Introduction to Deep Learning

Activation Function:

Step Function: ¶

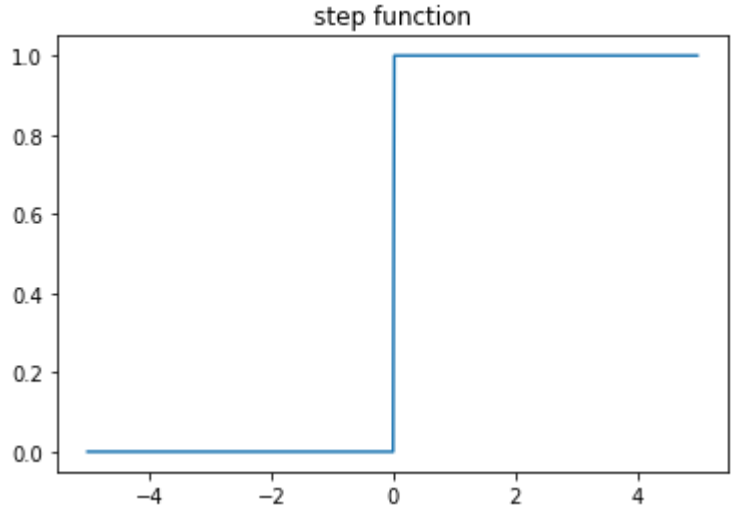
$$\phi(x) = \begin{cases} 1 \; if \; x > 0, \\ 0 \; if \; x < 0 \end{cases}$$

In [2]:

```
import numpy as np
import matplotlib.pyplot as plt
import matplotlib
%matplotlib inline

z = np.arange(-5, 5, 0.02)
step_fn = np.vectorize(lambda z: 1.0 if z > 0.0 else 0.0)
step = step_fn(z)

fig = plt.figure()
ax = fig.add_subplot(111)
ax.plot(z, step)
ax.set_title('step function')
plt.show()
```



Threshold Functions:

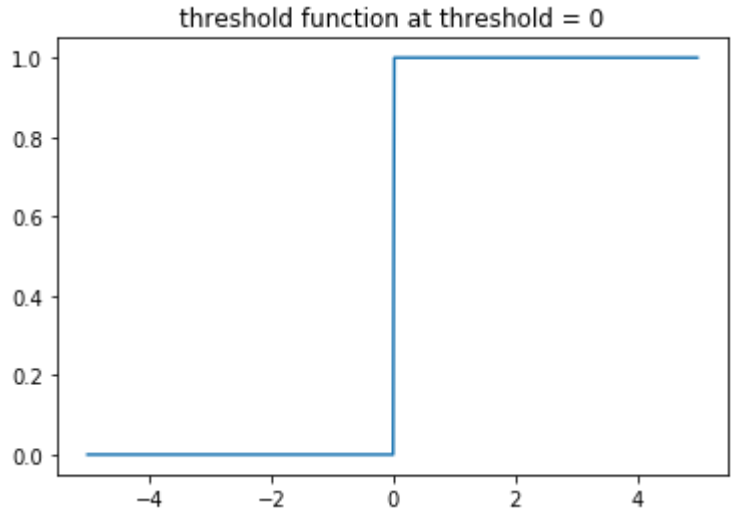
$$\phi(x) = \begin{cases} 1 \; if \; x > 0, \\ 0 \; if \; x < 0 \end{cases}$$

threshold func. can be across any threshold value (if its threshold is set to zero, it can also be called as Step Func)

In [3]:

```
z = np.arange(-5, 5, 0.02)
step_fn = np.vectorize(lambda z: 1.0 if z > 0.0 else 0.0)
step = step_fn(z)

fig = plt.figure()
ax = fig.add_subplot(111)
ax.plot(z, step)
ax.set_title('threshold function at threshold = 0')
plt.show()
```



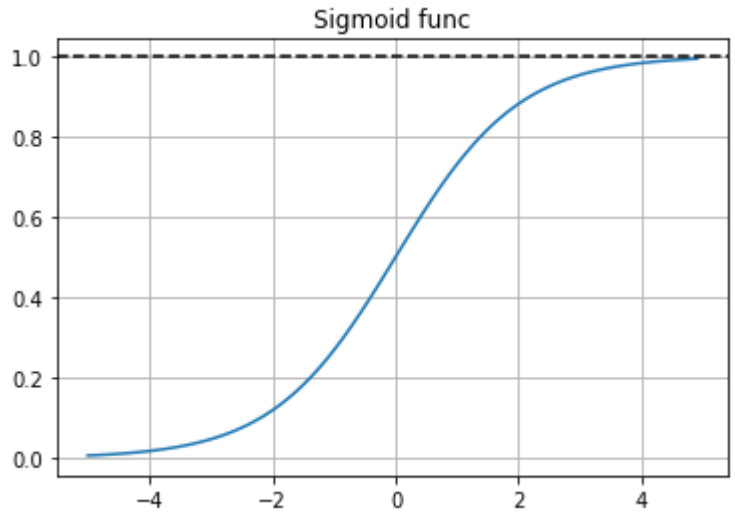
Sigmoid Function

$$\phi(x) = \frac{1}{1 + e^{-x}}$$

In [5]:

```
z = np.arange(-5, 5, 0.1)
sigma_fn = np.vectorize(lambda z: 1/(1 + np.exp(-z)))
sigma = sigma_fn(z)

fig = plt.figure()
ax = fig.add_subplot(111)
ax.plot(z, sigma)
ax.grid(True)
plt.axhline(y=1, color='k', linestyle='--')
ax.set_title('Sigmoid func')
plt.show()
```



Hyperbolic Tangent Function (tan-h)

$$\phi(x) = tanh(x_j^i) = \frac{1 - e^{-2x}}{1 + e^{-2x}}$$

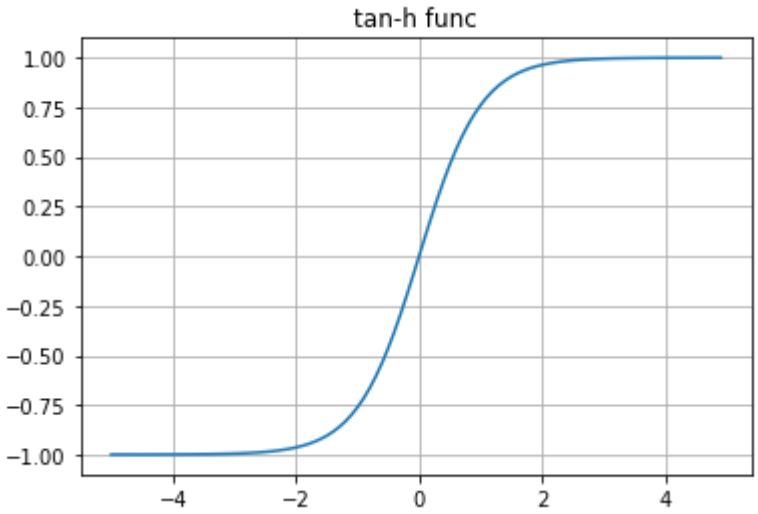
the gradients of tan-h are much stepper than sigmoid function
a scaled version of our sigmoid function

$$\phi(x) = 2\sigma(2x) - 1$$

In [6]:

```
z = np.arange(-5, 5, .1)
t = np.tanh(z)

fig = plt.figure()
ax = fig.add_subplot(111)
ax.plot(z, t)
ax.grid(True)
ax.set_title('tan-h func')
plt.show()
```



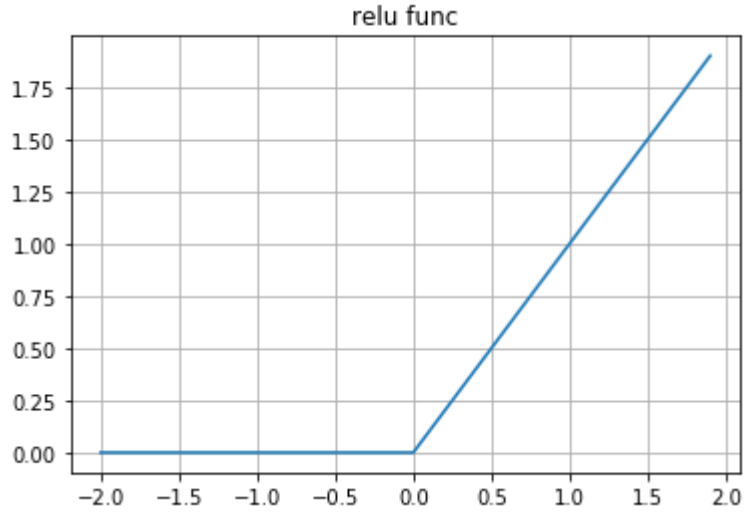
Rectified Linear Unit Function (ReLU)

$$\phi(x) = max(0, x_j^i)$$

In [7]:

```
z = np.arange(-2, 2, 0.1)
zero = np.zeros(len(z))
y = np.max([zero, z], axis=0)

fig = plt.figure()
ax = fig.add_subplot(111)
ax.plot(z, y)
ax.grid(True)
ax.set_title('relu func')
plt.show()
```



In [ ]:

```

```

Churn Modelling using ANN

grab the dataset for kaggle https://www.kaggle.com/barelydedicated/bank-customer-churn-modeling (https://www.kaggle.com/barelydedicated/bank-customer-churn-modeling)

Short Assignment: Do Exploratory Data Analysis on this dataset. Try to grab as many patterns in the data as you can (as a human) and then tomorrow we'll let ANN pick up the patterns on its own and come up with an optimal classification model to predict the churn.

Installing the libraries

```
pip install tensorflow
pip install keras

-OR-

conda install tensorflow
conda install keras
```

Importing libraries

In [4]:

```
import numpy as np
import pandas as pd
```

load the dataset

In [5]:

```
dataset = pd.read_csv("Churn_Modelling.csv")
dataset.head()
```

Out[5]:

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Bal
0	1	15634602	Hargrave	619	France	Female	42	2	
1	2	15647311	Hill	608	Spain	Female	41	1	838(
2	3	15619304	Onio	502	France	Female	42	8	15966
3	4	15701354	Boni	699	France	Female	39	1	
4	5	15737888	Mitchell	850	Spain	Female	43	2	12551

In [6]:

```
dataset.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10000 entries, 0 to 9999
Data columns (total 14 columns):
RowNumber          10000 non-null int64
CustomerId         10000 non-null int64
Surname            10000 non-null object
CreditScore        10000 non-null int64
Geography          10000 non-null object
Gender             10000 non-null object
Age                10000 non-null int64
Tenure             10000 non-null int64
Balance            10000 non-null float64
NumOfProducts      10000 non-null int64
HasCrCard          10000 non-null int64
IsActiveMember     10000 non-null int64
EstimatedSalary    10000 non-null float64
Exited             10000 non-null int64
dtypes: float64(2), int64(9), object(3)
memory usage: 1.1+ MB
```

In [12]:

```
# spliting dataset into feature vector and y-label
X = dataset.iloc[:, 3:-1].values
y = dataset.iloc[:, -1].values
```

handling categorical values

In [13]:

```
X
```

Out[13]:

```
array([[619, 'France', 'Female', ..., 1, 1, 101348.88],
       [608, 'Spain', 'Female', ..., 0, 1, 112542.58],
       [502, 'France', 'Female', ..., 1, 0, 113931.57],
       ...,
       [709, 'France', 'Female', ..., 0, 1, 42085.58],
       [772, 'Germany', 'Male', ..., 1, 0, 92888.52],
       [792, 'France', 'Female', ..., 1, 0, 38190.78]], dtype=object)
```

In [18]:

```
from sklearn.preprocessing import LabelEncoder, OneHotEncoder

labelencoder_X_1 = LabelEncoder()
X[:, 1] = labelencoder_X_1.fit_transform(X[:, 1]) # encoding Geography field's values

labelencoder_X_2 = LabelEncoder()
X[:, 2] = labelencoder_X_2.fit_transform(X[:, 2]) # encoding Gender field's values
```

In [19]:

```
labelencoder_X_1.classes_
```

Out[19]:

```
array(['France', 'Germany', 'Spain'], dtype=object)
```

In [20]:

```
labelencoder_X_2.classes_
```

Out[20]:

```
array(['Female', 'Male'], dtype=object)
```

In [21]:

```
X
```

Out[21]:

```
array([[619, 0, 0, ..., 1, 1, 101348.88],
       [608, 2, 0, ..., 0, 1, 112542.58],
       [502, 0, 0, ..., 1, 0, 113931.57],
       ...,
       [709, 0, 0, ..., 0, 1, 42085.58],
       [772, 1, 1, ..., 1, 0, 92888.52],
       [792, 0, 0, ..., 1, 0, 38190.78]], dtype=object)
```

In [22]:

```
onehotencoder = OneHotEncoder(categorical_features= [1]) # converting to 1-hot encodes
 for values at index 1
X = onehotencoder.fit_transform(X).toarray()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\preprocessing\_encoder
s.py:368: FutureWarning: The handling of integer data will change in versi
on 0.22. Currently, the categories are determined based on the range [0, m
ax(values)], while in the future they will be determined based on the uniq
ue values.
If you want the future behaviour and silence this warning, you can specify
"categories='auto'".
In case you used a LabelEncoder before this OneHotEncoder to convert the c
ategories to integers, then you can now use the OneHotEncoder directly.
  warnings.warn(msg, FutureWarning)
```

In [23]:

```
X
```

Out[23]:

```
array([[1.0000000e+00, 0.0000000e+00, 0.0000000e+00, ..., 1.0000000e+00,
        1.0000000e+00, 1.0134888e+05],
       [0.0000000e+00, 0.0000000e+00, 1.0000000e+00, ..., 0.0000000e+00,
        1.0000000e+00, 1.1254258e+05],
       [1.0000000e+00, 0.0000000e+00, 0.0000000e+00, ..., 1.0000000e+00,
        0.0000000e+00, 1.1393157e+05],
       ...,
       [1.0000000e+00, 0.0000000e+00, 0.0000000e+00, ..., 0.0000000e+00,
        1.0000000e+00, 4.2085580e+04],
       [0.0000000e+00, 1.0000000e+00, 0.0000000e+00, ..., 1.0000000e+00,
        0.0000000e+00, 9.2888520e+04],
       [1.0000000e+00, 0.0000000e+00, 0.0000000e+00, ..., 1.0000000e+00,
        0.0000000e+00, 3.8190780e+04]])
```

In [24]:

```
X = X[:, 1:]
```

In [25]:

```
X
```

Out[25]:

```
array([[0.0000000e+00, 0.0000000e+00, 6.1900000e+02, ..., 1.0000000e+00,
        1.0000000e+00, 1.0134888e+05],
       [0.0000000e+00, 1.0000000e+00, 6.0800000e+02, ..., 0.0000000e+00,
        1.0000000e+00, 1.1254258e+05],
       [0.0000000e+00, 0.0000000e+00, 5.0200000e+02, ..., 1.0000000e+00,
        0.0000000e+00, 1.1393157e+05],
       ...,
       [0.0000000e+00, 0.0000000e+00, 7.0900000e+02, ..., 0.0000000e+00,
        1.0000000e+00, 4.2085580e+04],
       [1.0000000e+00, 0.0000000e+00, 7.7200000e+02, ..., 1.0000000e+00,
        0.0000000e+00, 9.2888520e+04],
       [0.0000000e+00, 0.0000000e+00, 7.9200000e+02, ..., 1.0000000e+00,
        0.0000000e+00, 3.8190780e+04]])
```

splitting the dataset into train & test sets

In [26]:

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=2
9)
```

Feature Scaling

In [27]:

```
from sklearn.preprocessing import StandardScaler

sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.fit_transform(X_test)
```

Building the ANN

there are 2 way to set up the architecture of any NNs (Neural Networks):

- by creating directed graph model
- by sequential model

We will set up a sequential model using `keras` lib.

In a sequential model you have all your neural networks as layers laid down in sequence.

In [28]:

```
import keras
from keras.models import Sequential # for creating Sequential model like architecture
from keras.layers import Dense # this is for creating layers of your NN
```

In [29]:

```
# building ANN classifier

classifier = Sequential() # this will initialize your Sequential model
```

In [33]:

```
# (11 + 1) / 2 = 6  # this is very subjective definition, feel free to set out your own
logic

# adding input layer and first hidden layer
classifier.add(Dense(units=6, kernel_initializer='uniform', input_dim=11, activation='r
elu'))
```

In [34]:

```
# adding another layer: hidden layer
classifier.add(Dense(units=6, kernel_initializer='uniform', activation='relu'))
```

In [35]:

```
# adding the output layer
classifier.add(Dense(units=1, kernel_initializer='uniform', activation='sigmoid'))
```

compiling the ANN

In [36]:

```
classifier.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
#binary_crossentropy bcz we binary outcomes
```

Training our ANN

In [37]:

```
classifier.fit(X_train, y_train, batch_size=10, epochs=100)
```

```
WARNING:tensorflow:From C:\ProgramData\Anaconda3\lib\site-packages\tensorf
low\python\ops\math_ops.py:3066: to_int32 (from tensorflow.python.ops.math
_ops) is deprecated and will be removed in a future version.
Instructions for updating:
Use tf.cast instead.
Epoch 1/100
8000/8000 [==============================] - 3s 387us/step - loss: 0.4982
- acc: 0.7962
Epoch 2/100
8000/8000 [==============================] - ETA: 0s - loss: 0.4321 - acc:
0.797 - 1s 170us/step - loss: 0.4323 - acc: 0.7975
Epoch 3/100
8000/8000 [==============================] - 1s 170us/step - loss: 0.4291
- acc: 0.7975
Epoch 4/100
8000/8000 [==============================] - 1s 133us/step - loss: 0.4266
- acc: 0.7975
Epoch 5/100
8000/8000 [==============================] - 1s 144us/step - loss: 0.4208
- acc: 0.8151
Epoch 6/100
8000/8000 [==============================] - 1s 168us/step - loss: 0.4142
- acc: 0.8266
Epoch 7/100
8000/8000 [==============================] - 1s 171us/step - loss: 0.4101
- acc: 0.8296
Epoch 8/100
8000/8000 [==============================] - 2s 192us/step - loss: 0.4079
- acc: 0.8314
Epoch 9/100
8000/8000 [==============================] - 1s 168us/step - loss: 0.4057
- acc: 0.8341 1s - lo
Epoch 10/100
8000/8000 [==============================] - 1s 156us/step - loss: 0.4040
- acc: 0.8342
Epoch 11/100
8000/8000 [==============================] - 1s 149us/step - loss: 0.4024
- acc: 0.8350
Epoch 12/100
8000/8000 [==============================] - 1s 146us/step - loss: 0.4016
- acc: 0.8336
Epoch 13/100
8000/8000 [==============================] - 1s 151us/step - loss: 0.4002
- acc: 0.8339
Epoch 14/100
8000/8000 [==============================] - 1s 177us/step - loss: 0.3989
- acc: 0.8331
Epoch 15/100
8000/8000 [==============================] - 1s 153us/step - loss: 0.3988
- acc: 0.8346
Epoch 16/100
8000/8000 [==============================] - 1s 154us/step - loss: 0.3985
- acc: 0.8342
Epoch 17/100
8000/8000 [==============================] - 1s 157us/step - loss: 0.3977
- acc: 0.8347
Epoch 18/100
8000/8000 [==============================] - 1s 143us/step - loss: 0.3976
- acc: 0.8359
Epoch 19/100
8000/8000 [==============================] - 1s 167us/step - loss: 0.3972
```

