_accuracy: 0.4515

Epoch 281/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0495 - accuracy: 0.9883 - val\_loss: 4.5979 - val\_accuracy: 0.4551

Epoch 282/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0388 - accuracy: 0.9880 - val\_loss: 4.7040 - val\_accuracy: 0.4535

Epoch 283/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0461 - accuracy: 0.9861 - val\_loss: 4.6665 - val\_accuracy: 0.4579

Epoch 284/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0309 - accuracy: 0.9905 - val\_loss: 4.6974 - val\_accuracy: 0.4562

Epoch 285/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0282 - accuracy: 0.9898 - val\_loss: 4.8991 - val\_accuracy: 0.4540

Epoch 286/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0525 - accuracy: 0.9836 - val\_loss: 4.8158 - val\_accuracy: 0.4538

Epoch 287/300

2743/2743 [==============================] - 15s 6ms/step - loss: 0.0479 - accuracy: 0.9843 - val\_loss: 4.7299 - val\_accuracy: 0.4515

Epoch 288/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0627 - accuracy: 0.9843 - val\_loss: 4.6545 - val\_accuracy: 0.4588

Epoch 289/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0447 - accuracy: 0.9861 - val\_loss: 4.7838 - val\_accuracy: 0.4584

Epoch 290/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0397 - accuracy: 0.9887 - val\_loss: 4.7496 - val\_accuracy: 0.4532

Epoch 291/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0436 - accuracy: 0.9883 - val\_loss: 4.6084 - val\_accuracy: 0.4562

Epoch 292/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0289 - accuracy: 0.9898 - val\_loss: 4.7904 - val\_accuracy: 0.4545

Epoch 293/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0326 - accuracy: 0.9887 - val\_loss: 4.7658 - val\_accuracy: 0.4532

Epoch 294/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0377 - accuracy: 0.9891 - val\_loss: 4.6890 - val\_accuracy: 0.4593

Epoch 295/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0385 - accuracy: 0.9876 - val\_loss: 4.7553 - val\_accuracy: 0.4498

Epoch 296/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0484 - accuracy: 0.9872 - val\_loss: 4.9391 - val\_accuracy: 0.4573

Epoch 297/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0485 - accuracy: 0.9876 - val\_loss: 4.7548 - val\_accuracy: 0.4576

Epoch 298/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0387 - accuracy: 0.9876 - val\_loss: 4.8327 - val\_accuracy: 0.4502

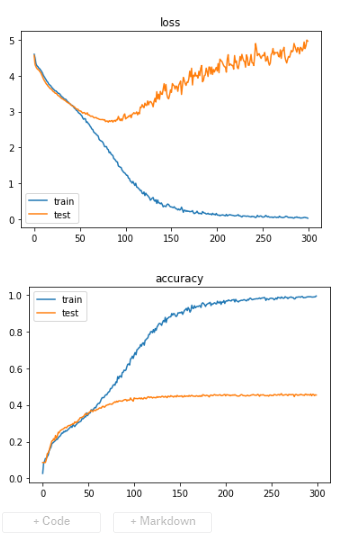
Epoch 299/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0387 - accuracy: 0.9887 - val\_loss: 4.9934 - val\_accuracy: 0.4551

Epoch 300/300

2743/2743 [==============================] - 15s 5ms/step - loss: 0.0241 - accuracy: 0.9934 - val\_loss: 4.9647 - val\_accuracy: 0.4540





**Caltech-256:**

Data Description:

The original Caltech-101 was collected by choosing a set of object categories, downloading examples from Google Images and then manually screening out all images that did not fit the category. Caltech-256 is collected in a similar manner with several improvements:

a) the number of categories is more than doubled.

b) the minimum number of images in any category is increased from 31 to 80.

c) artifacts due to image rotation are avoided .

d) a new and larger clutter category is introduced for testing background rejection.

Methods Used:

.

Training Samples: 30% images per class

Testing Samples: 70% images per class

|  |  |
| --- | --- |
| Training Accuracy | Testing Accuracy |
| 93.7% | 92.96% |

**Output:**

**Model.summary()**

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:66: The name tf.get\_default\_graph is deprecated. Please use tf.compat.v1.get\_default\_graph instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:541: The name tf.placeholder is deprecated. Please use tf.compat.v1.placeholder instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:4432: The name tf.random\_uniform is deprecated. Please use tf.random.uniform instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:4267: The name tf.nn.max\_pool is deprecated. Please use tf.nn.max\_pool2d instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:148: The name tf.placeholder\_with\_default is deprecated. Please use tf.compat.v1.placeholder\_with\_default instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:3733: calling dropout (from tensorflow.python.ops.nn\_ops) with keep\_prob is deprecated and will be removed in a future version.

Instructions for updating:

Please use `rate` instead of `keep\_prob`. Rate should be set to `rate = 1 - keep\_prob`.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/optimizers.py:793: The name tf.train.Optimizer is deprecated. Please use tf.compat.v1.train.Optimizer instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:3576: The name tf.log is deprecated. Please use tf.math.log instead.

Model: "sequential\_1"

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Layer (type) Output Shape Param #

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conv2d\_1 (Conv2D) (None, 128, 128, 64) 1792

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conv2d\_2 (Conv2D) (None, 128, 128, 64) 36928

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max\_pooling2d\_1 (MaxPooling2 (None, 64, 64, 64) 0

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conv2d\_3 (Conv2D) (None, 64, 64, 128) 73856

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conv2d\_4 (Conv2D) (None, 64, 64, 128) 147584

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max\_pooling2d\_2 (MaxPooling2 (None, 32, 32, 128) 0

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conv2d\_5 (Conv2D) (None, 32, 32, 256) 295168

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conv2d\_6 (Conv2D) (None, 32, 32, 256) 590080

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conv2d\_7 (Conv2D) (None, 32, 32, 256) 590080

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conv2d\_8 (Conv2D) (None, 32, 32, 256) 590080

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max\_pooling2d\_3 (MaxPooling2 (None, 16, 16, 256) 0

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conv2d\_9 (Conv2D) (None, 16, 16, 512) 1180160

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conv2d\_10 (Conv2D) (None, 16, 16, 512) 2359808

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conv2d\_11 (Conv2D) (None, 16, 16, 512) 2359808

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conv2d\_12 (Conv2D) (None, 16, 16, 512) 2359808

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max\_pooling2d\_4 (MaxPooling2 (None, 8, 8, 512) 0

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conv2d\_13 (Conv2D) (None, 8, 8, 512) 2359808

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conv2d\_14 (Conv2D) (None, 8, 8, 512) 2359808

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conv2d\_15 (Conv2D) (None, 8, 8, 512) 2359808

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conv2d\_16 (Conv2D) (None, 8, 8, 512) 2359808

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max\_pooling2d\_5 (MaxPooling2 (None, 4, 4, 512) 0

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flatten\_1 (Flatten) (None, 8192) 0

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dense\_1 (Dense) (None, 4096) 33558528

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_1 (Dropout) (None, 4096) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_2 (Dense) (None, 4096) 16781312

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dropout\_2 (Dropout) (None, 4096) 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dense\_3 (Dense) (None, 257) 1052929

=================================================================

Total params: 71,417,153

Trainable params: 71,417,153

Non-trainable params: 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

None

**Accuracy Computation:**

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/tensorflow\_core/python/ops/math\_grad.py:1424: where (from tensorflow.python.ops.array\_ops) is deprecated and will be removed in a future version.

Instructions for updating:

Use tf.where in 2.0, which has the same broadcast rule as np.where

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:1033: The name tf.assign\_add is deprecated. Please use tf.compat.v1.assign\_add instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:1020: The name tf.assign is deprecated. Please use tf.compat.v1.assign instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:3005: The name tf.Session is deprecated. Please use tf.compat.v1.Session instead.

Train on 151 samples, validate on 355 samples

Epoch 1/300

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:190: The name tf.get\_default\_session is deprecated. Please use tf.compat.v1.get\_default\_session instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:197: The name tf.ConfigProto is deprecated. Please use tf.compat.v1.ConfigProto instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:207: The name tf.global\_variables is deprecated. Please use tf.compat.v1.global\_variables instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:216: The name tf.is\_variable\_initialized is deprecated. Please use tf.compat.v1.is\_variable\_initialized instead.

WARNING:tensorflow:From /usr/local/lib/python3.6/dist-packages/keras/backend/tensorflow\_backend.py:223: The name tf.variables\_initializer is deprecated. Please use tf.compat.v1.variables\_initializer instead.

151/151 [==============================] - 24s 156ms/step - loss: 5.6312 - acc: 0.0000e+00 - val\_loss: 5.6025 - val\_acc: 0.0000e+00

Epoch 2/300

151/151 [==============================] - 3s 21ms/step - loss: 5.6235 - acc: 0.0000e+00 - val\_loss: 5.5874 - val\_acc: 0.0000e+00

Epoch 3/300

151/151 [==============================] - 3s 21ms/step - loss: 5.6051 - acc: 0.0000e+00 - val\_loss: 5.5732 - val\_acc: 0.0000e+00

Epoch 4/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5818 - acc: 0.0000e+00 - val\_loss: 5.5591 - val\_acc: 0.0000e+00

Epoch 5/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5701 - acc: 0.0000e+00 - val\_loss: 5.5454 - val\_acc: 0.0000e+00

Epoch 6/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5574 - acc: 0.0000e+00 - val\_loss: 5.5320 - val\_acc: 0.0000e+00

Epoch 7/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5586 - acc: 0.0000e+00 - val\_loss: 5.5188 - val\_acc: 0.0000e+00

Epoch 8/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5425 - acc: 0.0000e+00 - val\_loss: 5.5055 - val\_acc: 0.0000e+00

Epoch 9/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5283 - acc: 0.0000e+00 - val\_loss: 5.4921 - val\_acc: 0.0000e+00

Epoch 10/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5290 - acc: 0.0000e+00 - val\_loss: 5.4788 - val\_acc: 0.0000e+00

Epoch 11/300

151/151 [==============================] - 3s 21ms/step - loss: 5.5097 - acc: 0.0000e+00 - val\_loss: 5.4655 - val\_acc: 0.0000e+00

Epoch 12/300

151/151 [==============================] - 3s 21ms/step - loss: 5.4916 - acc: 0.0199 - val\_loss: 5.4519 - val\_acc: 0.0000e+00

Epoch 13/300

151/151 [==============================] - 3s 21ms/step - loss: 5.4857 - acc: 0.0000e+00 - val\_loss: 5.4383 - val\_acc: 0.0113

Epoch 14/300

151/151 [==============================] - 3s 21ms/step - loss: 5.4682 - acc: 0.0132 - val\_loss: 5.4241 - val\_acc: 0.1972

Epoch 15/300

151/151 [==============================] - 3s 21ms/step - loss: 5.4499 - acc: 0.0199 - val\_loss: 5.4099 - val\_acc: 0.5070

Epoch 16/300

151/151 [==============================] - 3s 21ms/step - loss: 5.4409 - acc: 0.0397 - val\_loss: 5.3951 - val\_acc: 0.7718

Epoch 17/300

151/151 [==============================] - 3s 21ms/step - loss: 5.4341 - acc: 0.0265 - val\_loss: 5.3794 - val\_acc: 0.8592

Epoch 18/300

151/151 [==============================] - 3s 21ms/step - loss: 5.4248 - acc: 0.0265 - val\_loss: 5.3638 - val\_acc: 0.8986

Epoch 19/300

151/151 [==============================] - 3s 21ms/step - loss: 5.3967 - acc: 0.0795 - val\_loss: 5.3469 - val\_acc: 0.9183

Epoch 20/300

151/151 [==============================] - 3s 21ms/step - loss: 5.3945 - acc: 0.0464 - val\_loss: 5.3291 - val\_acc: 0.9268