```
- acc: 0.8344
Epoch 20/100
8000/8000 [==============================] - 1s 158us/step - loss: 0.3973
- acc: 0.8354
Epoch 21/100
8000/8000 [==============================] - 1s 151us/step - loss: 0.3969
- acc: 0.8349
Epoch 22/100
8000/8000 [==============================] - 1s 158us/step - loss: 0.3967
- acc: 0.8359
Epoch 23/100
8000/8000 [==============================] - 1s 152us/step - loss: 0.3960
- acc: 0.8354 1s - loss:
Epoch 24/100
8000/8000 [==============================] - 1s 156us/step - loss: 0.3967
- acc: 0.8351
Epoch 25/100
8000/8000 [==============================] - 1s 146us/step - loss: 0.3958
- acc: 0.8371
Epoch 26/100
8000/8000 [==============================] - 1s 146us/step - loss: 0.3959
- acc: 0.8362
Epoch 27/100
8000/8000 [==============================] - 1s 159us/step - loss: 0.3954
- acc: 0.8362
Epoch 28/100
8000/8000 [==============================] - 1s 147us/step - loss: 0.3953
- acc: 0.8347
Epoch 29/100
8000/8000 [==============================] - 1s 142us/step - loss: 0.3955
- acc: 0.8355
Epoch 30/100
8000/8000 [==============================] - 1s 147us/step - loss: 0.3957
- acc: 0.8357
Epoch 31/100
8000/8000 [==============================] - 1s 141us/step - loss: 0.3950
- acc: 0.8362
Epoch 32/100
8000/8000 [==============================] - 1s 143us/step - loss: 0.3947
- acc: 0.8356
Epoch 33/100
8000/8000 [==============================] - 1s 141us/step - loss: 0.3950
- acc: 0.8364
Epoch 34/100
8000/8000 [==============================] - 1s 140us/step - loss: 0.3944
- acc: 0.8374
Epoch 35/100
8000/8000 [==============================] - 1s 143us/step - loss: 0.3947
- acc: 0.8339
Epoch 36/100
8000/8000 [==============================] - 1s 143us/step - loss: 0.3940
- acc: 0.8370
Epoch 37/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3939
- acc: 0.8369
Epoch 38/100
8000/8000 [==============================] - ETA: 0s - loss: 0.3923 - acc:
0.837 - 1s 139us/step - loss: 0.3927 - acc: 0.8367
Epoch 39/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3918
- acc: 0.8400 1s - loss: 0
```

```
Epoch 40/100
8000/8000 [==============================] - 1s 146us/step - loss: 0.3900
- acc: 0.8412
Epoch 41/100
8000/8000 [==============================] - 1s 139us/step - loss: 0.3881
- acc: 0.8415
Epoch 42/100
8000/8000 [==============================] - 1s 149us/step - loss: 0.3863
- acc: 0.8417
Epoch 43/100
8000/8000 [==============================] - 1s 143us/step - loss: 0.3837
- acc: 0.8386
Epoch 44/100
8000/8000 [==============================] - 1s 136us/step - loss: 0.3791
- acc: 0.8402
Epoch 45/100
8000/8000 [==============================] - 1s 138us/step - loss: 0.3750
- acc: 0.8427
Epoch 46/100
8000/8000 [==============================] - 1s 140us/step - loss: 0.3721
- acc: 0.8406
Epoch 47/100
8000/8000 [==============================] - 1s 143us/step - loss: 0.3694
- acc: 0.8452
Epoch 48/100
8000/8000 [==============================] - 1s 142us/step - loss: 0.3660
- acc: 0.8449
Epoch 49/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3626
- acc: 0.8504
Epoch 50/100
8000/8000 [==============================] - 1s 139us/step - loss: 0.3610
- acc: 0.8505
Epoch 51/100
8000/8000 [==============================] - 1s 147us/step - loss: 0.3597
- acc: 0.8510
Epoch 52/100
8000/8000 [==============================] - 1s 147us/step - loss: 0.3575
- acc: 0.8517
Epoch 53/100
8000/8000 [==============================] - 1s 149us/step - loss: 0.3575
- acc: 0.8511 0s - loss: 0.3547
Epoch 54/100
8000/8000 [==============================] - 1s 154us/step - loss: 0.3564
- acc: 0.8542
Epoch 55/100
8000/8000 [==============================] - 1s 163us/step - loss: 0.3558
- acc: 0.8529
Epoch 56/100
8000/8000 [==============================] - 1s 145us/step - loss: 0.3525
- acc: 0.8545
Epoch 57/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3528
- acc: 0.8547
Epoch 58/100
8000/8000 [==============================] - 1s 141us/step - loss: 0.3526
- acc: 0.8551
Epoch 59/100
8000/8000 [==============================] - 1s 136us/step - loss: 0.3510
- acc: 0.8569
Epoch 60/100
```

```
8000/8000 [==============================] - 1s 134us/step - loss: 0.3488
- acc: 0.8574
Epoch 61/100
8000/8000 [==============================] - 1s 134us/step - loss: 0.3492
- acc: 0.8549
Epoch 62/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3482
- acc: 0.8566
Epoch 63/100
8000/8000 [==============================] - 1s 145us/step - loss: 0.3482
- acc: 0.8572
Epoch 64/100
8000/8000 [==============================] - 1s 146us/step - loss: 0.3479
- acc: 0.8584
Epoch 65/100
8000/8000 [==============================] - 1s 150us/step - loss: 0.3469
- acc: 0.8597
Epoch 66/100
8000/8000 [==============================] - 1s 148us/step - loss: 0.3474
- acc: 0.8582
Epoch 67/100
8000/8000 [==============================] - 1s 129us/step - loss: 0.3454
- acc: 0.8584
Epoch 68/100
8000/8000 [==============================] - 1s 127us/step - loss: 0.3475
- acc: 0.8580
Epoch 69/100
8000/8000 [==============================] - 1s 127us/step - loss: 0.3454
- acc: 0.8587
Epoch 70/100
8000/8000 [==============================] - 1s 128us/step - loss: 0.3463
- acc: 0.8555
Epoch 71/100
8000/8000 [==============================] - 1s 128us/step - loss: 0.3459
- acc: 0.8579
Epoch 72/100
8000/8000 [==============================] - 1s 128us/step - loss: 0.3451
- acc: 0.8592
Epoch 73/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3452
- acc: 0.8575
Epoch 74/100
8000/8000 [==============================] - 1s 130us/step - loss: 0.3450
- acc: 0.8581
Epoch 75/100
8000/8000 [==============================] - 1s 133us/step - loss: 0.3451
- acc: 0.8607
Epoch 76/100
8000/8000 [==============================] - 1s 135us/step - loss: 0.3445
- acc: 0.8592
Epoch 77/100
8000/8000 [==============================] - 1s 126us/step - loss: 0.3453
- acc: 0.8577
Epoch 78/100
8000/8000 [==============================] - 1s 123us/step - loss: 0.3459
- acc: 0.8581
Epoch 79/100
8000/8000 [==============================] - 1s 131us/step - loss: 0.3458
- acc: 0.8594
Epoch 80/100
8000/8000 [==============================] - 1s 141us/step - loss: 0.3441
```

```
- acc: 0.8606
Epoch 81/100
8000/8000 [==============================] - 1s 138us/step - loss: 0.3439
- acc: 0.8587
Epoch 82/100
8000/8000 [==============================] - 1s 141us/step - loss: 0.3453
- acc: 0.8574
Epoch 83/100
8000/8000 [==============================] - 1s 128us/step - loss: 0.3442
- acc: 0.8577
Epoch 84/100
8000/8000 [==============================] - 1s 121us/step - loss: 0.3442
- acc: 0.8611
Epoch 85/100
8000/8000 [==============================] - 1s 122us/step - loss: 0.3452
- acc: 0.8591
Epoch 86/100
8000/8000 [==============================] - 1s 121us/step - loss: 0.3439
- acc: 0.8611
Epoch 87/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3443
- acc: 0.8587
Epoch 88/100
8000/8000 [==============================] - 1s 132us/step - loss: 0.3438
- acc: 0.8602
Epoch 89/100
8000/8000 [==============================] - 1s 123us/step - loss: 0.3445
- acc: 0.8600
Epoch 90/100
8000/8000 [==============================] - 1s 124us/step - loss: 0.3437
- acc: 0.8582
Epoch 91/100
8000/8000 [==============================] - 1s 125us/step - loss: 0.3438
- acc: 0.8605
Epoch 92/100
8000/8000 [==============================] - 1s 137us/step - loss: 0.3431
- acc: 0.8601
Epoch 93/100
8000/8000 [==============================] - 1s 131us/step - loss: 0.3415
- acc: 0.8579
Epoch 94/100
8000/8000 [==============================] - 1s 143us/step - loss: 0.3435
- acc: 0.8595 1s - loss:
Epoch 95/100
8000/8000 [==============================] - 1s 140us/step - loss: 0.3419
- acc: 0.8614
Epoch 96/100
8000/8000 [==============================] - 1s 129us/step - loss: 0.3433
- acc: 0.8584
Epoch 97/100
8000/8000 [==============================] - 1s 130us/step - loss: 0.3417
- acc: 0.8597
Epoch 98/100
8000/8000 [==============================] - 1s 123us/step - loss: 0.3410
- acc: 0.8620
Epoch 99/100
8000/8000 [==============================] - 1s 125us/step - loss: 0.3418
- acc: 0.8594
Epoch 100/100
8000/8000 [==============================] - 1s 125us/step - loss: 0.3423
- acc: 0.8599
```

Out[37]:

```
<keras.callbacks.History at 0x16dfd2e0470>
```

Testing our ANN model

In [38]:

```
y_pred = classifier.predict(X_test)
```

In [39]:

```
y_pred
```

Out[39]:

```
array([[0.07319081],
       [0.01856461],
       [0.16162011],
       ...,
       [0.04956833],
       [0.06632102],
       [0.26854303]], dtype=float32)
```

In [40]:

```
y_test
```

Out[40]:

```
array([1, 0, 0, ..., 0, 0, 1], dtype=int64)
```

In [41]:

```
y_pred = (y_pred > 0.5)
y_pred
```

Out[41]:

```
array([[False],
       [False],
       [False],
       ...,
       [False],
       [False],
       [False]])
```

In [42]:

```
from sklearn.metrics import confusion_matrix

cm = confusion_matrix(y_test, y_pred)
```

In [43]:

```
cm
```

Out[43]:

```
array([[1518,   65],
       [ 217,  200]], dtype=int64)
```

In [45]:

```
len(X_test)
```

Out[45]:

```
2000
```

In [44]:

```
(1518 + 200)/2000
```

Out[44]:

```
0.859
```

so, we have an accuracy of **85.9%**

```
        CreditScore : 600
        Geography   : France
        Gender  : Male
        Age : 40
        Tenure  : 3
        Balance : $60000
    NumOfProducts   :2
    HasCrCard   : Yes
    IsActiveMember  : Yes
    EstimatedSalary: $50000
```

In [48]:

```
new_prediction = classifier.predict(sc.transform(np.array([[0.0, 0, 600, 1, 40, 3, 6000
0, 2, 1, 1, 50000]])))
```

In [50]:

```
new_prediction = (new_prediction > 0.5)
new_prediction
```

Out[50]:

```
array([[False]])
```

Evaluation of ANN

10-fold CV

In [52]:

```
X = dataset.iloc[:, 3:-1].values
y = dataset.iloc[:, -1].values

labelencoder_X_1 = LabelEncoder()
X[:, 1] = labelencoder_X_1.fit_transform(X[:, 1])
labelencoder_X_2 = LabelEncoder()
X[:, 2] = labelencoder_X_2.fit_transform(X[:, 2])

onehotencoder = OneHotEncoder(categorical_features= [1]) # converting to 1-hot encodes
 for values at index 1
X = onehotencoder.fit_transform(X).toarray()
X = X[:, 1:]

sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.fit_transform(X_test)
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\preprocessing\_encoder
s.py:368: FutureWarning: The handling of integer data will change in versi
on 0.22. Currently, the categories are determined based on the range [0, m
ax(values)], while in the future they will be determined based on the uniq
ue values.
If you want the future behaviour and silence this warning, you can specify
"categories='auto'".
In case you used a LabelEncoder before this OneHotEncoder to convert the c
ategories to integers, then you can now use the OneHotEncoder directly.
  warnings.warn(msg, FutureWarning)
```

In [53]:

```
from keras.wrappers.scikit_learn import KerasClassifier
from sklearn.model_selection import cross_val_score
```

In [54]:

```
def build_classifier():
    classifier = Sequential()
    classifier.add(Dense(units=6, kernel_initializer='uniform', input_dim=11, activatio
n='relu'))
    classifier.add(Dense(units=6, kernel_initializer='uniform', activation='relu'))
    classifier.add(Dense(units=1, kernel_initializer='uniform', activation='sigmoid'))
    classifier.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accurac
y'])
    return classifier
```

In [55]:

```
k_clf = KerasClassifier(build_fn=build_classifier, batch_size=10, epochs=100)
```

In [56]:

```
cv_score = cross_val_score(estimator=k_clf, X=X_train, y=y_train, cv=10, n_jobs=-1)
```

In [57]:

```
cv_score.mean() # mean accuracy of your ANN classifier
```

Out[57]:

```
0.8406249940022826
```

In [58]:

```
cv_score.std() # variance
```

Out[58]:

```
0.00955657477709918
```

[NOTE:] if your model has high variance (meaning it has learned too much than what it should have), then its a case of overfitting!!

Regularization of deep neural nets

To handle overfitting in deep neural networks, we do this by adding a `dropout layer` .

```
from keras.layers import Dropout

classifier = Sequential()
classifier.add(Dense(units=6, kernel_initializer='uniform', input_dim=11, activa
tion='relu'))
classifier.add(Dropout(0.1)) # 10% dropout rate after first hidden layer

classifier.add(Dense(units=6, kernel_initializer='uniform', activation='relu'))
classifier.add(Dropout(0.1)) # 10% dropout rate after 2nd hidden layer

classifier.add(Dense(units=1, kernel_initializer='uniform', activation='sigmoid'
))
classifier.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accur
acy'])
```

Tuning your ANN model

In [60]:

```
from keras.wrappers.scikit_learn import KerasClassifier
from sklearn.model_selection import GridSearchCV

def build_classifier(optimizer):
    classifier = Sequential()
    classifier.add(Dense(units=6, kernel_initializer='uniform', input_dim=11, activatio
n='relu'))
    classifier.add(Dense(units=6, kernel_initializer='uniform', activation='relu'))
    classifier.add(Dense(units=1, kernel_initializer='uniform', activation='sigmoid'))
    classifier.compile(optimizer=optimizer, loss='binary_crossentropy', metrics=['accur
acy'])
    return classifier

k_clf = KerasClassifier(build_fn=build_classifier)

params_grid = {
    'batch_size': [25, 32],
    'epochs': [100, 200, 250],
    'optimizer': ['adam', 'rmsprop']
}

grid_search = GridSearchCV(estimator=k_clf,
                           param_grid=params_grid,
                           cv=10,
                           scoring='accuracy'
                          )

grid_search_cv_model = grid_search.fit(X_train, y_train)
```

```
Epoch 1/100
7200/7200 [==============================] - 2s 208us/step - loss: 0.5530
- acc: 0.7996
Epoch 2/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4341 -
acc: 0.8001
Epoch 3/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4270 -
acc: 0.8001
Epoch 4/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4233 -
acc: 0.8001
Epoch 5/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4199 -
acc: 0.8001
Epoch 6/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4167 -
acc: 0.8001
Epoch 7/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.4150 -
acc: 0.8237
Epoch 8/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4135 -
acc: 0.8281
Epoch 9/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4124 -
acc: 0.8301
Epoch 10/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4115 -
acc: 0.8299
Epoch 11/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.4103 -
acc: 0.8314
Epoch 12/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4093 -
acc: 0.8325
Epoch 13/100
7200/7200 [==============================] - 1s 84us/step - loss: 0.4084 -
acc: 0.8324
Epoch 14/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4080 -
acc: 0.8356
Epoch 15/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4069 -
acc: 0.8349
Epoch 16/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4063 -
acc: 0.8340
Epoch 17/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4055 -
acc: 0.8365
Epoch 18/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4050 -
acc: 0.8356
Epoch 19/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.4045 -
acc: 0.8361
Epoch 20/100
7200/7200 [==============================] - 1s 81us/step - loss: 0.4038 -
acc: 0.8360
Epoch 21/100
```

```
7200/7200 [==============================] - 0s 67us/step - loss: 0.4034 -
acc: 0.8368
Epoch 22/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4027 -
acc: 0.8368
Epoch 23/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4025 -
acc: 0.8372
Epoch 24/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4022 -
acc: 0.8365
Epoch 25/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4018 -
acc: 0.8375
Epoch 26/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4014 -
acc: 0.8374
Epoch 27/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4012 -
acc: 0.8367
Epoch 28/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.4010 -
acc: 0.8372: 0s - loss: 0.4052 - acc
Epoch 29/100
7200/7200 [==============================] - 1s 69us/step - loss: 0.4007 -
acc: 0.8387
Epoch 30/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4007 -
acc: 0.8382
Epoch 31/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4003 -
acc: 0.8372
Epoch 32/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4002 -
acc: 0.8382
Epoch 33/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3999 -
acc: 0.8367
Epoch 34/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.3996 -
acc: 0.8376
Epoch 35/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3998 -
acc: 0.8371
Epoch 36/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3994 -
acc: 0.8375
Epoch 37/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3995 -
acc: 0.8371
Epoch 38/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3991 -
acc: 0.8365
Epoch 39/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3992 -
acc: 0.8379
Epoch 40/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3989 -
acc: 0.8378
Epoch 41/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3986 -
```

```
acc: 0.8375
Epoch 42/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3991 -
acc: 0.8354
Epoch 43/100
7200/7200 [==============================] - 1s 83us/step - loss: 0.3987 -
acc: 0.8374
Epoch 44/100
7200/7200 [==============================] - 1s 81us/step - loss: 0.3987 -
acc: 0.8382
Epoch 45/100
7200/7200 [==============================] - 1s 78us/step - loss: 0.3982 -
acc: 0.8364
Epoch 46/100
7200/7200 [==============================] - 1s 78us/step - loss: 0.3983 -
acc: 0.8365
Epoch 47/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3984 -
acc: 0.8376
Epoch 48/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3982 -
acc: 0.8367
Epoch 49/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3979 -
acc: 0.8378
Epoch 50/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3982 -
acc: 0.8361
Epoch 51/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3978 -
acc: 0.8383
Epoch 52/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.3984 -
acc: 0.8367
Epoch 53/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3980 -
acc: 0.8369
Epoch 54/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3979 -
acc: 0.8383
Epoch 55/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3978 -
acc: 0.8369: 0s - loss: 0.3858 - acc
Epoch 56/100
7200/7200 [==============================] - 1s 79us/step - loss: 0.3975 -
acc: 0.8374
Epoch 57/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3975 -
acc: 0.8369
Epoch 58/100
7200/7200 [==============================] - 1s 77us/step - loss: 0.3976 -
acc: 0.8371
Epoch 59/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.3980 -
acc: 0.8378
Epoch 60/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3975 -
acc: 0.8367
Epoch 61/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.3976 -
acc: 0.8367
```

```
Epoch 62/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.3970 -
acc: 0.8367
Epoch 63/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.3972 -
acc: 0.8369
Epoch 64/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3971 -
acc: 0.8369
Epoch 65/100
7200/7200 [==============================] - 1s 78us/step - loss: 0.3972 -
acc: 0.8382
Epoch 66/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.3970 -
acc: 0.8385
Epoch 67/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3969 -
acc: 0.8365
Epoch 68/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.3971 -
acc: 0.8372
Epoch 69/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.3970 -
acc: 0.8381
Epoch 70/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3966 -
acc: 0.8372
Epoch 71/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3968 -
acc: 0.8378
Epoch 72/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3967 -
acc: 0.8383
Epoch 73/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3972 -
acc: 0.8365
Epoch 74/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3968 -
acc: 0.8367
Epoch 75/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3968 -
acc: 0.8369
Epoch 76/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.3966 -
acc: 0.8386
Epoch 77/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3971 -
acc: 0.8379
Epoch 78/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3967 -
acc: 0.8365
Epoch 79/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3968 -
acc: 0.8368: 0s - loss: 0.3986 - acc: 0.8
Epoch 80/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3967 -
acc: 0.8350
Epoch 81/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3965 -
acc: 0.8378
Epoch 82/100
```

```
7200/7200 [==============================] - 0s 60us/step - loss: 0.3966 -
acc: 0.8387
Epoch 83/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3967 -
acc: 0.8379
Epoch 84/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3968 -
acc: 0.8390
Epoch 85/100
7200/7200 [==============================] - 1s 92us/step - loss: 0.3965 -
acc: 0.8358
Epoch 86/100
7200/7200 [==============================] - ETA: 0s - loss: 0.3968 - acc:
0.838 - 1s 78us/step - loss: 0.3966 - acc: 0.8386
Epoch 87/100
7200/7200 [==============================] - 1s 96us/step - loss: 0.3963 -
acc: 0.8367
Epoch 88/100
7200/7200 [==============================] - 1s 77us/step - loss: 0.3966 -
acc: 0.8365
Epoch 89/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3963 -
acc: 0.8374
Epoch 90/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3964 -
acc: 0.8376
Epoch 91/100
7200/7200 [==============================] - 1s 80us/step - loss: 0.3967 -
acc: 0.8374
Epoch 92/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3966 -
acc: 0.8362
Epoch 93/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3961 -
acc: 0.8393
Epoch 94/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3965 -
acc: 0.8381
Epoch 95/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3966 -
acc: 0.8362
Epoch 96/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3962 -
acc: 0.8387
Epoch 97/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3964 -
acc: 0.8372
Epoch 98/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.3959 -
acc: 0.8365
Epoch 99/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3961 -
acc: 0.8387
Epoch 100/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.3960 -
acc: 0.8376
Epoch 1/100
7200/7200 [==============================] - 2s 219us/step - loss: 0.5466
- acc: 0.7974
Epoch 2/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4382 -
```

```
acc: 0.7974
Epoch 3/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4330 -
acc: 0.7974
Epoch 4/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4303 -
acc: 0.7974
Epoch 5/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4284 -
acc: 0.7974
Epoch 6/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4259 -
acc: 0.7974
Epoch 7/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4230 -
acc: 0.7982
Epoch 8/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4203 -
acc: 0.8169
Epoch 9/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4185 -
acc: 0.8222
Epoch 10/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4166 -
acc: 0.8268
Epoch 11/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4154 -
acc: 0.8296
Epoch 12/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4145 -
acc: 0.8304
Epoch 13/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4133 -
acc: 0.8314
Epoch 14/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4125 -
acc: 0.8306
Epoch 15/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4116 -
acc: 0.8326
Epoch 16/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4111 -
acc: 0.8340
Epoch 17/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4108 -
acc: 0.8332
Epoch 18/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4097 -
acc: 0.8328
Epoch 19/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4093 -
acc: 0.8350
Epoch 20/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4089 -
acc: 0.8347
Epoch 21/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4083 -
acc: 0.8353
Epoch 22/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4080 -
acc: 0.8340
```

```
Epoch 23/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4075 -
acc: 0.8347
Epoch 24/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4070 -
acc: 0.8365
Epoch 25/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4065 -
acc: 0.8357
Epoch 26/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4059 -
acc: 0.8360
Epoch 27/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4061 -
acc: 0.8353
Epoch 28/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4055 -
acc: 0.8361
Epoch 29/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4054 -
acc: 0.8357
Epoch 30/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4050 -
acc: 0.8358
Epoch 31/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4050 -
acc: 0.8361
Epoch 32/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4046 -
acc: 0.8364
Epoch 33/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4044 -
acc: 0.8340
Epoch 34/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4043 -
acc: 0.8354
Epoch 35/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4042 -
acc: 0.8353
Epoch 36/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4037 -
acc: 0.8371
Epoch 37/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4041 -
acc: 0.8351
Epoch 38/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4037 -
acc: 0.8356
Epoch 39/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4038 -
acc: 0.8351: 0s - loss: 0.4455 - acc
Epoch 40/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4032 -
acc: 0.8354
Epoch 41/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4033 -
acc: 0.8344
Epoch 42/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4031 -
acc: 0.8344
Epoch 43/100
```

```
7200/7200 [==============================] - 0s 49us/step - loss: 0.4034 -
acc: 0.8343
Epoch 44/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4030 -
acc: 0.8350
Epoch 45/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4033 -
acc: 0.8342
Epoch 46/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4027 -
acc: 0.8362
Epoch 47/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4028 -
acc: 0.8351
Epoch 48/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4027 -
acc: 0.8362
Epoch 49/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4030 -
acc: 0.8342
Epoch 50/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4026 -
acc: 0.8347
Epoch 51/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4028 -
acc: 0.8332
Epoch 52/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4020 -
acc: 0.8342
Epoch 53/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4024 -
acc: 0.8347
Epoch 54/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4024 -
acc: 0.8351
Epoch 55/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4024 -
acc: 0.8347
Epoch 56/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4023 -
acc: 0.8342
Epoch 57/100
7200/7200 [==============================] - 0s 44us/step - loss: 0.4022 -
acc: 0.8356
Epoch 58/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4021 -
acc: 0.8353
Epoch 59/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4022 -
acc: 0.8343
Epoch 60/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4022 -
acc: 0.8344
Epoch 61/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4019 -
acc: 0.8339
Epoch 62/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4020 -
acc: 0.8340
Epoch 63/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4015 -
```

```
acc: 0.8346
Epoch 64/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4021 -
acc: 0.8344
Epoch 65/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4018 -
acc: 0.8346
Epoch 66/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4021 -
acc: 0.8350
Epoch 67/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4016 -
acc: 0.8349
Epoch 68/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4015 -
acc: 0.8342
Epoch 69/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4016 -
acc: 0.8331
Epoch 70/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4017 -
acc: 0.8343
Epoch 71/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4016 -
acc: 0.8360
Epoch 72/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4014 -
acc: 0.8337
Epoch 73/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4016 -
acc: 0.8349
Epoch 74/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4018 -
acc: 0.8342
Epoch 75/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4017 -
acc: 0.8340
Epoch 76/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4018 -
acc: 0.8340
Epoch 77/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4015 -
acc: 0.8351
Epoch 78/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4014 -
acc: 0.8356
Epoch 79/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4012 -
acc: 0.8356
Epoch 80/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.4017 -
acc: 0.8343
Epoch 81/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4017 -
acc: 0.8353
Epoch 82/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4016 -
acc: 0.8343
Epoch 83/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4015 -
acc: 0.8324
```

```
Epoch 84/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4018 -
acc: 0.8343
Epoch 85/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4015 -
acc: 0.8349
Epoch 86/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4014 -
acc: 0.8332
Epoch 87/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4014 -
acc: 0.8346
Epoch 88/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4015 -
acc: 0.8347
Epoch 89/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4013 -
acc: 0.8346
Epoch 90/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4011 -
acc: 0.8336
Epoch 91/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4013 -
acc: 0.8350
Epoch 92/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4011 -
acc: 0.8340
Epoch 93/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4012 -
acc: 0.8349
Epoch 94/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4013 -
acc: 0.8337
Epoch 95/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4013 -
acc: 0.8342: 0s - loss: 0.3915 - acc: 0
Epoch 96/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4014 -
acc: 0.8357
Epoch 97/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4015 -
acc: 0.8360
Epoch 98/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4008 -
acc: 0.8346
Epoch 99/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4008 -
acc: 0.8353
Epoch 100/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4013 -
acc: 0.8340
Epoch 1/100
7200/7200 [==============================] - 1s 150us/step - loss: 0.5562
- acc: 0.7944
Epoch 2/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4363 -
acc: 0.7956
Epoch 3/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4312 -
acc: 0.7956
Epoch 4/100
```

```
7200/7200 [==============================] - 0s 51us/step - loss: 0.4274 -
acc: 0.7956
Epoch 5/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4242 -
acc: 0.7956
Epoch 6/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4216 -
acc: 0.8010
Epoch 7/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4200 -
acc: 0.8215
Epoch 8/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4188 -
acc: 0.8240
Epoch 9/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4174 -
acc: 0.8274
Epoch 10/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4168 -
acc: 0.8268
Epoch 11/100
7200/7200 [==============================] - 0s 45us/step - loss: 0.4157 -
acc: 0.8294
Epoch 12/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4147 -
acc: 0.8303
Epoch 13/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4138 -
acc: 0.8317
Epoch 14/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4130 -
acc: 0.8312
Epoch 15/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4121 -
acc: 0.8310
Epoch 16/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4115 -
acc: 0.8332
Epoch 17/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4110 -
acc: 0.8326
Epoch 18/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4102 -
acc: 0.8343
Epoch 19/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4098 -
acc: 0.8339
Epoch 20/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4097 -
acc: 0.8343
Epoch 21/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4089 -
acc: 0.8343
Epoch 22/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4082 -
acc: 0.8351
Epoch 23/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4079 -
acc: 0.8356
Epoch 24/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4075 -
```

```
acc: 0.8360
Epoch 25/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4072 -
acc: 0.8351
Epoch 26/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4070 -
acc: 0.8351
Epoch 27/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4062 -
acc: 0.8344
Epoch 28/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4061 -
acc: 0.8357
Epoch 29/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4061 -
acc: 0.8343
Epoch 30/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4060 -
acc: 0.8350
Epoch 31/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4058 -
acc: 0.8344
Epoch 32/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4054 -
acc: 0.8367
Epoch 33/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4054 -
acc: 0.8351
Epoch 34/100
7200/7200 [==============================] - 0s 44us/step - loss: 0.4052 -
acc: 0.8346
Epoch 35/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4049 -
acc: 0.8364
Epoch 36/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4049 -
acc: 0.8353
Epoch 37/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4045 -
acc: 0.8354: 0s - loss: 0.4055 - acc: 0.
Epoch 38/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4050 -
acc: 0.8349
Epoch 39/100
7200/7200 [==============================] - 0s 44us/step - loss: 0.4044 -
acc: 0.8364
Epoch 40/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4044 -
acc: 0.8350
Epoch 41/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4043 -
acc: 0.8354
Epoch 42/100
7200/7200 [==============================] - 0s 45us/step - loss: 0.4041 -
acc: 0.8364
Epoch 43/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4039 -
acc: 0.8351
Epoch 44/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4039 -
acc: 0.8364
```

```
Epoch 45/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4036 -
acc: 0.8360
Epoch 46/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4035 -
acc: 0.8350
Epoch 47/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4035 -
acc: 0.8356
Epoch 48/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4035 -
acc: 0.8360
Epoch 49/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4035 -
acc: 0.8365
Epoch 50/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4033 -
acc: 0.8362
Epoch 51/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4033 -
acc: 0.8360
Epoch 52/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4033 -
acc: 0.8364
Epoch 53/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4031 -
acc: 0.8365
Epoch 54/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4032 -
acc: 0.8349
Epoch 55/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4033 -
acc: 0.8365
Epoch 56/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4029 -
acc: 0.8376
Epoch 57/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4031 -
acc: 0.8346
Epoch 58/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4028 -
acc: 0.8368
Epoch 59/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4028 -
acc: 0.8357
Epoch 60/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4031 -
acc: 0.8362
Epoch 61/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4031 -
acc: 0.8361
Epoch 62/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4024 -
acc: 0.8378
Epoch 63/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4026 -
acc: 0.8362: 0s - loss: 0.4212 - acc: 0.
Epoch 64/100
7200/7200 [==============================] - 0s 44us/step - loss: 0.4025 -
acc: 0.8356
Epoch 65/100
```

```
7200/7200 [==============================] - 0s 48us/step - loss: 0.4026 -
acc: 0.8374
Epoch 66/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4024 -
acc: 0.8353
Epoch 67/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4025 -
acc: 0.8371
Epoch 68/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4024 -
acc: 0.8354
Epoch 69/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4026 -
acc: 0.8357
Epoch 70/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4025 -
acc: 0.8374
Epoch 71/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4028 -
acc: 0.8353
Epoch 72/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4024 -
acc: 0.8369
Epoch 73/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4020 -
acc: 0.8374
Epoch 74/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4025 -
acc: 0.8362
Epoch 75/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4025 -
acc: 0.8356: 0s - loss: 0.4025 - acc: 0.8
Epoch 76/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4022 -
acc: 0.8342
Epoch 77/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4022 -
acc: 0.8354
Epoch 78/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4023 -
acc: 0.8358
Epoch 79/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4014 -
acc: 0.8356
Epoch 80/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4023 -
acc: 0.8365
Epoch 81/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4019 -
acc: 0.8360
Epoch 82/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4022 -
acc: 0.8369
Epoch 83/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4021 -
acc: 0.8368: 0s - loss: 0.4041 - acc: 0.83
Epoch 84/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4019 -
acc: 0.8353
Epoch 85/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4017 -
```

```
acc: 0.8368
Epoch 86/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4017 -
acc: 0.8362
Epoch 87/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4018 -
acc: 0.8379
Epoch 88/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4021 -
acc: 0.8358
Epoch 89/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4021 -
acc: 0.8368
Epoch 90/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4022 -
acc: 0.8375
Epoch 91/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4019 -
acc: 0.8357
Epoch 92/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4019 -
acc: 0.8358
Epoch 93/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4018 -
acc: 0.8361
Epoch 94/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4016 -
acc: 0.8351
Epoch 95/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4020 -
acc: 0.8354
Epoch 96/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4020 -
acc: 0.8376
Epoch 97/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4013 -
acc: 0.8364
Epoch 98/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4024 -
acc: 0.8365
Epoch 99/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4014 -
acc: 0.8365
Epoch 100/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4016 -
acc: 0.8374
Epoch 1/100
7200/7200 [==============================] - 1s 149us/step - loss: 0.5617
- acc: 0.7956
Epoch 2/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4356 -
acc: 0.7971
Epoch 3/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4284 -
acc: 0.7971
Epoch 4/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4236 -
acc: 0.7971
Epoch 5/100
7200/7200 [==============================] - 0s 45us/step - loss: 0.4189 -
acc: 0.8164
```

```
Epoch 6/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4151 -
acc: 0.8275
Epoch 7/100
7200/7200 [==============================] - 0s 45us/step - loss: 0.4120 -
acc: 0.8319
Epoch 8/100
7200/7200 [==============================] - 0s 45us/step - loss: 0.4092 -
acc: 0.8331
Epoch 9/100
7200/7200 [==============================] - 0s 46us/step - loss: 0.4071 -
acc: 0.8343
Epoch 10/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4053 -
acc: 0.8328
Epoch 11/100
7200/7200 [==============================] - 0s 45us/step - loss: 0.4039 -
acc: 0.8336
Epoch 12/100
7200/7200 [==============================] - 0s 47us/step - loss: 0.4027 -
acc: 0.8339
Epoch 13/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4018 -
acc: 0.8356
Epoch 14/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.4008 -
acc: 0.8351
Epoch 15/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.4003 -
acc: 0.8360
Epoch 16/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3995 -
acc: 0.8342: 0s - loss: 0.4063 - acc:
Epoch 17/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3989 -
acc: 0.8367
Epoch 18/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3986 -
acc: 0.8354
Epoch 19/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3982 -
acc: 0.8372
Epoch 20/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3975 -
acc: 0.8362
Epoch 21/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3969 -
acc: 0.8368
Epoch 22/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3965 -
acc: 0.8361
Epoch 23/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3962 -
acc: 0.8349
Epoch 24/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3956 -
acc: 0.8361
Epoch 25/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3959 -
acc: 0.8344
Epoch 26/100
```

```
7200/7200 [==============================] - 0s 68us/step - loss: 0.3949 -
acc: 0.8360
Epoch 27/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3948 -
acc: 0.8362
Epoch 28/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3942 -
acc: 0.8340
Epoch 29/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3940 -
acc: 0.8354
Epoch 30/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3933 -
acc: 0.8354
Epoch 31/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3932 -
acc: 0.8342
Epoch 32/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3926 -
acc: 0.8356
Epoch 33/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3923 -
acc: 0.8350
Epoch 34/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3920 -
acc: 0.8362
Epoch 35/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3916 -
acc: 0.8362
Epoch 36/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3909 -
acc: 0.8358
Epoch 37/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3903 -
acc: 0.8362
Epoch 38/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3898 -
acc: 0.8386
Epoch 39/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3885 -
acc: 0.8400
Epoch 40/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3863 -
acc: 0.8414
Epoch 41/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3845 -
acc: 0.8403
Epoch 42/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3810 -
acc: 0.8422
Epoch 43/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3773 -
acc: 0.8444
Epoch 44/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3729 -
acc: 0.8439
Epoch 45/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3675 -
acc: 0.8450
Epoch 46/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3623 -
```

```
acc: 0.8487
Epoch 47/100
7200/7200 [==============================] - 0s 49us/step - loss: 0.3588 -
acc: 0.8499
Epoch 48/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3557 -
acc: 0.8508
Epoch 49/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3541 -
acc: 0.8531
Epoch 50/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3523 -
acc: 0.8543
Epoch 51/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3506 -
acc: 0.8544
Epoch 52/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3492 -
acc: 0.8546
Epoch 53/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3484 -
acc: 0.8553
Epoch 54/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3472 -
acc: 0.8567
Epoch 55/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3457 -
acc: 0.8553
Epoch 56/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3461 -
acc: 0.8571
Epoch 57/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3444 -
acc: 0.8565
Epoch 58/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3443 -
acc: 0.8571
Epoch 59/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3429 -
acc: 0.8587
Epoch 60/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3433 -
acc: 0.8571
Epoch 61/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3431 -
acc: 0.8578
Epoch 62/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.3424 -
acc: 0.8586
Epoch 63/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3419 -
acc: 0.8585
Epoch 64/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3416 -
acc: 0.8592
Epoch 65/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.3413 -
acc: 0.8589
Epoch 66/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3410 -
acc: 0.8594
```

```
Epoch 67/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3402 -
acc: 0.8585
Epoch 68/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3413 -
acc: 0.8581
Epoch 69/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3414 -
acc: 0.8560
Epoch 70/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3411 -
acc: 0.8579
Epoch 71/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3400 -
acc: 0.8593
Epoch 72/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.3401 -
acc: 0.8571
Epoch 73/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3402 -
acc: 0.8554
Epoch 74/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3401 -
acc: 0.8579
Epoch 75/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3409 -
acc: 0.8568
Epoch 76/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3395 -
acc: 0.8599
Epoch 77/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3394 -
acc: 0.8582
Epoch 78/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3385 -
acc: 0.8596
Epoch 79/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3403 -
acc: 0.8575
Epoch 80/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3400 -
acc: 0.8574
Epoch 81/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3393 -
acc: 0.8585: 0s - loss: 0.3406 - acc: 0.85
Epoch 82/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3392 -
acc: 0.8583
Epoch 83/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3385 -
acc: 0.8581
Epoch 84/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.3387 -
acc: 0.8565
Epoch 85/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3384 -
acc: 0.8597
Epoch 86/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3388 -
acc: 0.8568
Epoch 87/100
```