Epoch 21/300

151/151 [==============================] - 3s 21ms/step - loss: 5.3623 - acc: 0.0927 - val\_loss: 5.3104 - val\_acc: 0.9296

Epoch 22/300

151/151 [==============================] - 3s 21ms/step - loss: 5.3350 - acc: 0.1854 - val\_loss: 5.2899 - val\_acc: 0.9296

Epoch 23/300

151/151 [==============================] - 3s 21ms/step - loss: 5.3313 - acc: 0.1457 - val\_loss: 5.2683 - val\_acc: 0.9296

Epoch 24/300

151/151 [==============================] - 3s 21ms/step - loss: 5.3288 - acc: 0.1722 - val\_loss: 5.2457 - val\_acc: 0.9296

Epoch 25/300

151/151 [==============================] - 3s 21ms/step - loss: 5.3037 - acc: 0.2318 - val\_loss: 5.2217 - val\_acc: 0.9296

Epoch 26/300

151/151 [==============================] - 3s 21ms/step - loss: 5.2900 - acc: 0.2583 - val\_loss: 5.1961 - val\_acc: 0.9296

Epoch 27/300

151/151 [==============================] - 3s 21ms/step - loss: 5.2595 - acc: 0.3245 - val\_loss: 5.1683 - val\_acc: 0.9296

Epoch 28/300

151/151 [==============================] - 3s 21ms/step - loss: 5.2351 - acc: 0.3179 - val\_loss: 5.1368 - val\_acc: 0.9296

Epoch 29/300

151/151 [==============================] - 3s 21ms/step - loss: 5.2011 - acc: 0.3974 - val\_loss: 5.1014 - val\_acc: 0.9296

Epoch 30/300

151/151 [==============================] - 3s 21ms/step - loss: 5.1559 - acc: 0.5298 - val\_loss: 5.0620 - val\_acc: 0.9296

Epoch 31/300

151/151 [==============================] - 3s 21ms/step - loss: 5.1359 - acc: 0.5430 - val\_loss: 5.0199 - val\_acc: 0.9296

Epoch 32/300

151/151 [==============================] - 3s 21ms/step - loss: 5.1021 - acc: 0.5232 - val\_loss: 4.9716 - val\_acc: 0.9296

Epoch 33/300

151/151 [==============================] - 3s 21ms/step - loss: 5.0443 - acc: 0.6689 - val\_loss: 4.9166 - val\_acc: 0.9296

Epoch 34/300

151/151 [==============================] - 3s 21ms/step - loss: 4.9877 - acc: 0.7285 - val\_loss: 4.8527 - val\_acc: 0.9296

Epoch 35/300

151/151 [==============================] - 3s 21ms/step - loss: 4.9484 - acc: 0.6954 - val\_loss: 4.7798 - val\_acc: 0.9296

Epoch 36/300

151/151 [==============================] - 3s 21ms/step - loss: 4.8630 - acc: 0.7947 - val\_loss: 4.6941 - val\_acc: 0.9296

Epoch 37/300

151/151 [==============================] - 3s 21ms/step - loss: 4.7682 - acc: 0.8013 - val\_loss: 4.5909 - val\_acc: 0.9296

Epoch 38/300

151/151 [==============================] - 3s 21ms/step - loss: 4.6953 - acc: 0.8212 - val\_loss: 4.4681 - val\_acc: 0.9296

Epoch 39/300

151/151 [==============================] - 3s 21ms/step - loss: 4.5727 - acc: 0.8411 - val\_loss: 4.3171 - val\_acc: 0.9296

Epoch 40/300

151/151 [==============================] - 3s 21ms/step - loss: 4.4679 - acc: 0.8543 - val\_loss: 4.1382 - val\_acc: 0.9296

Epoch 41/300

151/151 [==============================] - 3s 21ms/step - loss: 4.2447 - acc: 0.9007 - val\_loss: 3.9018 - val\_acc: 0.9296

Epoch 42/300

151/151 [==============================] - 3s 21ms/step - loss: 4.0507 - acc: 0.8940 - val\_loss: 3.6004 - val\_acc: 0.9296

Epoch 43/300

151/151 [==============================] - 3s 21ms/step - loss: 3.7463 - acc: 0.9139 - val\_loss: 3.2007 - val\_acc: 0.9296

Epoch 44/300

151/151 [==============================] - 3s 21ms/step - loss: 3.3309 - acc: 0.9139 - val\_loss: 2.6888 - val\_acc: 0.9296

Epoch 45/300

151/151 [==============================] - 3s 21ms/step - loss: 2.9453 - acc: 0.9007 - val\_loss: 2.0956 - val\_acc: 0.9296

Epoch 46/300

151/151 [==============================] - 3s 21ms/step - loss: 2.3642 - acc: 0.9139 - val\_loss: 1.5255 - val\_acc: 0.9296

Epoch 47/300

151/151 [==============================] - 3s 21ms/step - loss: 1.8358 - acc: 0.9205 - val\_loss: 1.1495 - val\_acc: 0.9296

Epoch 48/300

151/151 [==============================] - 3s 21ms/step - loss: 1.5117 - acc: 0.9205 - val\_loss: 0.9446 - val\_acc: 0.9296

Epoch 49/300

151/151 [==============================] - 3s 21ms/step - loss: 1.3560 - acc: 0.9205 - val\_loss: 0.8493 - val\_acc: 0.9296

Epoch 50/300

151/151 [==============================] - 3s 21ms/step - loss: 1.2060 - acc: 0.9205 - val\_loss: 0.8079 - val\_acc: 0.9296

Epoch 51/300

151/151 [==============================] - 3s 21ms/step - loss: 1.1281 - acc: 0.9205 - val\_loss: 0.7913 - val\_acc: 0.9296

Epoch 52/300

151/151 [==============================] - 3s 21ms/step - loss: 1.1078 - acc: 0.9205 - val\_loss: 0.7856 - val\_acc: 0.9296