```
7200/7200 [==============================] - 0s 51us/step - loss: 0.3391 -
acc: 0.8578
Epoch 88/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3382 -
acc: 0.8583
Epoch 89/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3385 -
acc: 0.8593
Epoch 90/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3392 -
acc: 0.8576
Epoch 91/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3385 -
acc: 0.8604
Epoch 92/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3388 -
acc: 0.8586
Epoch 93/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3375 -
acc: 0.8587: 0s - loss: 0.3434 - acc: 0.85
Epoch 94/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3389 -
acc: 0.8585
Epoch 95/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3382 -
acc: 0.8578
Epoch 96/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3381 -
acc: 0.8589
Epoch 97/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3378 -
acc: 0.8587
Epoch 98/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.3382 -
acc: 0.8600
Epoch 99/100
7200/7200 [==============================] - 0s 48us/step - loss: 0.3386 -
acc: 0.8590
Epoch 100/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3377 -
acc: 0.8597
Epoch 1/100
7200/7200 [==============================] - 1s 156us/step - loss: 0.5444
- acc: 0.7979
Epoch 2/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4357 -
acc: 0.7987: 0s - loss: 0.4434 - acc
Epoch 3/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4299 -
acc: 0.7987
Epoch 4/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4269 -
acc: 0.7987
Epoch 5/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4241 -
acc: 0.7988
Epoch 6/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4212 -
acc: 0.7988
Epoch 7/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4189 -
```

```
acc: 0.8161
Epoch 8/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4171 -
acc: 0.8221
Epoch 9/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4155 -
acc: 0.8239
Epoch 10/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4140 -
acc: 0.8267
Epoch 11/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4128 -
acc: 0.8306
Epoch 12/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4116 -
acc: 0.8329
Epoch 13/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4106 -
acc: 0.8333
Epoch 14/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4097 -
acc: 0.8349
Epoch 15/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4089 -
acc: 0.8336
Epoch 16/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4082 -
acc: 0.8346
Epoch 17/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4079 -
acc: 0.8353
Epoch 18/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4071 -
acc: 0.8358
Epoch 19/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4064 -
acc: 0.8350
Epoch 20/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4065 -
acc: 0.8347
Epoch 21/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4055 -
acc: 0.8356
Epoch 22/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4054 -
acc: 0.8349
Epoch 23/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4049 -
acc: 0.8332
Epoch 24/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4051 -
acc: 0.8362
Epoch 25/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4050 -
acc: 0.8336
Epoch 26/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4042 -
acc: 0.8356
Epoch 27/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4041 -
acc: 0.8347
```

```
Epoch 28/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4037 -
acc: 0.8353
Epoch 29/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4036 -
acc: 0.8357
Epoch 30/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4035 -
acc: 0.8346
Epoch 31/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4032 -
acc: 0.8362
Epoch 32/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4031 -
acc: 0.8347
Epoch 33/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4031 -
acc: 0.8343
Epoch 34/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4029 -
acc: 0.8342
Epoch 35/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4027 -
acc: 0.8358
Epoch 36/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4029 -
acc: 0.8367
Epoch 37/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4017 -
acc: 0.8358
Epoch 38/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4029 -
acc: 0.8364
Epoch 39/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4020 -
acc: 0.8374
Epoch 40/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4020 -
acc: 0.8364: 0s - loss: 0.4005 - acc: 0
Epoch 41/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4021 -
acc: 0.8353
Epoch 42/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4017 -
acc: 0.8365
Epoch 43/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4017 -
acc: 0.8360
Epoch 44/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4017 -
acc: 0.8353
Epoch 45/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4013 -
acc: 0.8368
Epoch 46/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4013 -
acc: 0.8375
Epoch 47/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4007 -
acc: 0.8356
Epoch 48/100
```

```
7200/7200 [==============================] - 0s 55us/step - loss: 0.4012 -
acc: 0.8368
Epoch 49/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4011 -
acc: 0.8365
Epoch 50/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4012 -
acc: 0.8372
Epoch 51/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4012 -
acc: 0.8367
Epoch 52/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4012 -
acc: 0.8365
Epoch 53/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4012 -
acc: 0.8351
Epoch 54/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4008 -
acc: 0.8361
Epoch 55/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4012 -
acc: 0.8325
Epoch 56/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4007 -
acc: 0.8367
Epoch 57/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4005 -
acc: 0.8361
Epoch 58/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4005 -
acc: 0.8365: 0s - loss: 0.3895 - acc:
Epoch 59/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4005 -
acc: 0.8356
Epoch 60/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4007 -
acc: 0.8362
Epoch 61/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4004 -
acc: 0.8365
Epoch 62/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4005 -
acc: 0.8379
Epoch 63/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4006 -
acc: 0.8344
Epoch 64/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4009 -
acc: 0.8356
Epoch 65/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4006 -
acc: 0.8365
Epoch 66/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4005 -
acc: 0.8349
Epoch 67/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4000 -
acc: 0.8354
Epoch 68/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4003 -
```

```
acc: 0.8354
Epoch 69/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4001 -
acc: 0.8367
Epoch 70/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4004 -
acc: 0.8344
Epoch 71/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4001 -
acc: 0.8362
Epoch 72/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4001 -
acc: 0.8365
Epoch 73/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3999 -
acc: 0.8351
Epoch 74/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4004 -
acc: 0.8357
Epoch 75/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3999 -
acc: 0.8349
Epoch 76/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3995 -
acc: 0.8368
Epoch 77/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3998 -
acc: 0.8365
Epoch 78/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4001 -
acc: 0.8357
Epoch 79/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3997 -
acc: 0.8367
Epoch 80/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3997 -
acc: 0.8367
Epoch 81/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.3993 -
acc: 0.8350
Epoch 82/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3997 -
acc: 0.8369
Epoch 83/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3999 -
acc: 0.8375
Epoch 84/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4000 -
acc: 0.8364
Epoch 85/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4000 -
acc: 0.8356
Epoch 86/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3999 -
acc: 0.8354
Epoch 87/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3996 -
acc: 0.8358
Epoch 88/100
7200/7200 [==============================] - 1s 87us/step - loss: 0.3997 -
acc: 0.8357: 0s - loss: 0.4133 - a
```

```
Epoch 89/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3995 -
acc: 0.8361
Epoch 90/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3996 -
acc: 0.8357
Epoch 91/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3997 -
acc: 0.8358
Epoch 92/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3988 -
acc: 0.8362
Epoch 93/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3997 -
acc: 0.8362
Epoch 94/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3993 -
acc: 0.8354
Epoch 95/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3992 -
acc: 0.8382
Epoch 96/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.3993 -
acc: 0.8361
Epoch 97/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3989 -
acc: 0.8382
Epoch 98/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3987 -
acc: 0.8379: 0s - loss: 0.3827 - acc:
Epoch 99/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.3996 -
acc: 0.8361
Epoch 100/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3991 -
acc: 0.8360
Epoch 1/100
7200/7200 [==============================] - 1s 169us/step - loss: 0.5644
- acc: 0.7940
Epoch 2/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4375 -
acc: 0.7954
Epoch 3/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4319 -
acc: 0.7954
Epoch 4/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.4294 -
acc: 0.7954
Epoch 5/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4265 -
acc: 0.7954
Epoch 6/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.4242 -
acc: 0.7954
Epoch 7/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4220 -
acc: 0.8051
Epoch 8/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4207 -
acc: 0.8172
Epoch 9/100
```

```
7200/7200 [==============================] - 0s 54us/step - loss: 0.4197 -
acc: 0.8212
Epoch 10/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4187 -
acc: 0.8224
Epoch 11/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4175 -
acc: 0.8282
Epoch 12/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4164 -
acc: 0.8254
Epoch 13/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4156 -
acc: 0.8293
Epoch 14/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.4150 -
acc: 0.8293
Epoch 15/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4142 -
acc: 0.8300
Epoch 16/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4136 -
acc: 0.8308
Epoch 17/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4129 -
acc: 0.8303
Epoch 18/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4125 -
acc: 0.8308
Epoch 19/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4120 -
acc: 0.8319
Epoch 20/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4116 -
acc: 0.8317
Epoch 21/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4112 -
acc: 0.8322
Epoch 22/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4109 -
acc: 0.8321
Epoch 23/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4103 -
acc: 0.8333
Epoch 24/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4104 -
acc: 0.8328
Epoch 25/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4098 -
acc: 0.8321
Epoch 26/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4096 -
acc: 0.8332
Epoch 27/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4091 -
acc: 0.8322
Epoch 28/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4088 -
acc: 0.8336
Epoch 29/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4086 -
```

```
acc: 0.8333
Epoch 30/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4082 -
acc: 0.8328
Epoch 31/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4080 -
acc: 0.8336
Epoch 32/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4077 -
acc: 0.8340
Epoch 33/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4074 -
acc: 0.8328
Epoch 34/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4075 -
acc: 0.8324
Epoch 35/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4070 -
acc: 0.8340
Epoch 36/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4069 -
acc: 0.8342
Epoch 37/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4068 -
acc: 0.8325
Epoch 38/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4063 -
acc: 0.8342
Epoch 39/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4062 -
acc: 0.8325
Epoch 40/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4060 -
acc: 0.8354
Epoch 41/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4058 -
acc: 0.8333
Epoch 42/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4055 -
acc: 0.8342
Epoch 43/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4056 -
acc: 0.8346
Epoch 44/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4049 -
acc: 0.8344
Epoch 45/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4045 -
acc: 0.8340
Epoch 46/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4047 -
acc: 0.8325
Epoch 47/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4044 -
acc: 0.8342
Epoch 48/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4041 -
acc: 0.8329
Epoch 49/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4040 -
acc: 0.8335
```

```
Epoch 50/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4037 -
acc: 0.8339
Epoch 51/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4036 -
acc: 0.8344
Epoch 52/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4033 -
acc: 0.8325
Epoch 53/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4031 -
acc: 0.8336
Epoch 54/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4034 -
acc: 0.8342
Epoch 55/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4031 -
acc: 0.8344
Epoch 56/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4031 -
acc: 0.8318
Epoch 57/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4030 -
acc: 0.8344
Epoch 58/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4026 -
acc: 0.8347: 0s - loss: 0.4041 - acc: 0.835
Epoch 59/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4030 -
acc: 0.8340
Epoch 60/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4027 -
acc: 0.8339
Epoch 61/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4028 -
acc: 0.8340
Epoch 62/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4025 -
acc: 0.8351
Epoch 63/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4027 -
acc: 0.8346
Epoch 64/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4024 -
acc: 0.8337
Epoch 65/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4026 -
acc: 0.8335
Epoch 66/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4020 -
acc: 0.8339
Epoch 67/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4022 -
acc: 0.8336
Epoch 68/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4021 -
acc: 0.8340
Epoch 69/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4020 -
acc: 0.8344
Epoch 70/100
```

```
7200/7200 [==============================] - 0s 51us/step - loss: 0.4016 -
acc: 0.8350
Epoch 71/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4021 -
acc: 0.8361
Epoch 72/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4020 -
acc: 0.8343
Epoch 73/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4016 -
acc: 0.8340
Epoch 74/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4019 -
acc: 0.8336
Epoch 75/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4019 -
acc: 0.8337
Epoch 76/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4014 -
acc: 0.8342
Epoch 77/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4018 -
acc: 0.8331
Epoch 78/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4017 -
acc: 0.8342
Epoch 79/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4010 -
acc: 0.8333
Epoch 80/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4015 -
acc: 0.8339
Epoch 81/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4018 -
acc: 0.8358
Epoch 82/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4012 -
acc: 0.8331
Epoch 83/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.4014 -
acc: 0.8340
Epoch 84/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4014 -
acc: 0.8350
Epoch 85/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4014 -
acc: 0.8337
Epoch 86/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4014 -
acc: 0.8344
Epoch 87/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4013 -
acc: 0.8349
Epoch 88/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4016 -
acc: 0.8339
Epoch 89/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4013 -
acc: 0.8337
Epoch 90/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4006 -
```

```
acc: 0.8342
Epoch 91/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4014 -
acc: 0.8346
Epoch 92/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4010 -
acc: 0.8351
Epoch 93/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4013 -
acc: 0.8322
Epoch 94/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4010 -
acc: 0.8340
Epoch 95/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4010 -
acc: 0.8329
Epoch 96/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4011 -
acc: 0.8346
Epoch 97/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.4013 -
acc: 0.8353
Epoch 98/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4010 -
acc: 0.8346
Epoch 99/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4010 -
acc: 0.8349
Epoch 100/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.4010 -
acc: 0.8336
Epoch 1/100
7200/7200 [==============================] - 1s 167us/step - loss: 0.6569
 - acc: 0.7975
Epoch 2/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5990 -
acc: 0.7989
Epoch 3/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5604 -
acc: 0.7989
Epoch 4/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5359 -
acc: 0.7989
Epoch 5/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5208 -
acc: 0.7989
Epoch 6/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5119 -
acc: 0.7989
Epoch 7/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5070 -
acc: 0.7989
Epoch 8/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.5044 -
acc: 0.7989
Epoch 9/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5031 -
acc: 0.7989
Epoch 10/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5024 -
acc: 0.7989
```

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Epoch 11/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5021 -
acc: 0.7989
Epoch 12/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 13/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 14/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 15/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 16/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 17/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 18/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.5020 -
acc: 0.7989
Epoch 19/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 20/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 21/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 22/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.5020 -
acc: 0.7989
Epoch 23/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.5020 -
acc: 0.7989: 0s - loss: 0.4972 - acc:
Epoch 24/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.5020 -
acc: 0.7989
Epoch 25/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 26/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 27/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 28/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 29/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 30/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 31/100
```

```
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 32/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 33/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 34/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 35/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 36/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 37/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 38/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.5020 -
acc: 0.7989
Epoch 39/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 40/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 41/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 42/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 43/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 44/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 45/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 46/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.5020 -
acc: 0.7989
Epoch 47/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 48/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 49/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 50/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.5020 -
acc: 0.7989
Epoch 51/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
```

```
acc: 0.7989
Epoch 52/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 53/100
7200/7200 [==============================] - 0s 50us/step - loss: 0.5020 -
acc: 0.7989
Epoch 54/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 55/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.5020 -
acc: 0.7989
Epoch 56/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 57/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 58/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.5020 -
acc: 0.7989
Epoch 59/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.5020 -
acc: 0.7989
Epoch 60/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 61/100
7200/7200 [==============================] - 0s 51us/step - loss: 0.5020 -
acc: 0.7989
Epoch 62/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 63/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 64/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 65/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 66/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.5020 -
acc: 0.7989
Epoch 67/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 68/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 69/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.5020 -
acc: 0.7989
Epoch 70/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 71/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
```

```
Epoch 72/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.5020 -
acc: 0.7989
Epoch 73/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.5020 -
acc: 0.7989
Epoch 74/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 75/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.5020 -
acc: 0.7989
Epoch 76/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.5020 -
acc: 0.7989
Epoch 77/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 78/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.5020 -
acc: 0.7989
Epoch 79/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.5020 -
acc: 0.7989
Epoch 80/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 81/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 82/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.5020 -
acc: 0.7989
Epoch 83/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.5020 -
acc: 0.7989
Epoch 84/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 85/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.5020 -
acc: 0.7989
Epoch 86/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.5020 -
acc: 0.7989
Epoch 87/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.5020 -
acc: 0.7989
Epoch 88/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.5020 -
acc: 0.7989
Epoch 89/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.5020 -
acc: 0.7989
Epoch 90/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 91/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.5020 -
acc: 0.7989
Epoch 92/100
```

```
7200/7200 [==============================] - 0s 58us/step - loss: 0.5020 -
acc: 0.7989
Epoch 93/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 94/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.5020 -
acc: 0.7989: 0s - loss: 0.4965 - acc: 0
Epoch 95/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.5020 -
acc: 0.7989
Epoch 96/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 97/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 98/100
7200/7200 [==============================] - 0s 52us/step - loss: 0.5020 -
acc: 0.7989
Epoch 99/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.5020 -
acc: 0.7989
Epoch 100/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.5020 -
acc: 0.7989
Epoch 1/100
7200/7200 [==============================] - 1s 182us/step - loss: 0.5515
 - acc: 0.7943
Epoch 2/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4283 -
acc: 0.7947
Epoch 3/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4183 -
acc: 0.7947
Epoch 4/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4119 -
acc: 0.7947
Epoch 5/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4059 -
acc: 0.7947
Epoch 6/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4001 -
acc: 0.8142
Epoch 7/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3945 -
acc: 0.8283
Epoch 8/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3894 -
acc: 0.8265
Epoch 9/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3846 -
acc: 0.8286
Epoch 10/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3809 -
acc: 0.8287
Epoch 11/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3773 -
acc: 0.8397
Epoch 12/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3740 -
```

```
acc: 0.8435
Epoch 13/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3714 -
acc: 0.8439
Epoch 14/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3687 -
acc: 0.8471
Epoch 15/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3667 -
acc: 0.8456
Epoch 16/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3648 -
acc: 0.8493
Epoch 17/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3619 -
acc: 0.8514
Epoch 18/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3619 -
acc: 0.8506
Epoch 19/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3609 -
acc: 0.8522: 0s - loss: 0.3811 - acc:
Epoch 20/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3595 -
acc: 0.8512
Epoch 21/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3591 -
acc: 0.8529
Epoch 22/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3578 -
acc: 0.8544
Epoch 23/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3574 -
acc: 0.8533
Epoch 24/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3566 -
acc: 0.8522
Epoch 25/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3567 -
acc: 0.8549
Epoch 26/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3551 -
acc: 0.8539
Epoch 27/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3551 -
acc: 0.8549
Epoch 28/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.3546 -
acc: 0.8540
Epoch 29/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3543 -
acc: 0.8553
Epoch 30/100
7200/7200 [==============================] - 1s 73us/step - loss: 0.3534 -
acc: 0.8562
Epoch 31/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3537 -
acc: 0.8526
Epoch 32/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3523 -
acc: 0.8561
```

```
Epoch 33/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3528 -
acc: 0.8547
Epoch 34/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3526 -
acc: 0.8560
Epoch 35/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3511 -
acc: 0.8574
Epoch 36/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3518 -
acc: 0.8562
Epoch 37/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3510 -
acc: 0.8564
Epoch 38/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3505 -
acc: 0.8569
Epoch 39/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3509 -
acc: 0.8562
Epoch 40/100
7200/7200 [==============================] - 1s 76us/step - loss: 0.3505 -
acc: 0.8574
Epoch 41/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3499 -
acc: 0.8572
Epoch 42/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3498 -
acc: 0.8590
Epoch 43/100
7200/7200 [==============================] - 1s 80us/step - loss: 0.3498 -
acc: 0.8567
Epoch 44/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3503 -
acc: 0.8536
Epoch 45/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3491 -
acc: 0.8568
Epoch 46/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3493 -
acc: 0.8571
Epoch 47/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3485 -
acc: 0.8599
Epoch 48/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3488 -
acc: 0.8564
Epoch 49/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3497 -
acc: 0.8572
Epoch 50/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3487 -
acc: 0.8567
Epoch 51/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3486 -
acc: 0.8582
Epoch 52/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3476 -
acc: 0.8589
Epoch 53/100
```

```
7200/7200 [==============================] - 0s 57us/step - loss: 0.3478 -
acc: 0.8603
Epoch 54/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3477 -
acc: 0.8576
Epoch 55/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3476 -
acc: 0.8582
Epoch 56/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3481 -
acc: 0.8568
Epoch 57/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3476 -
acc: 0.8586
Epoch 58/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3467 -
acc: 0.8583
Epoch 59/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3476 -
acc: 0.8576
Epoch 60/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3464 -
acc: 0.8586
Epoch 61/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3469 -
acc: 0.8612
Epoch 62/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3465 -
acc: 0.8608
Epoch 63/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3458 -
acc: 0.8579
Epoch 64/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3462 -
acc: 0.8558
Epoch 65/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3458 -
acc: 0.8589
Epoch 66/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3468 -
acc: 0.8599
Epoch 67/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3459 -
acc: 0.8589
Epoch 68/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3453 -
acc: 0.8571
Epoch 69/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3458 -
acc: 0.8582
Epoch 70/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3456 -
acc: 0.8596
Epoch 71/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3449 -
acc: 0.8585
Epoch 72/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3459 -
acc: 0.8592
Epoch 73/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3450 -
```

```
acc: 0.8579
Epoch 74/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3453 -
acc: 0.8586
Epoch 75/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3450 -
acc: 0.8593
Epoch 76/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3453 -
acc: 0.8579
Epoch 77/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3450 -
acc: 0.8587
Epoch 78/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.3446 -
acc: 0.8587
Epoch 79/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3445 -
acc: 0.8608
Epoch 80/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3451 -
acc: 0.8604
Epoch 81/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3443 -
acc: 0.8582
Epoch 82/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3447 -
acc: 0.8606
Epoch 83/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3450 -
acc: 0.8569
Epoch 84/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3454 -
acc: 0.8587
Epoch 85/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3444 -
acc: 0.8582
Epoch 86/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3442 -
acc: 0.8622
Epoch 87/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3444 -
acc: 0.8604
Epoch 88/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3438 -
acc: 0.8574
Epoch 89/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3449 -
acc: 0.8592
Epoch 90/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3438 -
acc: 0.8581
Epoch 91/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3443 -
acc: 0.8592
Epoch 92/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3440 -
acc: 0.8589
Epoch 93/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3441 -
acc: 0.8589
```

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Epoch 94/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3435 -
acc: 0.8589
Epoch 95/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3442 -
acc: 0.8589
Epoch 96/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3438 -
acc: 0.8579
Epoch 97/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3435 -
acc: 0.8601
Epoch 98/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3442 -
acc: 0.8581
Epoch 99/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3445 -
acc: 0.8587
Epoch 100/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3435 -
acc: 0.8590
Epoch 1/100
7200/7200 [==============================] - 1s 188us/step - loss: 0.5502
 - acc: 0.7983
Epoch 2/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4341 -
acc: 0.7983
Epoch 3/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4281 -
acc: 0.7983
Epoch 4/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4252 -
acc: 0.7983
Epoch 5/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4226 -
acc: 0.7983
Epoch 6/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4201 -
acc: 0.8032
Epoch 7/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4179 -
acc: 0.8171
Epoch 8/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4164 -
acc: 0.8235
Epoch 9/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4153 -
acc: 0.8242
Epoch 10/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4141 -
acc: 0.8267
Epoch 11/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4132 -
acc: 0.8287
Epoch 12/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4122 -
acc: 0.8290
Epoch 13/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4111 -
acc: 0.8297
Epoch 14/100
```

```
7200/7200 [==============================] - 0s 57us/step - loss: 0.4105 -
acc: 0.8312
Epoch 15/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4099 -
acc: 0.8319
Epoch 16/100
7200/7200 [==============================] - 0s 53us/step - loss: 0.4097 -
acc: 0.8314
Epoch 17/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4087 -
acc: 0.8326
Epoch 18/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4082 -
acc: 0.8311
Epoch 19/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4077 -
acc: 0.8331
Epoch 20/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4073 -
acc: 0.8333
Epoch 21/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4068 -
acc: 0.8317
Epoch 22/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4067 -
acc: 0.8339
Epoch 23/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4059 -
acc: 0.8331
Epoch 24/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4063 -
acc: 0.8336
Epoch 25/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4056 -
acc: 0.8335
Epoch 26/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4052 -
acc: 0.8332
Epoch 27/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4047 -
acc: 0.8333
Epoch 28/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4046 -
acc: 0.8332
Epoch 29/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4045 -
acc: 0.8328
Epoch 30/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4036 -
acc: 0.8335
Epoch 31/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4043 -
acc: 0.8336
Epoch 32/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4035 -
acc: 0.8328
Epoch 33/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4036 -
acc: 0.8342
Epoch 34/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4035 -
```

```
acc: 0.8333
Epoch 35/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4032 -
acc: 0.8350
Epoch 36/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4029 -
acc: 0.8335
Epoch 37/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4027 -
acc: 0.8343
Epoch 38/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4026 -
acc: 0.8339
Epoch 39/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4023 -
acc: 0.8343
Epoch 40/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4025 -
acc: 0.8333
Epoch 41/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4019 -
acc: 0.8331
Epoch 42/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4020 -
acc: 0.8326
Epoch 43/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4027 -
acc: 0.8336
Epoch 44/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4020 -
acc: 0.8346
Epoch 45/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4017 -
acc: 0.8339
Epoch 46/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4016 -
acc: 0.8340
Epoch 47/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4016 -
acc: 0.8328
Epoch 48/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4011 -
acc: 0.8337
Epoch 49/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4013 -
acc: 0.8343
Epoch 50/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4012 -
acc: 0.8346
Epoch 51/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4012 -
acc: 0.8358
Epoch 52/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.4006 -
acc: 0.8347
Epoch 53/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4013 -
acc: 0.8333
Epoch 54/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4008 -
acc: 0.8332
```

```
Epoch 55/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4012 -
acc: 0.8325
Epoch 56/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4007 -
acc: 0.8332
Epoch 57/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4004 -
acc: 0.8357
Epoch 58/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4006 -
acc: 0.8332
Epoch 59/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4006 -
acc: 0.8340
Epoch 60/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4002 -
acc: 0.8351
Epoch 61/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4002 -
acc: 0.8336
Epoch 62/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4002 -
acc: 0.8335
Epoch 63/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4004 -
acc: 0.8325
Epoch 64/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4000 -
acc: 0.8346
Epoch 65/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4006 -
acc: 0.8340
Epoch 66/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4004 -
acc: 0.8350
Epoch 67/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4004 -
acc: 0.8333
Epoch 68/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4002 -
acc: 0.8350
Epoch 69/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4002 -
acc: 0.8349
Epoch 70/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4001 -
acc: 0.8331
Epoch 71/100
7200/7200 [==============================] - 1s 76us/step - loss: 0.3996 -
acc: 0.8339
Epoch 72/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3999 -
acc: 0.8347
Epoch 73/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4000 -
acc: 0.8337
Epoch 74/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4000 -
acc: 0.8340
Epoch 75/100
```

```
7200/7200 [==============================] - 0s 61us/step - loss: 0.3995 -
acc: 0.8343
Epoch 76/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3994 -
acc: 0.8346
Epoch 77/100
7200/7200 [==============================] - 1s 69us/step - loss: 0.3996 -
acc: 0.8335
Epoch 78/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3999 -
acc: 0.8349
Epoch 79/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3996 -
acc: 0.8344
Epoch 80/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3995 -
acc: 0.8344
Epoch 81/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3996 -
acc: 0.8340
Epoch 82/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3996 -
acc: 0.8339
Epoch 83/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3999 -
acc: 0.8350
Epoch 84/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3996 -
acc: 0.8340
Epoch 85/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3993 -
acc: 0.8344
Epoch 86/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3995 -
acc: 0.8337
Epoch 87/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3996 -
acc: 0.8340
Epoch 88/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3995 -
acc: 0.8342
Epoch 89/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3993 -
acc: 0.8350
Epoch 90/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3995 -
acc: 0.8336
Epoch 91/100
7200/7200 [==============================] - ETA: 0s - loss: 0.4004 - acc:
0.834 - 0s 62us/step - loss: 0.3992 - acc: 0.8353
Epoch 92/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3997 -
acc: 0.8347
Epoch 93/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3997 -
acc: 0.8333
Epoch 94/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3990 -
acc: 0.8342
Epoch 95/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3995 -
```