Epoch 53/300

151/151 [==============================] - 3s 21ms/step - loss: 1.1100 - acc: 0.9205 - val\_loss: 0.7829 - val\_acc: 0.9296

Epoch 54/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0874 - acc: 0.9205 - val\_loss: 0.7815 - val\_acc: 0.9296

Epoch 55/300

151/151 [==============================] - 3s 21ms/step - loss: 1.1199 - acc: 0.9205 - val\_loss: 0.7810 - val\_acc: 0.9296

Epoch 56/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0667 - acc: 0.9205 - val\_loss: 0.7814 - val\_acc: 0.9296

Epoch 57/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0619 - acc: 0.9205 - val\_loss: 0.7817 - val\_acc: 0.9296

Epoch 58/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0399 - acc: 0.9205 - val\_loss: 0.7811 - val\_acc: 0.9296

Epoch 59/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0424 - acc: 0.9205 - val\_loss: 0.7802 - val\_acc: 0.9296

Epoch 60/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0732 - acc: 0.9205 - val\_loss: 0.7806 - val\_acc: 0.9296

Epoch 61/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9335 - acc: 0.9205 - val\_loss: 0.7804 - val\_acc: 0.9296

Epoch 62/300

151/151 [==============================] - 3s 21ms/step - loss: 1.1315 - acc: 0.9205 - val\_loss: 0.7803 - val\_acc: 0.9296

Epoch 63/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9852 - acc: 0.9205 - val\_loss: 0.7800 - val\_acc: 0.9296

Epoch 64/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0364 - acc: 0.9205 - val\_loss: 0.7787 - val\_acc: 0.9296

Epoch 65/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9922 - acc: 0.9205 - val\_loss: 0.7790 - val\_acc: 0.9296

Epoch 66/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0735 - acc: 0.9205 - val\_loss: 0.7780 - val\_acc: 0.9296

Epoch 67/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9820 - acc: 0.9205 - val\_loss: 0.7800 - val\_acc: 0.9296

Epoch 68/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0532 - acc: 0.9205 - val\_loss: 0.7797 - val\_acc: 0.9296

Epoch 69/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9927 - acc: 0.9205 - val\_loss: 0.7795 - val\_acc: 0.9296

Epoch 70/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9229 - acc: 0.9205 - val\_loss: 0.7791 - val\_acc: 0.9296

Epoch 71/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0504 - acc: 0.9205 - val\_loss: 0.7795 - val\_acc: 0.9296

Epoch 72/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0207 - acc: 0.9205 - val\_loss: 0.7809 - val\_acc: 0.9296

Epoch 73/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9703 - acc: 0.9205 - val\_loss: 0.7800 - val\_acc: 0.9296

Epoch 74/300

151/151 [==============================] - 3s 21ms/step - loss: 1.1080 - acc: 0.9205 - val\_loss: 0.7771 - val\_acc: 0.9296

Epoch 75/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0046 - acc: 0.9205 - val\_loss: 0.7766 - val\_acc: 0.9296

Epoch 76/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9812 - acc: 0.9205 - val\_loss: 0.7750 - val\_acc: 0.9296

Epoch 77/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9734 - acc: 0.9205 - val\_loss: 0.7750 - val\_acc: 0.9296

Epoch 78/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9883 - acc: 0.9205 - val\_loss: 0.7746 - val\_acc: 0.9296

Epoch 79/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9495 - acc: 0.9205 - val\_loss: 0.7744 - val\_acc: 0.9296

Epoch 80/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9558 - acc: 0.9205 - val\_loss: 0.7728 - val\_acc: 0.9296

Epoch 81/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0015 - acc: 0.9205 - val\_loss: 0.7748 - val\_acc: 0.9296

Epoch 82/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9517 - acc: 0.9205 - val\_loss: 0.7744 - val\_acc: 0.9296

Epoch 83/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9893 - acc: 0.9205 - val\_loss: 0.7734 - val\_acc: 0.9296

Epoch 84/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9703 - acc: 0.9205 - val\_loss: 0.7748 - val\_acc: 0.9296

Epoch 85/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0104 - acc: 0.9205 - val\_loss: 0.7755 - val\_acc: 0.9296

Epoch 86/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9834 - acc: 0.9205 - val\_loss: 0.7730 - val\_acc: 0.9296

Epoch 87/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9867 - acc: 0.9205 - val\_loss: 0.7714 - val\_acc: 0.9296

Epoch 88/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9575 - acc: 0.9205 - val\_loss: 0.7711 - val\_acc: 0.9296

Epoch 89/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9445 - acc: 0.9205 - val\_loss: 0.7701 - val\_acc: 0.9296

Epoch 90/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9428 - acc: 0.9205 - val\_loss: 0.7702 - val\_acc: 0.9296

Epoch 91/300

151/151 [==============================] - 3s 21ms/step - loss: 1.0062 - acc: 0.9205 - val\_loss: 0.7701 - val\_acc: 0.9296

Epoch 92/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9816 - acc: 0.9205 - val\_loss: 0.7706 - val\_acc: 0.9296

Epoch 93/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9481 - acc: 0.9205 - val\_loss: 0.7715 - val\_acc: 0.9296

Epoch 94/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9561 - acc: 0.9205 - val\_loss: 0.7706 - val\_acc: 0.9296

Epoch 95/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9849 - acc: 0.9205 - val\_loss: 0.7706 - val\_acc: 0.9296

Epoch 96/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9882 - acc: 0.9205 - val\_loss: 0.7693 - val\_acc: 0.9296

Epoch 97/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9838 - acc: 0.9205 - val\_loss: 0.7689 - val\_acc: 0.9296

Epoch 98/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9882 - acc: 0.9205 - val\_loss: 0.7695 - val\_acc: 0.9296

Epoch 99/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9724 - acc: 0.9205 - val\_loss: 0.7694 - val\_acc: 0.9296