```
acc: 0.8333
Epoch 96/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3997 -
acc: 0.8339
Epoch 97/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3993 -
acc: 0.8343
Epoch 98/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3994 -
acc: 0.8353
Epoch 99/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3993 -
acc: 0.8361
Epoch 100/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3993 -
acc: 0.8339
Epoch 1/100
7200/7200 [==============================] - 1s 193us/step - loss: 0.5780
 - acc: 0.7972
Epoch 2/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4283 -
acc: 0.8032
Epoch 3/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4026 -
acc: 0.8171
Epoch 4/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3853 -
acc: 0.8225
Epoch 5/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3716 -
acc: 0.8453
Epoch 6/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3613 -
acc: 0.8543
Epoch 7/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3551 -
acc: 0.8585
Epoch 8/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3505 -
acc: 0.8599
Epoch 9/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3478 -
acc: 0.8612
Epoch 10/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3461 -
acc: 0.8625
Epoch 11/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3448 -
acc: 0.8583
Epoch 12/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3439 -
acc: 0.8612
Epoch 13/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3431 -
acc: 0.8603
Epoch 14/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3417 -
acc: 0.8619
Epoch 15/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3418 -
acc: 0.8619
```

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Epoch 16/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3419 -
acc: 0.8631
Epoch 17/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3406 -
acc: 0.8615
Epoch 18/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3406 -
acc: 0.8621
Epoch 19/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3398 -
acc: 0.8611
Epoch 20/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3397 -
acc: 0.8628
Epoch 21/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3393 -
acc: 0.8608
Epoch 22/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3394 -
acc: 0.8615
Epoch 23/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3387 -
acc: 0.8608
Epoch 24/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3381 -
acc: 0.8636
Epoch 25/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3384 -
acc: 0.8619
Epoch 26/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3372 -
acc: 0.8614: 0s - loss: 0.3361 - acc:
Epoch 27/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3372 -
acc: 0.8643
Epoch 28/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3371 -
acc: 0.8626
Epoch 29/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3367 -
acc: 0.8633
Epoch 30/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3365 -
acc: 0.8650
Epoch 31/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3359 -
acc: 0.8624
Epoch 32/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3360 -
acc: 0.8629
Epoch 33/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3356 -
acc: 0.8625
Epoch 34/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3359 -
acc: 0.8643
Epoch 35/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3354 -
acc: 0.8628
Epoch 36/100
```

```
7200/7200 [==============================] - 0s 59us/step - loss: 0.3353 -
acc: 0.8643
Epoch 37/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3352 -
acc: 0.8643
Epoch 38/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3352 -
acc: 0.8635
Epoch 39/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3353 -
acc: 0.8635
Epoch 40/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3351 -
acc: 0.8647
Epoch 41/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3347 -
acc: 0.8642
Epoch 42/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3353 -
acc: 0.8615
Epoch 43/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3347 -
acc: 0.8639
Epoch 44/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3344 -
acc: 0.8615
Epoch 45/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3352 -
acc: 0.8629
Epoch 46/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3342 -
acc: 0.8635
Epoch 47/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3345 -
acc: 0.8631
Epoch 48/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3342 -
acc: 0.8637
Epoch 49/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3344 -
acc: 0.8650
Epoch 50/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3343 -
acc: 0.8631
Epoch 51/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3342 -
acc: 0.8632
Epoch 52/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3344 -
acc: 0.8625
Epoch 53/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3342 -
acc: 0.8637
Epoch 54/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3340 -
acc: 0.8628
Epoch 55/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3344 -
acc: 0.8624
Epoch 56/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3341 -
```

```
acc: 0.8646
Epoch 57/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3341 -
acc: 0.8631
Epoch 58/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3339 -
acc: 0.8639
Epoch 59/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3342 -
acc: 0.8631
Epoch 60/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3341 -
acc: 0.8621
Epoch 61/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3337 -
acc: 0.8635
Epoch 62/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3340 -
acc: 0.8636
Epoch 63/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3340 -
acc: 0.8640
Epoch 64/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3338 -
acc: 0.8640: 0s - loss: 0.3369 - acc: 0.86
Epoch 65/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3341 -
acc: 0.8622
Epoch 66/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3339 -
acc: 0.8635
Epoch 67/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3336 -
acc: 0.8649
Epoch 68/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3334 -
acc: 0.8647
Epoch 69/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3334 -
acc: 0.8640
Epoch 70/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3341 -
acc: 0.8649
Epoch 71/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3336 -
acc: 0.8647
Epoch 72/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3338 -
acc: 0.8635
Epoch 73/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3333 -
acc: 0.8626
Epoch 74/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3339 -
acc: 0.8632
Epoch 75/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3340 -
acc: 0.8651
Epoch 76/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3334 -
acc: 0.8649
```

```
Epoch 77/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3336 -
acc: 0.8636
Epoch 78/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3332 -
acc: 0.8649
Epoch 79/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3338 -
acc: 0.8622
Epoch 80/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3334 -
acc: 0.8647
Epoch 81/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3331 -
acc: 0.8633
Epoch 82/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3327 -
acc: 0.8647
Epoch 83/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3336 -
acc: 0.8619
Epoch 84/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3335 -
acc: 0.8644
Epoch 85/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3328 -
acc: 0.8651
Epoch 86/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3328 -
acc: 0.8640
Epoch 87/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3338 -
acc: 0.8651
Epoch 88/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3332 -
acc: 0.8635
Epoch 89/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3329 -
acc: 0.8642
Epoch 90/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3333 -
acc: 0.8650
Epoch 91/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3329 -
acc: 0.8647
Epoch 92/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3326 -
acc: 0.8629
Epoch 93/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3334 -
acc: 0.8621
Epoch 94/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3322 -
acc: 0.8639
Epoch 95/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3334 -
acc: 0.8644
Epoch 96/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3325 -
acc: 0.8660
Epoch 97/100
```

```
7200/7200 [==============================] - 0s 58us/step - loss: 0.3331 -
acc: 0.8635
Epoch 98/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3329 -
acc: 0.8635
Epoch 99/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3326 -
acc: 0.8643
Epoch 100/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3324 -
acc: 0.8632
Epoch 1/100
7200/7200 [==============================] - 1s 182us/step - loss: 0.5824
 - acc: 0.7985
Epoch 2/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4393 -
acc: 0.8001
Epoch 3/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4284 -
acc: 0.8001
Epoch 4/100
7200/7200 [==============================] - 1s 73us/step - loss: 0.4248 -
acc: 0.8001
Epoch 5/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4220 -
acc: 0.8001
Epoch 6/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4197 -
acc: 0.8001
Epoch 7/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.4176 -
acc: 0.8001
Epoch 8/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4155 -
acc: 0.8150
Epoch 9/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4139 -
acc: 0.8237
Epoch 10/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4126 -
acc: 0.8276
Epoch 11/100
7200/7200 [==============================] - 1s 76us/step - loss: 0.4117 -
acc: 0.8283
Epoch 12/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4105 -
acc: 0.8294
Epoch 13/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4095 -
acc: 0.8318
Epoch 14/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4090 -
acc: 0.8336
Epoch 15/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4083 -
acc: 0.8329
Epoch 16/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4076 -
acc: 0.8337
Epoch 17/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4070 -
```

```
acc: 0.8343
Epoch 18/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4065 -
acc: 0.8337
Epoch 19/100
7200/7200 [==============================] - 1s 73us/step - loss: 0.4062 -
acc: 0.8346
Epoch 20/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4055 -
acc: 0.8346
Epoch 21/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4052 -
acc: 0.8349
Epoch 22/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4043 -
acc: 0.8357
Epoch 23/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4038 -
acc: 0.8360
Epoch 24/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4037 -
acc: 0.8347
Epoch 25/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4031 -
acc: 0.8365
Epoch 26/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4031 -
acc: 0.8347
Epoch 27/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.4025 -
acc: 0.8350
Epoch 28/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4024 -
acc: 0.8351
Epoch 29/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4021 -
acc: 0.8357
Epoch 30/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4021 -
acc: 0.8364
Epoch 31/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4014 -
acc: 0.8369
Epoch 32/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4012 -
acc: 0.8367
Epoch 33/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4012 -
acc: 0.8374
Epoch 34/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4008 -
acc: 0.8358
Epoch 35/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4009 -
acc: 0.8383
Epoch 36/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8371
Epoch 37/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8368
```

```
Epoch 38/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4003 -
acc: 0.8358
Epoch 39/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4001 -
acc: 0.8368
Epoch 40/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4000 -
acc: 0.8367
Epoch 41/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4000 -
acc: 0.8374
Epoch 42/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3998 -
acc: 0.8369
Epoch 43/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3997 -
acc: 0.8376
Epoch 44/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3998 -
acc: 0.8364
Epoch 45/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3994 -
acc: 0.8374
Epoch 46/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3995 -
acc: 0.8372
Epoch 47/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3995 -
acc: 0.8372
Epoch 48/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3993 -
acc: 0.8364
Epoch 49/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3991 -
acc: 0.8365
Epoch 50/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3990 -
acc: 0.8365
Epoch 51/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3991 -
acc: 0.8378
Epoch 52/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3990 -
acc: 0.8371
Epoch 53/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3989 -
acc: 0.8362
Epoch 54/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3990 -
acc: 0.8368
Epoch 55/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3987 -
acc: 0.8393
Epoch 56/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3984 -
acc: 0.8367
Epoch 57/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3984 -
acc: 0.8372
Epoch 58/100
```

```
7200/7200 [==============================] - 0s 54us/step - loss: 0.3986 -
acc: 0.8379
Epoch 59/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3984 -
acc: 0.8361
Epoch 60/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3985 -
acc: 0.8364
Epoch 61/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3983 -
acc: 0.8371
Epoch 62/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3983 -
acc: 0.8358
Epoch 63/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3981 -
acc: 0.8382
Epoch 64/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3979 -
acc: 0.8364
Epoch 65/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3984 -
acc: 0.8360
Epoch 66/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3984 -
acc: 0.8358
Epoch 67/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3982 -
acc: 0.8375
Epoch 68/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.3981 -
acc: 0.8372
Epoch 69/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3980 -
acc: 0.8375
Epoch 70/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3978 -
acc: 0.8365: 0s - loss: 0.3896 - acc:
Epoch 71/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3979 -
acc: 0.8364: 0s - loss: 0.4170 - acc
Epoch 72/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3982 -
acc: 0.8365
Epoch 73/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3980 -
acc: 0.8369
Epoch 74/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3978 -
acc: 0.8374
Epoch 75/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3976 -
acc: 0.8364
Epoch 76/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3973 -
acc: 0.8376
Epoch 77/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3977 -
acc: 0.8369
Epoch 78/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3978 -
```

```
acc: 0.8371
Epoch 79/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3974 -
acc: 0.8365
Epoch 80/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3977 -
acc: 0.8365
Epoch 81/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3973 -
acc: 0.8372
Epoch 82/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3975 -
acc: 0.8371
Epoch 83/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3975 -
acc: 0.8369
Epoch 84/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3975 -
acc: 0.8360
Epoch 85/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3974 -
acc: 0.8369
Epoch 86/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3973 -
acc: 0.8364
Epoch 87/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3971 -
acc: 0.8371
Epoch 88/100
7200/7200 [==============================] - 0s 54us/step - loss: 0.3973 -
acc: 0.8361
Epoch 89/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3973 -
acc: 0.8358
Epoch 90/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3973 -
acc: 0.8371
Epoch 91/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3969 -
acc: 0.8368
Epoch 92/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3967 -
acc: 0.8365
Epoch 93/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3970 -
acc: 0.8371
Epoch 94/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3971 -
acc: 0.8358
Epoch 95/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3969 -
acc: 0.8368
Epoch 96/100
7200/7200 [==============================] - ETA: 0s - loss: 0.3991 - acc:
0.835 - 0s 55us/step - loss: 0.3971 - acc: 0.8368
Epoch 97/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3972 -
acc: 0.8371
Epoch 98/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3971 -
acc: 0.8351
```

```
Epoch 99/100
7200/7200 [==============================] - ETA: 0s - loss: 0.3954 - acc:
0.837 - 0s 55us/step - loss: 0.3970 - acc: 0.8372
Epoch 100/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3971 -
acc: 0.8376
Epoch 1/100
7200/7200 [==============================] - 1s 184us/step - loss: 0.5941
 - acc: 0.7960
Epoch 2/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4484 -
acc: 0.7974
Epoch 3/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4302 -
acc: 0.7974
Epoch 4/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4240 -
acc: 0.7974
Epoch 5/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4183 -
acc: 0.8165
Epoch 6/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4122 -
acc: 0.8257
Epoch 7/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4052 -
acc: 0.8308
Epoch 8/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3989 -
acc: 0.8314
Epoch 9/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3932 -
acc: 0.8314
Epoch 10/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3883 -
acc: 0.8307
Epoch 11/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3842 -
acc: 0.8317
Epoch 12/100
7200/7200 [==============================] - 1s 77us/step - loss: 0.3809 -
acc: 0.8335
Epoch 13/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3772 -
acc: 0.8383
Epoch 14/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3752 -
acc: 0.8403
Epoch 15/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3730 -
acc: 0.8421
Epoch 16/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3707 -
acc: 0.8450
Epoch 17/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3689 -
acc: 0.8462
Epoch 18/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3673 -
acc: 0.8507
Epoch 19/100
```

```
7200/7200 [==============================] - 0s 63us/step - loss: 0.3660 -
acc: 0.8489
Epoch 20/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3643 -
acc: 0.8496
Epoch 21/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3629 -
acc: 0.8511
Epoch 22/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3622 -
acc: 0.8517
Epoch 23/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3613 -
acc: 0.8517
Epoch 24/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3606 -
acc: 0.8535
Epoch 25/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3590 -
acc: 0.8544
Epoch 26/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3582 -
acc: 0.8547
Epoch 27/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3579 -
acc: 0.8540
Epoch 28/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3572 -
acc: 0.8529
Epoch 29/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3566 -
acc: 0.8558
Epoch 30/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3557 -
acc: 0.8579
Epoch 31/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3559 -
acc: 0.8553
Epoch 32/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3556 -
acc: 0.8558
Epoch 33/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3541 -
acc: 0.8554
Epoch 34/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3542 -
acc: 0.8546
Epoch 35/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3542 -
acc: 0.8556
Epoch 36/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3534 -
acc: 0.8561
Epoch 37/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3535 -
acc: 0.8546
Epoch 38/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3527 -
acc: 0.8583
Epoch 39/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3513 -
```

```
acc: 0.8586
Epoch 40/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3527 -
acc: 0.8578
Epoch 41/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3510 -
acc: 0.8582
Epoch 42/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3516 -
acc: 0.8547
Epoch 43/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3518 -
acc: 0.8562
Epoch 44/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3511 -
acc: 0.8556
Epoch 45/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3505 -
acc: 0.8560
Epoch 46/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3500 -
acc: 0.8590
Epoch 47/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3499 -
acc: 0.8578
Epoch 48/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3501 -
acc: 0.8579
Epoch 49/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3497 -
acc: 0.8565
Epoch 50/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3492 -
acc: 0.8565
Epoch 51/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3492 -
acc: 0.8575
Epoch 52/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3487 -
acc: 0.8585
Epoch 53/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3487 -
acc: 0.8578
Epoch 54/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3487 -
acc: 0.8579
Epoch 55/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3484 -
acc: 0.8575
Epoch 56/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3482 -
acc: 0.8585
Epoch 57/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3478 -
acc: 0.8572
Epoch 58/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3481 -
acc: 0.8593
Epoch 59/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3484 -
acc: 0.8590
```

```
Epoch 60/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3473 -
acc: 0.8586
Epoch 61/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3473 -
acc: 0.8593
Epoch 62/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3473 -
acc: 0.8601
Epoch 63/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3477 -
acc: 0.8581
Epoch 64/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3470 -
acc: 0.8590
Epoch 65/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3468 -
acc: 0.8603
Epoch 66/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3461 -
acc: 0.8581
Epoch 67/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3465 -
acc: 0.8581
Epoch 68/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3462 -
acc: 0.8575
Epoch 69/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3459 -
acc: 0.8581
Epoch 70/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3457 -
acc: 0.8575
Epoch 71/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3457 -
acc: 0.8607
Epoch 72/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3458 -
acc: 0.8601
Epoch 73/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3453 -
acc: 0.8603
Epoch 74/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3450 -
acc: 0.8614
Epoch 75/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3456 -
acc: 0.8572
Epoch 76/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3452 -
acc: 0.8587
Epoch 77/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3453 -
acc: 0.8603
Epoch 78/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3446 -
acc: 0.8586
Epoch 79/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3454 -
acc: 0.8611
Epoch 80/100
```

```
7200/7200 [==============================] - 0s 61us/step - loss: 0.3448 -
acc: 0.8606
Epoch 81/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3445 -
acc: 0.8590: 0s - loss: 0.3657 - acc:
Epoch 82/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3440 -
acc: 0.8594
Epoch 83/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3434 -
acc: 0.8608
Epoch 84/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3435 -
acc: 0.8606
Epoch 85/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3430 -
acc: 0.8612
Epoch 86/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3433 -
acc: 0.8597
Epoch 87/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3428 -
acc: 0.8586
Epoch 88/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3412 -
acc: 0.8596
Epoch 89/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3419 -
acc: 0.8610
Epoch 90/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3423 -
acc: 0.8618
Epoch 91/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3414 -
acc: 0.8606
Epoch 92/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3419 -
acc: 0.8594: 0s - loss: 0.3437 - acc: 0.8
Epoch 93/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3409 -
acc: 0.8596
Epoch 94/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3409 -
acc: 0.8619
Epoch 95/100
7200/7200 [==============================] - 1s 73us/step - loss: 0.3414 -
acc: 0.8622
Epoch 96/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3414 -
acc: 0.8603
Epoch 97/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.3408 -
acc: 0.8614
Epoch 98/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3410 -
acc: 0.8607
Epoch 99/100
7200/7200 [==============================] - 1s 81us/step - loss: 0.3406 -
acc: 0.8606
Epoch 100/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3401 -
```

```
acc: 0.8612
Epoch 1/100
7200/7200 [==============================] - 2s 212us/step - loss: 0.6042
 - acc: 0.7942
Epoch 2/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4594 -
acc: 0.7956
Epoch 3/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4402 -
acc: 0.7956
Epoch 4/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.4338 -
acc: 0.7956
Epoch 5/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4307 -
acc: 0.7956
Epoch 6/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4278 -
acc: 0.7956
Epoch 7/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4244 -
acc: 0.8058
Epoch 8/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4212 -
acc: 0.8232
Epoch 9/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4175 -
acc: 0.8274
Epoch 10/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4139 -
acc: 0.8282
Epoch 11/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4115 -
acc: 0.8303
Epoch 12/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4096 -
acc: 0.8315
Epoch 13/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4080 -
acc: 0.8324
Epoch 14/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4066 -
acc: 0.8357
Epoch 15/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4054 -
acc: 0.8344
Epoch 16/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4044 -
acc: 0.8360
Epoch 17/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4035 -
acc: 0.8353
Epoch 18/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4028 -
acc: 0.8347
Epoch 19/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4021 -
acc: 0.8378
Epoch 20/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.4014 -
acc: 0.8367
```

```
Epoch 21/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4009 -
acc: 0.8361
Epoch 22/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4004 -
acc: 0.8356
Epoch 23/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4001 -
acc: 0.8371
Epoch 24/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3996 -
acc: 0.8376
Epoch 25/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3992 -
acc: 0.8378
Epoch 26/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3987 -
acc: 0.8382
Epoch 27/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3984 -
acc: 0.8360
Epoch 28/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3982 -
acc: 0.8383
Epoch 29/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3981 -
acc: 0.8375
Epoch 30/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3978 -
acc: 0.8382
Epoch 31/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3972 -
acc: 0.8371
Epoch 32/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3971 -
acc: 0.8378
Epoch 33/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3969 -
acc: 0.8376
Epoch 34/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3967 -
acc: 0.8378
Epoch 35/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3963 -
acc: 0.8381
Epoch 36/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3959 -
acc: 0.8378
Epoch 37/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3961 -
acc: 0.8379
Epoch 38/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3957 -
acc: 0.8399
Epoch 39/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3958 -
acc: 0.8381
Epoch 40/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3955 -
acc: 0.8393
Epoch 41/100
```

```
7200/7200 [==============================] - 0s 56us/step - loss: 0.3953 -
acc: 0.8387
Epoch 42/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3953 -
acc: 0.8401
Epoch 43/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3956 -
acc: 0.8378
Epoch 44/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3952 -
acc: 0.8378
Epoch 45/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3951 -
acc: 0.8394
Epoch 46/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3951 -
acc: 0.8368
Epoch 47/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3949 -
acc: 0.8390
Epoch 48/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3951 -
acc: 0.8353
Epoch 49/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3950 -
acc: 0.8387
Epoch 50/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3951 -
acc: 0.8374
Epoch 51/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3950 -
acc: 0.8369
Epoch 52/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3949 -
acc: 0.8392
Epoch 53/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3946 -
acc: 0.8386
Epoch 54/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3945 -
acc: 0.8393
Epoch 55/100
7200/7200 [==============================] - 0s 55us/step - loss: 0.3947 -
acc: 0.8401
Epoch 56/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3946 -
acc: 0.8365
Epoch 57/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3948 -
acc: 0.8385
Epoch 58/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3946 -
acc: 0.8392
Epoch 59/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3944 -
acc: 0.8386
Epoch 60/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3943 -
acc: 0.8376
Epoch 61/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3946 -
```

```
acc: 0.8390
Epoch 62/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3943 -
acc: 0.8387
Epoch 63/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3943 -
acc: 0.8372
Epoch 64/100
7200/7200 [==============================] - 1s 81us/step - loss: 0.3942 -
acc: 0.8375
Epoch 65/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3945 -
acc: 0.8375
Epoch 66/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3941 -
acc: 0.8381
Epoch 67/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3941 -
acc: 0.8375
Epoch 68/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3941 -
acc: 0.8389
Epoch 69/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3942 -
acc: 0.8365
Epoch 70/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3938 -
acc: 0.8378
Epoch 71/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3941 -
acc: 0.8393
Epoch 72/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3939 -
acc: 0.8389
Epoch 73/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3942 -
acc: 0.8382: 0s - loss: 0.3906 - acc: 0.84
Epoch 74/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3938 -
acc: 0.8390
Epoch 75/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3938 -
acc: 0.8387
Epoch 76/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3940 -
acc: 0.8387
Epoch 77/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3937 -
acc: 0.8362
Epoch 78/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3938 -
acc: 0.8372
Epoch 79/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3940 -
acc: 0.8385
Epoch 80/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3935 -
acc: 0.8376
Epoch 81/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3935 -
acc: 0.8383
```

```
Epoch 82/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3934 -
acc: 0.8389
Epoch 83/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3935 -
acc: 0.8386
Epoch 84/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3933 -
acc: 0.8389
Epoch 85/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3933 -
acc: 0.8376
Epoch 86/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3935 -
acc: 0.8379
Epoch 87/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3934 -
acc: 0.8392
Epoch 88/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3932 -
acc: 0.8390
Epoch 89/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3934 -
acc: 0.8365
Epoch 90/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.3936 -
acc: 0.8374
Epoch 91/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3932 -
acc: 0.8369
Epoch 92/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3931 -
acc: 0.8381
Epoch 93/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3932 -
acc: 0.8394
Epoch 94/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3931 -
acc: 0.8393
Epoch 95/100
7200/7200 [==============================] - 1s 76us/step - loss: 0.3930 -
acc: 0.8372
Epoch 96/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3932 -
acc: 0.8386
Epoch 97/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3930 -
acc: 0.8381
Epoch 98/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3926 -
acc: 0.8385
Epoch 99/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3923 -
acc: 0.8386
Epoch 100/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3929 -
acc: 0.8387
Epoch 1/100
7200/7200 [==============================] - 1s 197us/step - loss: 0.5730
 - acc: 0.7967
Epoch 2/100
```

```
7200/7200 [==============================] - 0s 59us/step - loss: 0.4424 -
acc: 0.7971
Epoch 3/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4318 -
acc: 0.7971
Epoch 4/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4275 -
acc: 0.7971
Epoch 5/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4248 -
acc: 0.7971
Epoch 6/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4221 -
acc: 0.7971
Epoch 7/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4201 -
acc: 0.8128
Epoch 8/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4187 -
acc: 0.8222
Epoch 9/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4174 -
acc: 0.8244
Epoch 10/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4163 -
acc: 0.8275
Epoch 11/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4154 -
acc: 0.8289
Epoch 12/100
7200/7200 [==============================] - 1s 95us/step - loss: 0.4142 -
acc: 0.8283
Epoch 13/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4134 -
acc: 0.8301
Epoch 14/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4127 -
acc: 0.8318
Epoch 15/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4117 -
acc: 0.8321
Epoch 16/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4106 -
acc: 0.8311
Epoch 17/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4105 -
acc: 0.8322
Epoch 18/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4097 -
acc: 0.8329
Epoch 19/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4088 -
acc: 0.8328
Epoch 20/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4088 -
acc: 0.8326
Epoch 21/100
7200/7200 [==============================] - 1s 82us/step - loss: 0.4080 -
acc: 0.8321
Epoch 22/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4078 -
```

```
acc: 0.8335
Epoch 23/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.4072 -
acc: 0.8325
Epoch 24/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4067 -
acc: 0.8325
Epoch 25/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4064 -
acc: 0.8351
Epoch 26/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4063 -
acc: 0.8326
Epoch 27/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4061 -
acc: 0.8329
Epoch 28/100
7200/7200 [==============================] - 1s 80us/step - loss: 0.4058 -
acc: 0.8342
Epoch 29/100
7200/7200 [==============================] - 1s 89us/step - loss: 0.4055 -
acc: 0.8337
Epoch 30/100
7200/7200 [==============================] - 1s 88us/step - loss: 0.4055 -
acc: 0.8333
Epoch 31/100
7200/7200 [==============================] - 1s 85us/step - loss: 0.4052 -
acc: 0.8336
Epoch 32/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.4048 -
acc: 0.8337
Epoch 33/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.4048 -
acc: 0.8342
Epoch 34/100
7200/7200 [==============================] - 1s 80us/step - loss: 0.4045 -
acc: 0.8339
Epoch 35/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4040 -
acc: 0.8335
Epoch 36/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4042 -
acc: 0.8346
Epoch 37/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4038 -
acc: 0.8349
Epoch 38/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4040 -
acc: 0.8335
Epoch 39/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4039 -
acc: 0.8336
Epoch 40/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4035 -
acc: 0.8356
Epoch 41/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.4035 -
acc: 0.8333
Epoch 42/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4033 -
acc: 0.8350
```

```
Epoch 43/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4035 -
acc: 0.8339
Epoch 44/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4036 -
acc: 0.8340
Epoch 45/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.4033 -
acc: 0.8357
Epoch 46/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4027 -
acc: 0.8350
Epoch 47/100
7200/7200 [==============================] - 1s 73us/step - loss: 0.4033 -
acc: 0.8336
Epoch 48/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4030 -
acc: 0.8347
Epoch 49/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4030 -
acc: 0.8339
Epoch 50/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4030 -
acc: 0.8340
Epoch 51/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.4028 -
acc: 0.8346
Epoch 52/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4026 -
acc: 0.8347: 0s - loss: 0.3757 - acc:
Epoch 53/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4024 -
acc: 0.8332
Epoch 54/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4024 -
acc: 0.8349
Epoch 55/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4028 -
acc: 0.8349
Epoch 56/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4024 -
acc: 0.8337
Epoch 57/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4021 -
acc: 0.8333
Epoch 58/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4022 -
acc: 0.8350
Epoch 59/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4022 -
acc: 0.8351
Epoch 60/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4023 -
acc: 0.8354
Epoch 61/100
7200/7200 [==============================] - 1s 73us/step - loss: 0.4019 -
acc: 0.8346
Epoch 62/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.4022 -
acc: 0.8332
Epoch 63/100
```

```
7200/7200 [==============================] - 0s 66us/step - loss: 0.4021 -
acc: 0.8342
Epoch 64/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4020 -
acc: 0.8343
Epoch 65/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4019 -
acc: 0.8342
Epoch 66/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4019 -
acc: 0.8350
Epoch 67/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4018 -
acc: 0.8353
Epoch 68/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4018 -
acc: 0.8335
Epoch 69/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4016 -
acc: 0.8361
Epoch 70/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4017 -
acc: 0.8349
Epoch 71/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4017 -
acc: 0.8356
Epoch 72/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4019 -
acc: 0.8351
Epoch 73/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4019 -
acc: 0.8343
Epoch 74/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4019 -
acc: 0.8351
Epoch 75/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4017 -
acc: 0.8343
Epoch 76/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4018 -
acc: 0.8339
Epoch 77/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4016 -
acc: 0.8347
Epoch 78/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4018 -
acc: 0.8342
Epoch 79/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4014 -
acc: 0.8351
Epoch 80/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4019 -
acc: 0.8344
Epoch 81/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4015 -
acc: 0.8342
Epoch 82/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4016 -
acc: 0.8340
Epoch 83/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4016 -
```

```
acc: 0.8349
Epoch 84/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4014 -
acc: 0.8340
Epoch 85/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4014 -
acc: 0.8337
Epoch 86/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4014 -
acc: 0.8340
Epoch 87/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4015 -
acc: 0.8350
Epoch 88/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4015 -
acc: 0.8331
Epoch 89/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4016 -
acc: 0.8336
Epoch 90/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4017 -
acc: 0.8361
Epoch 91/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4015 -
acc: 0.8354
Epoch 92/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4015 -
acc: 0.8349
Epoch 93/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4011 -
acc: 0.8361
Epoch 94/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4016 -
acc: 0.8339
Epoch 95/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4010 -
acc: 0.8360
Epoch 96/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4014 -
acc: 0.8346
Epoch 97/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4012 -
acc: 0.8346
Epoch 98/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4015 -
acc: 0.8349
Epoch 99/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4012 -
acc: 0.8343
Epoch 100/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4014 -
acc: 0.8346
Epoch 1/100
7200/7200 [==============================] - 2s 212us/step - loss: 0.5818
 - acc: 0.7976
Epoch 2/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4423 -
acc: 0.7987
Epoch 3/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4316 -
acc: 0.7987
```

```
Epoch 4/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4275 -
acc: 0.7987
Epoch 5/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4246 -
acc: 0.7988
Epoch 6/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4222 -
acc: 0.7987
Epoch 7/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4195 -
acc: 0.7987
Epoch 8/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4174 -
acc: 0.8149
Epoch 9/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4161 -
acc: 0.8208
Epoch 10/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4147 -
acc: 0.8253
Epoch 11/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4138 -
acc: 0.8275
Epoch 12/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4128 -
acc: 0.8293
Epoch 13/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4120 -
acc: 0.8326
Epoch 14/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4112 -
acc: 0.8312
Epoch 15/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4105 -
acc: 0.8315
Epoch 16/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4097 -
acc: 0.8346
Epoch 17/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4092 -
acc: 0.8350
Epoch 18/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4086 -
acc: 0.8351
Epoch 19/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4082 -
acc: 0.8340
Epoch 20/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4076 -
acc: 0.8342
Epoch 21/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4069 -
acc: 0.8347
Epoch 22/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4067 -
acc: 0.8353
Epoch 23/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4063 -
acc: 0.8344
Epoch 24/100
```

```
7200/7200 [==============================] - 0s 63us/step - loss: 0.4059 -
acc: 0.8354
Epoch 25/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4058 -
acc: 0.8342
Epoch 26/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4053 -
acc: 0.8339
Epoch 27/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4049 -
acc: 0.8360
Epoch 28/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4047 -
acc: 0.8358
Epoch 29/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4047 -
acc: 0.8353
Epoch 30/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4043 -
acc: 0.8351
Epoch 31/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4041 -
acc: 0.8358
Epoch 32/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4039 -
acc: 0.8360: 0s - loss: 0.4112 - acc: 0
Epoch 33/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4038 -
acc: 0.8375
Epoch 34/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4035 -
acc: 0.8365
Epoch 35/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4031 -
acc: 0.8362
Epoch 36/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4027 -
acc: 0.8372
Epoch 37/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4025 -
acc: 0.8369
Epoch 38/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4022 -
acc: 0.8360
Epoch 39/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4018 -
acc: 0.8349
Epoch 40/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4013 -
acc: 0.8382
Epoch 41/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4012 -
acc: 0.8358
Epoch 42/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4007 -
acc: 0.8350
Epoch 43/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4002 -
acc: 0.8357
Epoch 44/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4002 -
```

```
acc: 0.8362
Epoch 45/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3997 -
acc: 0.8364
Epoch 46/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3994 -
acc: 0.8353
Epoch 47/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3993 -
acc: 0.8349
Epoch 48/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3986 -
acc: 0.8365
Epoch 49/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3987 -
acc: 0.8364
Epoch 50/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3984 -
acc: 0.8365
Epoch 51/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3981 -
acc: 0.8364
Epoch 52/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3978 -
acc: 0.8360
Epoch 53/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3976 -
acc: 0.8365
Epoch 54/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3974 -
acc: 0.8368
Epoch 55/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3973 -
acc: 0.8364
Epoch 56/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3969 -
acc: 0.8358
Epoch 57/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3968 -
acc: 0.8354
Epoch 58/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3963 -
acc: 0.8365
Epoch 59/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3964 -
acc: 0.8371
Epoch 60/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3964 -
acc: 0.8365
Epoch 61/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3960 -
acc: 0.8379
Epoch 62/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3956 -
acc: 0.8361
Epoch 63/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3959 -
acc: 0.8356
Epoch 64/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3958 -
acc: 0.8374
```

```
Epoch 65/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3957 -
acc: 0.8361
Epoch 66/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3955 -
acc: 0.8369
Epoch 67/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3953 -
acc: 0.8376
Epoch 68/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3954 -
acc: 0.8356
Epoch 69/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3948 -
acc: 0.8351
Epoch 70/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3950 -
acc: 0.8358
Epoch 71/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3949 -
acc: 0.8365
Epoch 72/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3950 -
acc: 0.8357
Epoch 73/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3947 -
acc: 0.8360
Epoch 74/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.3943 -
acc: 0.8367
Epoch 75/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3941 -
acc: 0.8356
Epoch 76/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3942 -
acc: 0.8371
Epoch 77/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3944 -
acc: 0.8367
Epoch 78/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3939 -
acc: 0.8379
Epoch 79/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3942 -
acc: 0.8357
Epoch 80/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3941 -
acc: 0.8367
Epoch 81/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3940 -
acc: 0.8354
Epoch 82/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3940 -
acc: 0.8358
Epoch 83/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3939 -
acc: 0.8382
Epoch 84/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3941 -
acc: 0.8361
Epoch 85/100
```

```
7200/7200 [==============================] - 0s 61us/step - loss: 0.3936 -
acc: 0.8369
Epoch 86/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3939 -
acc: 0.8362
Epoch 87/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3936 -
acc: 0.8375
Epoch 88/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3938 -
acc: 0.8356
Epoch 89/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3939 -
acc: 0.8362
Epoch 90/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.3934 -
acc: 0.8358
Epoch 91/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3942 -
acc: 0.8362
Epoch 92/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3937 -
acc: 0.8362
Epoch 93/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3937 -
acc: 0.8362
Epoch 94/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3933 -
acc: 0.8378
Epoch 95/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3934 -
acc: 0.8378
Epoch 96/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3934 -
acc: 0.8367
Epoch 97/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.3933 -
acc: 0.8364
Epoch 98/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3932 -
acc: 0.8383
Epoch 99/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3932 -
acc: 0.8378
Epoch 100/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3935 -
acc: 0.8364
Epoch 1/100
7200/7200 [==============================] - 1s 206us/step - loss: 0.5834
 - acc: 0.7947
Epoch 2/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4419 -
acc: 0.7954
Epoch 3/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4275 -
acc: 0.7954
Epoch 4/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4213 -
acc: 0.7954: 0s - loss: 0.4356 - acc
Epoch 5/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4162 -
```

```
acc: 0.7954
Epoch 6/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4111 -
acc: 0.7956
Epoch 7/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4056 -
acc: 0.8215
Epoch 8/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4002 -
acc: 0.8272
Epoch 9/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3952 -
acc: 0.8283
Epoch 10/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3911 -
acc: 0.8299
Epoch 11/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3871 -
acc: 0.8310
Epoch 12/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3832 -
acc: 0.8329
Epoch 13/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3804 -
acc: 0.8410
Epoch 14/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3771 -
acc: 0.8418
Epoch 15/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3743 -
acc: 0.8465
Epoch 16/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3725 -
acc: 0.8481
Epoch 17/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3710 -
acc: 0.8492
Epoch 18/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3689 -
acc: 0.8511
Epoch 19/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3676 -
acc: 0.8518
Epoch 20/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3656 -
acc: 0.8510
Epoch 21/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3645 -
acc: 0.8542
Epoch 22/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3636 -
acc: 0.8531
Epoch 23/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3627 -
acc: 0.8564
Epoch 24/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3607 -
acc: 0.8539
Epoch 25/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3603 -
acc: 0.8525
```

```
Epoch 26/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3596 -
acc: 0.8561
Epoch 27/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3586 -
acc: 0.8544
Epoch 28/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3578 -
acc: 0.8553
Epoch 29/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3569 -
acc: 0.8562
Epoch 30/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.3566 -
acc: 0.8550
Epoch 31/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.3559 -
acc: 0.8565
Epoch 32/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3548 -
acc: 0.8554
Epoch 33/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3548 -
acc: 0.8546
Epoch 34/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3542 -
acc: 0.8560
Epoch 35/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3540 -
acc: 0.8567
Epoch 36/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3532 -
acc: 0.8567
Epoch 37/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3527 -
acc: 0.8549
Epoch 38/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3525 -
acc: 0.8565
Epoch 39/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3525 -
acc: 0.8554
Epoch 40/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3522 -
acc: 0.8567
Epoch 41/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3514 -
acc: 0.8572
Epoch 42/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3512 -
acc: 0.8586
Epoch 43/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3507 -
acc: 0.8547
Epoch 44/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3509 -
acc: 0.8587
Epoch 45/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3505 -
acc: 0.8561
Epoch 46/100
```

```
7200/7200 [==============================] - 0s 69us/step - loss: 0.3502 -
acc: 0.8596
Epoch 47/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3504 -
acc: 0.8547
Epoch 48/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3504 -
acc: 0.8574
Epoch 49/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3503 -
acc: 0.8579
Epoch 50/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3492 -
acc: 0.8582
Epoch 51/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3495 -
acc: 0.8562
Epoch 52/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3495 -
acc: 0.8568
Epoch 53/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3496 -
acc: 0.8578
Epoch 54/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3486 -
acc: 0.8569
Epoch 55/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3490 -
acc: 0.8590
Epoch 56/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3490 -
acc: 0.8589
Epoch 57/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3492 -
acc: 0.8557
Epoch 58/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.3490 -
acc: 0.8578
Epoch 59/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3490 -
acc: 0.8587
Epoch 60/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3487 -
acc: 0.8569
Epoch 61/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3488 -
acc: 0.8575
Epoch 62/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3479 -
acc: 0.8589
Epoch 63/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3490 -
acc: 0.8582
Epoch 64/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3479 -
acc: 0.8571
Epoch 65/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3480 -
acc: 0.8562
Epoch 66/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3482 -
```

```
acc: 0.8565
Epoch 67/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3479 -
acc: 0.8568
Epoch 68/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3480 -
acc: 0.8578
Epoch 69/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3469 -
acc: 0.8564
Epoch 70/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3468 -
acc: 0.8578
Epoch 71/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3481 -
acc: 0.8578
Epoch 72/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3475 -
acc: 0.8586
Epoch 73/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3474 -
acc: 0.8599
Epoch 74/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3477 -
acc: 0.8582
Epoch 75/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3471 -
acc: 0.8586
Epoch 76/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3473 -
acc: 0.8593
Epoch 77/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3472 -
acc: 0.8582
Epoch 78/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3465 -
acc: 0.8583
Epoch 79/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3470 -
acc: 0.8572
Epoch 80/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3472 -
acc: 0.8569
Epoch 81/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3467 -
acc: 0.8593
Epoch 82/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3468 -
acc: 0.8574
Epoch 83/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3467 -
acc: 0.8590
Epoch 84/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3462 -
acc: 0.8574
Epoch 85/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3464 -
acc: 0.8581
Epoch 86/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3469 -
acc: 0.8581
```