Epoch 100/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9502 - acc: 0.9205 - val\_loss: 0.7687 - val\_acc: 0.9296

Epoch 101/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9275 - acc: 0.9205 - val\_loss: 0.7717 - val\_acc: 0.9296

Epoch 102/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9122 - acc: 0.9205 - val\_loss: 0.7720 - val\_acc: 0.9296

Epoch 103/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8904 - acc: 0.9205 - val\_loss: 0.7734 - val\_acc: 0.9296

Epoch 104/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9243 - acc: 0.9205 - val\_loss: 0.7738 - val\_acc: 0.9296

Epoch 105/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9684 - acc: 0.9205 - val\_loss: 0.7721 - val\_acc: 0.9296

Epoch 106/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9311 - acc: 0.9205 - val\_loss: 0.7724 - val\_acc: 0.9296

Epoch 107/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9605 - acc: 0.9205 - val\_loss: 0.7696 - val\_acc: 0.9296

Epoch 108/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8506 - acc: 0.9205 - val\_loss: 0.7722 - val\_acc: 0.9296

Epoch 109/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9003 - acc: 0.9205 - val\_loss: 0.7725 - val\_acc: 0.9296

Epoch 110/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8723 - acc: 0.9205 - val\_loss: 0.7716 - val\_acc: 0.9296

Epoch 111/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9777 - acc: 0.9205 - val\_loss: 0.7730 - val\_acc: 0.9296

Epoch 112/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9267 - acc: 0.9205 - val\_loss: 0.7740 - val\_acc: 0.9296

Epoch 113/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8895 - acc: 0.9205 - val\_loss: 0.7719 - val\_acc: 0.9296

Epoch 114/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8654 - acc: 0.9205 - val\_loss: 0.7720 - val\_acc: 0.9296

Epoch 115/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9009 - acc: 0.9205 - val\_loss: 0.7727 - val\_acc: 0.9296

Epoch 116/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9170 - acc: 0.9205 - val\_loss: 0.7727 - val\_acc: 0.9296

Epoch 117/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8875 - acc: 0.9205 - val\_loss: 0.7723 - val\_acc: 0.9296

Epoch 118/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9144 - acc: 0.9205 - val\_loss: 0.7712 - val\_acc: 0.9296

Epoch 119/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8606 - acc: 0.9205 - val\_loss: 0.7721 - val\_acc: 0.9296

Epoch 120/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8828 - acc: 0.9205 - val\_loss: 0.7725 - val\_acc: 0.9296

Epoch 121/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9247 - acc: 0.9205 - val\_loss: 0.7753 - val\_acc: 0.9296

Epoch 122/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8769 - acc: 0.9205 - val\_loss: 0.7729 - val\_acc: 0.9296

Epoch 123/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9300 - acc: 0.9205 - val\_loss: 0.7737 - val\_acc: 0.9296

Epoch 124/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9124 - acc: 0.9205 - val\_loss: 0.7711 - val\_acc: 0.9296

Epoch 125/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9142 - acc: 0.9205 - val\_loss: 0.7709 - val\_acc: 0.9296

Epoch 126/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9103 - acc: 0.9205 - val\_loss: 0.7719 - val\_acc: 0.9296

Epoch 127/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9346 - acc: 0.9205 - val\_loss: 0.7714 - val\_acc: 0.9296

Epoch 128/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8732 - acc: 0.9205 - val\_loss: 0.7725 - val\_acc: 0.9296

Epoch 129/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9076 - acc: 0.9205 - val\_loss: 0.7721 - val\_acc: 0.9296

Epoch 130/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8737 - acc: 0.9205 - val\_loss: 0.7738 - val\_acc: 0.9296

Epoch 131/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8693 - acc: 0.9205 - val\_loss: 0.7743 - val\_acc: 0.9296

Epoch 132/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9457 - acc: 0.9205 - val\_loss: 0.7746 - val\_acc: 0.9296

Epoch 133/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8742 - acc: 0.9205 - val\_loss: 0.7747 - val\_acc: 0.9296

Epoch 134/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9475 - acc: 0.9205 - val\_loss: 0.7721 - val\_acc: 0.9296

Epoch 135/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8697 - acc: 0.9205 - val\_loss: 0.7712 - val\_acc: 0.9296

Epoch 136/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8957 - acc: 0.9205 - val\_loss: 0.7722 - val\_acc: 0.9296

Epoch 137/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9381 - acc: 0.9205 - val\_loss: 0.7702 - val\_acc: 0.9296

Epoch 138/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8945 - acc: 0.9205 - val\_loss: 0.7712 - val\_acc: 0.9296

Epoch 139/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9136 - acc: 0.9205 - val\_loss: 0.7724 - val\_acc: 0.9296

Epoch 140/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9271 - acc: 0.9205 - val\_loss: 0.7711 - val\_acc: 0.9296

Epoch 141/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9085 - acc: 0.9205 - val\_loss: 0.7705 - val\_acc: 0.9296

Epoch 142/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8979 - acc: 0.9205 - val\_loss: 0.7698 - val\_acc: 0.9296

Epoch 143/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8565 - acc: 0.9205 - val\_loss: 0.7704 - val\_acc: 0.9296

Epoch 144/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9088 - acc: 0.9205 - val\_loss: 0.7688 - val\_acc: 0.9296

Epoch 145/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8686 - acc: 0.9205 - val\_loss: 0.7688 - val\_acc: 0.9296

Epoch 146/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8648 - acc: 0.9205 - val\_loss: 0.7697 - val\_acc: 0.9296

Epoch 147/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8772 - acc: 0.9205 - val\_loss: 0.7699 - val\_acc: 0.9296

Epoch 148/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8529 - acc: 0.9205 - val\_loss: 0.7708 - val\_acc: 0.9296

Epoch 149/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8697 - acc: 0.9205 - val\_loss: 0.7718 - val\_acc: 0.9296

Epoch 150/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9117 - acc: 0.9205 - val\_loss: 0.7695 - val\_acc: 0.9296