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Epoch 87/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3463 -
acc: 0.8582
Epoch 88/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3462 -
acc: 0.8594
Epoch 89/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3462 -
acc: 0.8601
Epoch 90/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3459 -
acc: 0.8587
Epoch 91/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3459 -
acc: 0.8582
Epoch 92/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3465 -
acc: 0.8576
Epoch 93/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3461 -
acc: 0.8597
Epoch 94/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3466 -
acc: 0.8585
Epoch 95/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3466 -
acc: 0.8582
Epoch 96/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3460 -
acc: 0.8583
Epoch 97/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3462 -
acc: 0.8586
Epoch 98/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3459 -
acc: 0.8607
Epoch 99/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3462 -
acc: 0.8569
Epoch 100/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3457 -
acc: 0.8583
Epoch 1/100
7200/7200 [==============================] - 2s 210us/step - loss: 0.5821
 - acc: 0.7982
Epoch 2/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4434 -
acc: 0.7989
Epoch 3/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4320 -
acc: 0.7989
Epoch 4/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4280 -
acc: 0.7989
Epoch 5/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4254 -
acc: 0.7989
Epoch 6/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4227 -
acc: 0.7989
Epoch 7/100
```

```
7200/7200 [==============================] - 0s 64us/step - loss: 0.4201 -
acc: 0.7989
Epoch 8/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4179 -
acc: 0.8140
Epoch 9/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4167 -
acc: 0.8246
Epoch 10/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4157 -
acc: 0.8242
Epoch 11/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4144 -
acc: 0.8275
Epoch 12/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4133 -
acc: 0.8272
Epoch 13/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4125 -
acc: 0.8281
Epoch 14/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4119 -
acc: 0.8300
Epoch 15/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4110 -
acc: 0.8306
Epoch 16/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4107 -
acc: 0.8308
Epoch 17/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4100 -
acc: 0.8319
Epoch 18/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4096 -
acc: 0.8322
Epoch 19/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4089 -
acc: 0.8322
Epoch 20/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4086 -
acc: 0.8329
Epoch 21/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4082 -
acc: 0.8329
Epoch 22/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4076 -
acc: 0.8329
Epoch 23/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4073 -
acc: 0.8329
Epoch 24/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4070 -
acc: 0.8335
Epoch 25/100
7200/7200 [==============================] - 0s 56us/step - loss: 0.4063 -
acc: 0.8351
Epoch 26/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4061 -
acc: 0.8326
Epoch 27/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4058 -
```

```
acc: 0.8340
Epoch 28/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4056 -
acc: 0.8332
Epoch 29/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4050 -
acc: 0.8339: 0s - loss: 0.3544 - acc
Epoch 30/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4050 -
acc: 0.8343
Epoch 31/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4047 -
acc: 0.8335
Epoch 32/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4046 -
acc: 0.8339
Epoch 33/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4042 -
acc: 0.8340
Epoch 34/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4041 -
acc: 0.8336
Epoch 35/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4039 -
acc: 0.8332
Epoch 36/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4036 -
acc: 0.8336
Epoch 37/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4038 -
acc: 0.8339
Epoch 38/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4035 -
acc: 0.8340
Epoch 39/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4031 -
acc: 0.8343
Epoch 40/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4033 -
acc: 0.8339
Epoch 41/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4030 -
acc: 0.8326
Epoch 42/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4029 -
acc: 0.8337
Epoch 43/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4029 -
acc: 0.8333
Epoch 44/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4028 -
acc: 0.8351
Epoch 45/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4021 -
acc: 0.8339
Epoch 46/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4027 -
acc: 0.8332
Epoch 47/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4018 -
acc: 0.8353
```

```
Epoch 48/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4025 -
acc: 0.8350
Epoch 49/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4023 -
acc: 0.8362
Epoch 50/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4018 -
acc: 0.8346
Epoch 51/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4021 -
acc: 0.8347
Epoch 52/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4019 -
acc: 0.8354
Epoch 53/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4016 -
acc: 0.8343
Epoch 54/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4012 -
acc: 0.8340
Epoch 55/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4014 -
acc: 0.8349
Epoch 56/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4013 -
acc: 0.8346
Epoch 57/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4015 -
acc: 0.8349
Epoch 58/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4014 -
acc: 0.8362
Epoch 59/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4015 -
acc: 0.8346
Epoch 60/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4014 -
acc: 0.8339
Epoch 61/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4013 -
acc: 0.8349
Epoch 62/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4011 -
acc: 0.8365
Epoch 63/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4009 -
acc: 0.8357
Epoch 64/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4009 -
acc: 0.8354
Epoch 65/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4009 -
acc: 0.8347
Epoch 66/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4010 -
acc: 0.8354
Epoch 67/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4006 -
acc: 0.8346
Epoch 68/100
```

```
7200/7200 [==============================] - 0s 63us/step - loss: 0.4008 -
acc: 0.8351
Epoch 69/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4009 -
acc: 0.8336
Epoch 70/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8368
Epoch 71/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4005 -
acc: 0.8350
Epoch 72/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4008 -
acc: 0.8351
Epoch 73/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4010 -
acc: 0.8357
Epoch 74/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4009 -
acc: 0.8354
Epoch 75/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4002 -
acc: 0.8350
Epoch 76/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8346
Epoch 77/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4005 -
acc: 0.8356
Epoch 78/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8346
Epoch 79/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4006 -
acc: 0.8349
Epoch 80/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8357
Epoch 81/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4004 -
acc: 0.8354
Epoch 82/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4004 -
acc: 0.8351
Epoch 83/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4005 -
acc: 0.8364
Epoch 84/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4003 -
acc: 0.8362
Epoch 85/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4003 -
acc: 0.8362
Epoch 86/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4002 -
acc: 0.8346
Epoch 87/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4004 -
acc: 0.8357
Epoch 88/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3998 -
```

```
acc: 0.8368
Epoch 89/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4002 -
acc: 0.8358
Epoch 90/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4002 -
acc: 0.8365
Epoch 91/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4003 -
acc: 0.8356
Epoch 92/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4002 -
acc: 0.8364
Epoch 93/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4002 -
acc: 0.8368
Epoch 94/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3999 -
acc: 0.8362
Epoch 95/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4001 -
acc: 0.8361
Epoch 96/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4001 -
acc: 0.8340
Epoch 97/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4004 -
acc: 0.8351
Epoch 98/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4000 -
acc: 0.8378
Epoch 99/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4000 -
acc: 0.8354
Epoch 100/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3999 -
acc: 0.8349
Epoch 1/100
7200/7200 [==============================] - 2s 215us/step - loss: 0.6012
 - acc: 0.7931
Epoch 2/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4511 -
acc: 0.7947
Epoch 3/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4347 -
acc: 0.7947
Epoch 4/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4310 -
acc: 0.7947
Epoch 5/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4292 -
acc: 0.7947
Epoch 6/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4277 -
acc: 0.7947
Epoch 7/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4264 -
acc: 0.7947
Epoch 8/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4247 -
acc: 0.7947
```

```
Epoch 9/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4227 -
acc: 0.7947
Epoch 10/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4200 -
acc: 0.8118
Epoch 11/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4186 -
acc: 0.8217
Epoch 12/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4172 -
acc: 0.8224
Epoch 13/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4162 -
acc: 0.8254
Epoch 14/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4151 -
acc: 0.8265
Epoch 15/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4142 -
acc: 0.8278
Epoch 16/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4133 -
acc: 0.8294
Epoch 17/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4126 -
acc: 0.8294
Epoch 18/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4119 -
acc: 0.8303
Epoch 19/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4114 -
acc: 0.8310
Epoch 20/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4106 -
acc: 0.8296
Epoch 21/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4100 -
acc: 0.8311
Epoch 22/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4096 -
acc: 0.8315
Epoch 23/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4089 -
acc: 0.8312
Epoch 24/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4085 -
acc: 0.8317
Epoch 25/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4080 -
acc: 0.8315
Epoch 26/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4073 -
acc: 0.8322
Epoch 27/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4071 -
acc: 0.8328
Epoch 28/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4067 -
acc: 0.8325
Epoch 29/100
```

```
7200/7200 [==============================] - 0s 61us/step - loss: 0.4063 -
acc: 0.8324
Epoch 30/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4057 -
acc: 0.8321
Epoch 31/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4056 -
acc: 0.8317
Epoch 32/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4052 -
acc: 0.8324
Epoch 33/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4047 -
acc: 0.8328
Epoch 34/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4044 -
acc: 0.8328
Epoch 35/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4041 -
acc: 0.8321
Epoch 36/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4040 -
acc: 0.8314
Epoch 37/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4041 -
acc: 0.8331
Epoch 38/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4036 -
acc: 0.8319
Epoch 39/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4034 -
acc: 0.8344
Epoch 40/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4032 -
acc: 0.8319
Epoch 41/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4030 -
acc: 0.8319
Epoch 42/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4031 -
acc: 0.8336
Epoch 43/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4028 -
acc: 0.8333
Epoch 44/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4026 -
acc: 0.8329
Epoch 45/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4025 -
acc: 0.8333
Epoch 46/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4022 -
acc: 0.8325
Epoch 47/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4022 -
acc: 0.8321
Epoch 48/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4018 -
acc: 0.8335
Epoch 49/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4018 -
```