Epoch 151/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8624 - acc: 0.9205 - val\_loss: 0.7699 - val\_acc: 0.9296

Epoch 152/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8603 - acc: 0.9205 - val\_loss: 0.7719 - val\_acc: 0.9296

Epoch 153/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8897 - acc: 0.9205 - val\_loss: 0.7728 - val\_acc: 0.9296

Epoch 154/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8838 - acc: 0.9205 - val\_loss: 0.7735 - val\_acc: 0.9296

Epoch 155/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8127 - acc: 0.9205 - val\_loss: 0.7723 - val\_acc: 0.9296

Epoch 156/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8406 - acc: 0.9205 - val\_loss: 0.7713 - val\_acc: 0.9296

Epoch 157/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8704 - acc: 0.9205 - val\_loss: 0.7715 - val\_acc: 0.9296

Epoch 158/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8975 - acc: 0.9205 - val\_loss: 0.7711 - val\_acc: 0.9296

Epoch 159/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8835 - acc: 0.9205 - val\_loss: 0.7711 - val\_acc: 0.9296

Epoch 160/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9185 - acc: 0.9205 - val\_loss: 0.7702 - val\_acc: 0.9296

Epoch 161/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8057 - acc: 0.9205 - val\_loss: 0.7717 - val\_acc: 0.9296

Epoch 162/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8520 - acc: 0.9205 - val\_loss: 0.7722 - val\_acc: 0.9296

Epoch 163/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9099 - acc: 0.9205 - val\_loss: 0.7717 - val\_acc: 0.9296

Epoch 164/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9212 - acc: 0.9205 - val\_loss: 0.7716 - val\_acc: 0.9296

Epoch 165/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8877 - acc: 0.9205 - val\_loss: 0.7701 - val\_acc: 0.9296

Epoch 166/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9225 - acc: 0.9205 - val\_loss: 0.7698 - val\_acc: 0.9296

Epoch 167/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8446 - acc: 0.9205 - val\_loss: 0.7702 - val\_acc: 0.9296

Epoch 168/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8288 - acc: 0.9205 - val\_loss: 0.7710 - val\_acc: 0.9296

Epoch 169/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9021 - acc: 0.9205 - val\_loss: 0.7713 - val\_acc: 0.9296

Epoch 170/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8891 - acc: 0.9205 - val\_loss: 0.7708 - val\_acc: 0.9296

Epoch 171/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8712 - acc: 0.9205 - val\_loss: 0.7714 - val\_acc: 0.9296

Epoch 172/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8610 - acc: 0.9205 - val\_loss: 0.7694 - val\_acc: 0.9296

Epoch 173/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8269 - acc: 0.9205 - val\_loss: 0.7683 - val\_acc: 0.9296

Epoch 174/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8717 - acc: 0.9205 - val\_loss: 0.7684 - val\_acc: 0.9296

Epoch 175/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8682 - acc: 0.9205 - val\_loss: 0.7669 - val\_acc: 0.9296

Epoch 176/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8104 - acc: 0.9205 - val\_loss: 0.7668 - val\_acc: 0.9296

Epoch 177/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8714 - acc: 0.9205 - val\_loss: 0.7688 - val\_acc: 0.9296

Epoch 178/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8315 - acc: 0.9205 - val\_loss: 0.7702 - val\_acc: 0.9296

Epoch 179/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8721 - acc: 0.9205 - val\_loss: 0.7695 - val\_acc: 0.9296

Epoch 180/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8687 - acc: 0.9205 - val\_loss: 0.7690 - val\_acc: 0.9296

Epoch 181/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8928 - acc: 0.9205 - val\_loss: 0.7694 - val\_acc: 0.9296

Epoch 182/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8867 - acc: 0.9205 - val\_loss: 0.7684 - val\_acc: 0.9296

Epoch 183/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8770 - acc: 0.9205 - val\_loss: 0.7679 - val\_acc: 0.9296

Epoch 184/300

151/151 [==============================] - 3s 21ms/step - loss: 0.9226 - acc: 0.9205 - val\_loss: 0.7681 - val\_acc: 0.9296

Epoch 185/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8916 - acc: 0.9205 - val\_loss: 0.7668 - val\_acc: 0.9296

Epoch 186/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8468 - acc: 0.9205 - val\_loss: 0.7657 - val\_acc: 0.9296

Epoch 187/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8774 - acc: 0.9205 - val\_loss: 0.7660 - val\_acc: 0.9296

Epoch 188/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8239 - acc: 0.9205 - val\_loss: 0.7678 - val\_acc: 0.9296

Epoch 189/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8835 - acc: 0.9205 - val\_loss: 0.7655 - val\_acc: 0.9296

Epoch 190/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8352 - acc: 0.9205 - val\_loss: 0.7653 - val\_acc: 0.9296

Epoch 191/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8828 - acc: 0.9205 - val\_loss: 0.7669 - val\_acc: 0.9296

Epoch 192/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8253 - acc: 0.9205 - val\_loss: 0.7677 - val\_acc: 0.9296

Epoch 193/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8410 - acc: 0.9205 - val\_loss: 0.7667 - val\_acc: 0.9296

Epoch 194/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8714 - acc: 0.9205 - val\_loss: 0.7649 - val\_acc: 0.9296

Epoch 195/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8497 - acc: 0.9205 - val\_loss: 0.7651 - val\_acc: 0.9296

Epoch 196/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8812 - acc: 0.9205 - val\_loss: 0.7643 - val\_acc: 0.9296

Epoch 197/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8824 - acc: 0.9205 - val\_loss: 0.7658 - val\_acc: 0.9296

Epoch 198/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8395 - acc: 0.9205 - val\_loss: 0.7687 - val\_acc: 0.9296

Epoch 199/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8375 - acc: 0.9205 - val\_loss: 0.7710 - val\_acc: 0.9296

Epoch 200/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8115 - acc: 0.9205 - val\_loss: 0.7693 - val\_acc: 0.9296

Epoch 201/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8458 - acc: 0.9205 - val\_loss: 0.7679 - val\_acc: 0.9296

Epoch 202/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8698 - acc: 0.9205 - val\_loss: 0.7676 - val\_acc: 0.9296

Epoch 203/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8086 - acc: 0.9205 - val\_loss: 0.7684 - val\_acc: 0.9296

Epoch 204/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8451 - acc: 0.9205 - val\_loss: 0.7668 - val\_acc: 0.9296

Epoch 205/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8586 - acc: 0.9205 - val\_loss: 0.7674 - val\_acc: 0.9296

Epoch 206/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7996 - acc: 0.9205 - val\_loss: 0.7663 - val\_acc: 0.9296

Epoch 207/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8404 - acc: 0.9205 - val\_loss: 0.7681 - val\_acc: 0.9296

Epoch 208/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8887 - acc: 0.9205 - val\_loss: 0.7678 - val\_acc: 0.9296

Epoch 209/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7716 - acc: 0.9205 - val\_loss: 0.7686 - val\_acc: 0.9296

Epoch 210/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7703 - acc: 0.9205 - val\_loss: 0.7665 - val\_acc: 0.9296

Epoch 211/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8084 - acc: 0.9205 - val\_loss: 0.7679 - val\_acc: 0.9296

Epoch 212/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8317 - acc: 0.9205 - val\_loss: 0.7682 - val\_acc: 0.9296

Epoch 213/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8574 - acc: 0.9205 - val\_loss: 0.7683 - val\_acc: 0.9296

Epoch 214/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7868 - acc: 0.9205 - val\_loss: 0.7702 - val\_acc: 0.9296

Epoch 215/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8253 - acc: 0.9205 - val\_loss: 0.7700 - val\_acc: 0.9296

Epoch 216/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8906 - acc: 0.9205 - val\_loss: 0.7682 - val\_acc: 0.9296

Epoch 217/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8137 - acc: 0.9205 - val\_loss: 0.7682 - val\_acc: 0.9296

Epoch 218/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8441 - acc: 0.9205 - val\_loss: 0.7686 - val\_acc: 0.9296

Epoch 219/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8431 - acc: 0.9205 - val\_loss: 0.7663 - val\_acc: 0.9296

Epoch 220/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8412 - acc: 0.9205 - val\_loss: 0.7664 - val\_acc: 0.9296

Epoch 221/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8002 - acc: 0.9205 - val\_loss: 0.7691 - val\_acc: 0.9296

Epoch 222/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8024 - acc: 0.9205 - val\_loss: 0.7703 - val\_acc: 0.9296

Epoch 223/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8332 - acc: 0.9205 - val\_loss: 0.7684 - val\_acc: 0.9296

Epoch 224/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8183 - acc: 0.9205 - val\_loss: 0.7676 - val\_acc: 0.9296

Epoch 225/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8193 - acc: 0.9205 - val\_loss: 0.7653 - val\_acc: 0.9296

Epoch 226/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8741 - acc: 0.9205 - val\_loss: 0.7661 - val\_acc: 0.9296

Epoch 227/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8687 - acc: 0.9205 - val\_loss: 0.7665 - val\_acc: 0.9296

Epoch 228/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8142 - acc: 0.9205 - val\_loss: 0.7661 - val\_acc: 0.9296

Epoch 229/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8007 - acc: 0.9205 - val\_loss: 0.7667 - val\_acc: 0.9296

Epoch 230/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7990 - acc: 0.9205 - val\_loss: 0.7649 - val\_acc: 0.9296

Epoch 231/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7680 - acc: 0.9205 - val\_loss: 0.7652 - val\_acc: 0.9296

Epoch 232/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7931 - acc: 0.9205 - val\_loss: 0.7655 - val\_acc: 0.9296

Epoch 233/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8474 - acc: 0.9205 - val\_loss: 0.7654 - val\_acc: 0.9296

Epoch 234/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7875 - acc: 0.9205 - val\_loss: 0.7657 - val\_acc: 0.9296

Epoch 235/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7579 - acc: 0.9205 - val\_loss: 0.7671 - val\_acc: 0.9296

Epoch 236/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7207 - acc: 0.9205 - val\_loss: 0.7714 - val\_acc: 0.9296

Epoch 237/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8207 - acc: 0.9205 - val\_loss: 0.7689 - val\_acc: 0.9296

Epoch 238/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8546 - acc: 0.9205 - val\_loss: 0.7674 - val\_acc: 0.9296

Epoch 239/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8133 - acc: 0.9205 - val\_loss: 0.7674 - val\_acc: 0.9296

Epoch 240/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8167 - acc: 0.9205 - val\_loss: 0.7646 - val\_acc: 0.9296

Epoch 241/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8426 - acc: 0.9205 - val\_loss: 0.7647 - val\_acc: 0.9296

Epoch 242/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8494 - acc: 0.9205 - val\_loss: 0.7641 - val\_acc: 0.9296

Epoch 243/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8337 - acc: 0.9205 - val\_loss: 0.7636 - val\_acc: 0.9296

Epoch 244/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8062 - acc: 0.9205 - val\_loss: 0.7622 - val\_acc: 0.9296

Epoch 245/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8223 - acc: 0.9205 - val\_loss: 0.7641 - val\_acc: 0.9296

Epoch 246/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8313 - acc: 0.9205 - val\_loss: 0.7615 - val\_acc: 0.9296

Epoch 247/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8523 - acc: 0.9205 - val\_loss: 0.7621 - val\_acc: 0.9296

Epoch 248/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7649 - acc: 0.9205 - val\_loss: 0.7646 - val\_acc: 0.9296

Epoch 249/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8237 - acc: 0.9205 - val\_loss: 0.7635 - val\_acc: 0.9296

Epoch 250/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7691 - acc: 0.9205 - val\_loss: 0.7650 - val\_acc: 0.9296

Epoch 251/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7932 - acc: 0.9205 - val\_loss: 0.7660 - val\_acc: 0.9296

Epoch 252/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8042 - acc: 0.9205 - val\_loss: 0.7653 - val\_acc: 0.9296

Epoch 253/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7735 - acc: 0.9205 - val\_loss: 0.7664 - val\_acc: 0.9296

Epoch 254/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8339 - acc: 0.9205 - val\_loss: 0.7654 - val\_acc: 0.9296

Epoch 255/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7449 - acc: 0.9205 - val\_loss: 0.7659 - val\_acc: 0.9296

Epoch 256/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7706 - acc: 0.9205 - val\_loss: 0.7641 - val\_acc: 0.9296

Epoch 257/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7734 - acc: 0.9205 - val\_loss: 0.7634 - val\_acc: 0.9296

Epoch 258/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8085 - acc: 0.9205 - val\_loss: 0.7606 - val\_acc: 0.9296

Epoch 259/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8185 - acc: 0.9205 - val\_loss: 0.7625 - val\_acc: 0.9296

Epoch 260/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8219 - acc: 0.9205 - val\_loss: 0.7624 - val\_acc: 0.9296

Epoch 261/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7406 - acc: 0.9205 - val\_loss: 0.7631 - val\_acc: 0.9296

Epoch 262/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7740 - acc: 0.9205 - val\_loss: 0.7627 - val\_acc: 0.9296

Epoch 263/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8252 - acc: 0.9205 - val\_loss: 0.7614 - val\_acc: 0.9296

Epoch 264/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7784 - acc: 0.9205 - val\_loss: 0.7647 - val\_acc: 0.9296

Epoch 265/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7932 - acc: 0.9205 - val\_loss: 0.7653 - val\_acc: 0.9296

Epoch 266/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7469 - acc: 0.9205 - val\_loss: 0.7682 - val\_acc: 0.9296

Epoch 267/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7933 - acc: 0.9205 - val\_loss: 0.7685 - val\_acc: 0.9296

Epoch 268/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8035 - acc: 0.9205 - val\_loss: 0.7672 - val\_acc: 0.9296

Epoch 269/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8115 - acc: 0.9205 - val\_loss: 0.7678 - val\_acc: 0.9296

Epoch 270/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8226 - acc: 0.9205 - val\_loss: 0.7658 - val\_acc: 0.9296

Epoch 271/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8160 - acc: 0.9205 - val\_loss: 0.7662 - val\_acc: 0.9296

Epoch 272/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7769 - acc: 0.9205 - val\_loss: 0.7665 - val\_acc: 0.9296

Epoch 273/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8120 - acc: 0.9205 - val\_loss: 0.7671 - val\_acc: 0.9296

Epoch 274/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8045 - acc: 0.9205 - val\_loss: 0.7668 - val\_acc: 0.9296

Epoch 275/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7909 - acc: 0.9205 - val\_loss: 0.7663 - val\_acc: 0.9296

Epoch 276/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7170 - acc: 0.9205 - val\_loss: 0.7663 - val\_acc: 0.9296

Epoch 277/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8101 - acc: 0.9205 - val\_loss: 0.7652 - val\_acc: 0.9296

Epoch 278/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8304 - acc: 0.9205 - val\_loss: 0.7677 - val\_acc: 0.9296

Epoch 279/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8028 - acc: 0.9205 - val\_loss: 0.7689 - val\_acc: 0.9296

Epoch 280/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7691 - acc: 0.9205 - val\_loss: 0.7704 - val\_acc: 0.9296

Epoch 281/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7916 - acc: 0.9205 - val\_loss: 0.7697 - val\_acc: 0.9296

Epoch 282/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7574 - acc: 0.9205 - val\_loss: 0.7683 - val\_acc: 0.9296

Epoch 283/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7889 - acc: 0.9205 - val\_loss: 0.7690 - val\_acc: 0.9296

Epoch 284/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7940 - acc: 0.9205 - val\_loss: 0.7659 - val\_acc: 0.9296

Epoch 285/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7172 - acc: 0.9205 - val\_loss: 0.7647 - val\_acc: 0.9296

Epoch 286/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7715 - acc: 0.9205 - val\_loss: 0.7656 - val\_acc: 0.9296

Epoch 287/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8265 - acc: 0.9205 - val\_loss: 0.7639 - val\_acc: 0.9296

Epoch 288/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7826 - acc: 0.9205 - val\_loss: 0.7639 - val\_acc: 0.9296

Epoch 289/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8138 - acc: 0.9205 - val\_loss: 0.7639 - val\_acc: 0.9296

Epoch 290/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7685 - acc: 0.9205 - val\_loss: 0.7630 - val\_acc: 0.9296

Epoch 291/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8036 - acc: 0.9205 - val\_loss: 0.7622 - val\_acc: 0.9296

Epoch 292/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8270 - acc: 0.9205 - val\_loss: 0.7643 - val\_acc: 0.9296

Epoch 293/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7518 - acc: 0.9205 - val\_loss: 0.7656 - val\_acc: 0.9296

Epoch 294/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7820 - acc: 0.9205 - val\_loss: 0.7643 - val\_acc: 0.9296

Epoch 295/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7062 - acc: 0.9205 - val\_loss: 0.7639 - val\_acc: 0.9296

Epoch 296/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7638 - acc: 0.9205 - val\_loss: 0.7647 - val\_acc: 0.9296

Epoch 297/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7256 - acc: 0.9205 - val\_loss: 0.7682 - val\_acc: 0.9296

Epoch 298/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7888 - acc: 0.9205 - val\_loss: 0.7660 - val\_acc: 0.9296

Epoch 299/300

151/151 [==============================] - 3s 21ms/step - loss: 0.8533 - acc: 0.9205 - val\_loss: 0.7634 - val\_acc: 0.9296

Epoch 300/300

151/151 [==============================] - 3s 21ms/step - loss: 0.7170 - acc: 0.9205 - val\_loss: 0.7649 - val\_acc: 0.9296

Accuracy: 92.96%