```
acc: 0.8312
Epoch 50/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4019 -
acc: 0.8325
Epoch 51/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4014 -
acc: 0.8317
Epoch 52/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4016 -
acc: 0.8333
Epoch 53/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4014 -
acc: 0.8322
Epoch 54/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4014 -
acc: 0.8332
Epoch 55/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4014 -
acc: 0.8322
Epoch 56/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4013 -
acc: 0.8331
Epoch 57/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4012 -
acc: 0.8328
Epoch 58/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4010 -
acc: 0.8332
Epoch 59/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4007 -
acc: 0.8332
Epoch 60/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4011 -
acc: 0.8339
Epoch 61/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4009 -
acc: 0.8336
Epoch 62/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.4006 -
acc: 0.8340
Epoch 63/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4007 -
acc: 0.8325
Epoch 64/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4007 -
acc: 0.8324
Epoch 65/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8317
Epoch 66/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4006 -
acc: 0.8322
Epoch 67/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4007 -
acc: 0.8321
Epoch 68/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4006 -
acc: 0.8322
Epoch 69/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4006 -
acc: 0.8322
```

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Epoch 70/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4005 -
acc: 0.8329
Epoch 71/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4005 -
acc: 0.8332
Epoch 72/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4001 -
acc: 0.8322
Epoch 73/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4005 -
acc: 0.8318
Epoch 74/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4002 -
acc: 0.8315
Epoch 75/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3999 -
acc: 0.8328
Epoch 76/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4004 -
acc: 0.8331
Epoch 77/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4003 -
acc: 0.8332
Epoch 78/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4001 -
acc: 0.8336
Epoch 79/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4001 -
acc: 0.8324
Epoch 80/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4001 -
acc: 0.8319
Epoch 81/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4002 -
acc: 0.8332
Epoch 82/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4001 -
acc: 0.8335
Epoch 83/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3995 -
acc: 0.8324
Epoch 84/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4002 -
acc: 0.8335
Epoch 85/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4002 -
acc: 0.8328
Epoch 86/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3999 -
acc: 0.8325
Epoch 87/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3997 -
acc: 0.8325
Epoch 88/100
7200/7200 [==============================] - 0s 57us/step - loss: 0.4002 -
acc: 0.8318
Epoch 89/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4001 -
acc: 0.8321
Epoch 90/100
```

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7200/7200 [==============================] - 0s 60us/step - loss: 0.3999 -
acc: 0.8337
Epoch 91/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4000 -
acc: 0.8321
Epoch 92/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4003 -
acc: 0.8318
Epoch 93/100
7200/7200 [==============================] - 0s 58us/step - loss: 0.4000 -
acc: 0.8318
Epoch 94/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4000 -
acc: 0.8331
Epoch 95/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4000 -
acc: 0.8311
Epoch 96/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4001 -
acc: 0.8314
Epoch 97/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3999 -
acc: 0.8326
Epoch 98/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4000 -
acc: 0.8321
Epoch 99/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.3997 -
acc: 0.8322
Epoch 100/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3999 -
acc: 0.8321
Epoch 1/100
7200/7200 [==============================] - 2s 218us/step - loss: 0.5825
 - acc: 0.7958
Epoch 2/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4454 -
acc: 0.7983
Epoch 3/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4308 -
acc: 0.7983
Epoch 4/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4254 -
acc: 0.7983
Epoch 5/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4226 -
acc: 0.7983
Epoch 6/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4195 -
acc: 0.7983
Epoch 7/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4163 -
acc: 0.8236
Epoch 8/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4134 -
acc: 0.8283
Epoch 9/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4108 -
acc: 0.8318
Epoch 10/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4086 -
```

```
acc: 0.8321
Epoch 11/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4068 -
acc: 0.8318
Epoch 12/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4057 -
acc: 0.8325
Epoch 13/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4046 -
acc: 0.8329
Epoch 14/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.4034 -
acc: 0.8339
Epoch 15/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4026 -
acc: 0.8342
Epoch 16/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4016 -
acc: 0.8350
Epoch 17/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4010 -
acc: 0.8351
Epoch 18/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4005 -
acc: 0.8346
Epoch 19/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3998 -
acc: 0.8360
Epoch 20/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3993 -
acc: 0.8344
Epoch 21/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3988 -
acc: 0.8344
Epoch 22/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3983 -
acc: 0.8347
Epoch 23/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3977 -
acc: 0.8340
Epoch 24/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3974 -
acc: 0.8339
Epoch 25/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3973 -
acc: 0.8340
Epoch 26/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3966 -
acc: 0.8362
Epoch 27/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3967 -
acc: 0.8362
Epoch 28/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3965 -
acc: 0.8357
Epoch 29/100
7200/7200 [==============================] - 1s 70us/step - loss: 0.3959 -
acc: 0.8349
Epoch 30/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3959 -
acc: 0.8361
```

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Epoch 31/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3955 -
acc: 0.8361
Epoch 32/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3953 -
acc: 0.8358
Epoch 33/100
7200/7200 [==============================] - 1s 71us/step - loss: 0.3949 -
acc: 0.8361
Epoch 34/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3950 -
acc: 0.8364
Epoch 35/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3949 -
acc: 0.8356
Epoch 36/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3947 -
acc: 0.8371
Epoch 37/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3948 -
acc: 0.8376
Epoch 38/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3946 -
acc: 0.8351
Epoch 39/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3944 -
acc: 0.8376
Epoch 40/100
7200/7200 [==============================] - 1s 72us/step - loss: 0.3943 -
acc: 0.8383
Epoch 41/100
7200/7200 [==============================] - 1s 75us/step - loss: 0.3941 -
acc: 0.8365
Epoch 42/100
7200/7200 [==============================] - 1s 83us/step - loss: 0.3944 -
acc: 0.8360
Epoch 43/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3938 -
acc: 0.8368
Epoch 44/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3938 -
acc: 0.8374
Epoch 45/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3940 -
acc: 0.8360
Epoch 46/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3937 -
acc: 0.8356
Epoch 47/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3931 -
acc: 0.8360
Epoch 48/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3934 -
acc: 0.8350
Epoch 49/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3932 -
acc: 0.8379
Epoch 50/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3933 -
acc: 0.8372
Epoch 51/100
```

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7200/7200 [==============================] - 0s 62us/step - loss: 0.3934 -
acc: 0.8357
Epoch 52/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3933 -
acc: 0.8378
Epoch 53/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3932 -
acc: 0.8372
Epoch 54/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3930 -
acc: 0.8362
Epoch 55/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3928 -
acc: 0.8367
Epoch 56/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3928 -
acc: 0.8376
Epoch 57/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.3930 -
acc: 0.8368
Epoch 58/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3927 -
acc: 0.8379
Epoch 59/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3926 -
acc: 0.8382
Epoch 60/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3926 -
acc: 0.8378
Epoch 61/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3923 -
acc: 0.8371
Epoch 62/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3923 -
acc: 0.8376
Epoch 63/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3922 -
acc: 0.8368
Epoch 64/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3921 -
acc: 0.8374
Epoch 65/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.3921 -
acc: 0.8382
Epoch 66/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3919 -
acc: 0.8390
Epoch 67/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3918 -
acc: 0.8378
Epoch 68/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3919 -
acc: 0.8365
Epoch 69/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3915 -
acc: 0.8372
Epoch 70/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3914 -
acc: 0.8376
Epoch 71/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3914 -
```

```
acc: 0.8379
Epoch 72/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3911 -
acc: 0.8389
Epoch 73/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3912 -
acc: 0.8382
Epoch 74/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3912 -
acc: 0.8399
Epoch 75/100
7200/7200 [==============================] - 1s 74us/step - loss: 0.3909 -
acc: 0.8390
Epoch 76/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3903 -
acc: 0.8392
Epoch 77/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3902 -
acc: 0.8389
Epoch 78/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3906 -
acc: 0.8399
Epoch 79/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3903 -
acc: 0.8389
Epoch 80/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3903 -
acc: 0.8383
Epoch 81/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3900 -
acc: 0.8404
Epoch 82/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3897 -
acc: 0.8389
Epoch 83/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3896 -
acc: 0.8379
Epoch 84/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3891 -
acc: 0.8385
Epoch 85/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3892 -
acc: 0.8415
Epoch 86/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3892 -
acc: 0.8394
Epoch 87/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3893 -
acc: 0.8404
Epoch 88/100
7200/7200 [==============================] - 0s 59us/step - loss: 0.3892 -
acc: 0.8396
Epoch 89/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3888 -
acc: 0.8393
Epoch 90/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3887 -
acc: 0.8406
Epoch 91/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3888 -
acc: 0.8385
```

```
Epoch 92/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3887 -
acc: 0.8403
Epoch 93/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3883 -
acc: 0.8401
Epoch 94/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3880 -
acc: 0.8387
Epoch 95/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3880 -
acc: 0.8393
Epoch 96/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3867 -
acc: 0.8399
Epoch 97/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3857 -
acc: 0.8393
Epoch 98/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.3846 -
acc: 0.8396
Epoch 99/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3827 -
acc: 0.8412
Epoch 100/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3809 -
acc: 0.8422
Epoch 1/100
7200/7200 [==============================] - 2s 227us/step - loss: 0.5848
 - acc: 0.7968
Epoch 2/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4447 -
acc: 0.7988
Epoch 3/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4326 -
acc: 0.7987
Epoch 4/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4281 -
acc: 0.7987
Epoch 5/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4259 -
acc: 0.7987
Epoch 6/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4236 -
acc: 0.7987
Epoch 7/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4213 -
acc: 0.7988
Epoch 8/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4187 -
acc: 0.8140
Epoch 9/100
7200/7200 [==============================] - 0s 67us/step - loss: 0.4171 -
acc: 0.8221
Epoch 10/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4156 -
acc: 0.8236
Epoch 11/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4140 -
acc: 0.8258
Epoch 12/100
```

```
7200/7200 [==============================] - 0s 65us/step - loss: 0.4137 -
acc: 0.8292
Epoch 13/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4127 -
acc: 0.8303
Epoch 14/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4121 -
acc: 0.8312
Epoch 15/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4115 -
acc: 0.8321
Epoch 16/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4106 -
acc: 0.8303
Epoch 17/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4104 -
acc: 0.8319
Epoch 18/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4096 -
acc: 0.8317
Epoch 19/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4088 -
acc: 0.8317
Epoch 20/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4089 -
acc: 0.8315
Epoch 21/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4082 -
acc: 0.8340
Epoch 22/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4079 -
acc: 0.8335
Epoch 23/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4077 -
acc: 0.8332
Epoch 24/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4072 -
acc: 0.8325
Epoch 25/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4067 -
acc: 0.8332
Epoch 26/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4063 -
acc: 0.8329
Epoch 27/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4060 -
acc: 0.8339
Epoch 28/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4059 -
acc: 0.8333
Epoch 29/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4054 -
acc: 0.8337
Epoch 30/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4054 -
acc: 0.8342
Epoch 31/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4047 -
acc: 0.8351
Epoch 32/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4045 -
```

```
acc: 0.8343
Epoch 33/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4038 -
acc: 0.8358
Epoch 34/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4037 -
acc: 0.8332
Epoch 35/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.4037 -
acc: 0.8344
Epoch 36/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4038 -
acc: 0.8357
Epoch 37/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4034 -
acc: 0.8354
Epoch 38/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.4030 -
acc: 0.8353
Epoch 39/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4029 -
acc: 0.8354
Epoch 40/100
7200/7200 [==============================] - 0s 68us/step - loss: 0.4026 -
acc: 0.8357
Epoch 41/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4029 -
acc: 0.8353
Epoch 42/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4026 -
acc: 0.8350
Epoch 43/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4025 -
acc: 0.8349
Epoch 44/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4023 -
acc: 0.8351
Epoch 45/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4022 -
acc: 0.8354
Epoch 46/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4020 -
acc: 0.8350
Epoch 47/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4018 -
acc: 0.8358
Epoch 48/100
7200/7200 [==============================] - 0s 69us/step - loss: 0.4015 -
acc: 0.8350
Epoch 49/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.4015 -
acc: 0.8374
Epoch 50/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4010 -
acc: 0.8372
Epoch 51/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.4011 -
acc: 0.8357
Epoch 52/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.4007 -
acc: 0.8357
```

```
Epoch 53/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4002 -
acc: 0.8354
Epoch 54/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.4000 -
acc: 0.8342
Epoch 55/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.4000 -
acc: 0.8357
Epoch 56/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3994 -
acc: 0.8357
Epoch 57/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3992 -
acc: 0.8357
Epoch 58/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3990 -
acc: 0.8350
Epoch 59/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3986 -
acc: 0.8372
Epoch 60/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3983 -
acc: 0.8368
Epoch 61/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3976 -
acc: 0.8354
Epoch 62/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3974 -
acc: 0.8365
Epoch 63/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3972 -
acc: 0.8358
Epoch 64/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3973 -
acc: 0.8349
Epoch 65/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3967 -
acc: 0.8367
Epoch 66/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3969 -
acc: 0.8350
Epoch 67/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3964 -
acc: 0.8358
Epoch 68/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3959 -
acc: 0.8364
Epoch 69/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3959 -
acc: 0.8354
Epoch 70/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3956 -
acc: 0.8356
Epoch 71/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3952 -
acc: 0.8357
Epoch 72/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3949 -
acc: 0.8354
Epoch 73/100
```

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7200/7200 [==============================] - 1s 70us/step - loss: 0.3947 -
acc: 0.8349
Epoch 74/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3943 -
acc: 0.8362
Epoch 75/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3944 -
acc: 0.8347
Epoch 76/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3936 -
acc: 0.8356
Epoch 77/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3938 -
acc: 0.8376
Epoch 78/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3940 -
acc: 0.8371
Epoch 79/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3936 -
acc: 0.8364
Epoch 80/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3934 -
acc: 0.8371
Epoch 81/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3931 -
acc: 0.8365
Epoch 82/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3928 -
acc: 0.8353
Epoch 83/100
7200/7200 [==============================] - 0s 60us/step - loss: 0.3929 -
acc: 0.8360
Epoch 84/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3923 -
acc: 0.8364
Epoch 85/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3923 -
acc: 0.8365
Epoch 86/100
7200/7200 [==============================] - 0s 61us/step - loss: 0.3924 -
acc: 0.8367
Epoch 87/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3919 -
acc: 0.8378
Epoch 88/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3918 -
acc: 0.8390
Epoch 89/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3917 -
acc: 0.8376
Epoch 90/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3916 -
acc: 0.8389
Epoch 91/100
7200/7200 [==============================] - 0s 62us/step - loss: 0.3911 -
acc: 0.8393
Epoch 92/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3912 -
acc: 0.8371
Epoch 93/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3913 -
```

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acc: 0.8385
Epoch 94/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3905 -
acc: 0.8381
Epoch 95/100
7200/7200 [==============================] - 0s 65us/step - loss: 0.3910 -
acc: 0.8385
Epoch 96/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3906 -
acc: 0.8364
Epoch 97/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3908 -
acc: 0.8392
Epoch 98/100
7200/7200 [==============================] - 0s 64us/step - loss: 0.3908 -
acc: 0.8381
Epoch 99/100
7200/7200 [==============================] - 0s 63us/step - loss: 0.3901 -
acc: 0.8381
Epoch 100/100
7200/7200 [==============================] - 0s 66us/step - loss: 0.3900 -
acc: 0.8358
Epoch 1/200
7200/7200 [==============================] - 2s 245us/step - loss: 0.5659
 - acc: 0.7982
Epoch 2/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4334 -
acc: 0.8001
Epoch 3/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4267 -
acc: 0.8001
Epoch 4/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4233 -
acc: 0.8001
Epoch 5/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4201 -
acc: 0.8001
Epoch 6/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4176 -
acc: 0.8001
Epoch 7/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4158 -
acc: 0.8137
Epoch 8/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4138 -
acc: 0.8260
Epoch 9/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4133 -
acc: 0.8268
Epoch 10/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4124 -
acc: 0.8294
Epoch 11/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4112 -
acc: 0.8311
Epoch 12/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4102 -
acc: 0.8310
Epoch 13/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4098 -
acc: 0.8314
```

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Epoch 14/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4088 -
acc: 0.8314
Epoch 15/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.4084 -
acc: 0.8342
Epoch 16/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4074 -
acc: 0.8328
Epoch 17/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4067 -
acc: 0.8350
Epoch 18/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4060 -
acc: 0.8351
Epoch 19/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4054 -
acc: 0.8336
Epoch 20/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4049 -
acc: 0.8361
Epoch 21/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4042 -
acc: 0.8358
Epoch 22/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4035 -
acc: 0.8351
Epoch 23/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4031 -
acc: 0.8356
Epoch 24/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4028 -
acc: 0.8378
Epoch 25/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4026 -
acc: 0.8360
Epoch 26/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4023 -
acc: 0.8362
Epoch 27/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4017 -
acc: 0.8372
Epoch 28/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4009 -
acc: 0.8368
Epoch 29/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4008 -
acc: 0.8368
Epoch 30/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.4009 -
acc: 0.8365
Epoch 31/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4004 -
acc: 0.8372
Epoch 32/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4006 -
acc: 0.8372
Epoch 33/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4002 -
acc: 0.8375
Epoch 34/200
```

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7200/7200 [==============================] - 0s 65us/step - loss: 0.4002 -
acc: 0.8378
Epoch 35/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.4002 -
acc: 0.8376
Epoch 36/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3998 -
acc: 0.8372
Epoch 37/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3996 -
acc: 0.8372
Epoch 38/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3993 -
acc: 0.8389
Epoch 39/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3996 -
acc: 0.8382
Epoch 40/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3996 -
acc: 0.8379
Epoch 41/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3992 -
acc: 0.8374
Epoch 42/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3992 -
acc: 0.8381
Epoch 43/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3992 -
acc: 0.8376
Epoch 44/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3990 -
acc: 0.8372
Epoch 45/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3989 -
acc: 0.8362
Epoch 46/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3988 -
acc: 0.8374
Epoch 47/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3987 -
acc: 0.8372
Epoch 48/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3983 -
acc: 0.8365
Epoch 49/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3986 -
acc: 0.8386
Epoch 50/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3981 -
acc: 0.8367
Epoch 51/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3988 -
acc: 0.8375
Epoch 52/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3985 -
acc: 0.8369
Epoch 53/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3985 -
acc: 0.8375
Epoch 54/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3985 -
```

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acc: 0.8368
Epoch 55/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3982 -
acc: 0.8364
Epoch 56/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3979 -
acc: 0.8375
Epoch 57/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3979 -
acc: 0.8390
Epoch 58/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3978 -
acc: 0.8376
Epoch 59/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3980 -
acc: 0.8374
Epoch 60/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3982 -
acc: 0.8382
Epoch 61/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3981 -
acc: 0.8357
Epoch 62/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3979 -
acc: 0.8358
Epoch 63/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3977 -
acc: 0.8368
Epoch 64/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3981 -
acc: 0.8369
Epoch 65/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3978 -
acc: 0.8358
Epoch 66/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3980 -
acc: 0.8367
Epoch 67/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3977 -
acc: 0.8367
Epoch 68/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3976 -
acc: 0.8374
Epoch 69/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3974 -
acc: 0.8372
Epoch 70/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3976 -
acc: 0.8371
Epoch 71/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3978 -
acc: 0.8376
Epoch 72/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3974 -
acc: 0.8376
Epoch 73/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3973 -
acc: 0.8371
Epoch 74/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3976 -
acc: 0.8365
```

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Epoch 75/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3974 -
acc: 0.8372
Epoch 76/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3975 -
acc: 0.8372
Epoch 77/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3971 -
acc: 0.8382
Epoch 78/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3970 -
acc: 0.8368
Epoch 79/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3976 -
acc: 0.8372
Epoch 80/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3969 -
acc: 0.8371
Epoch 81/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3970 -
acc: 0.8361
Epoch 82/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3969 -
acc: 0.8365
Epoch 83/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3966 -
acc: 0.8358
Epoch 84/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3967 -
acc: 0.8360
Epoch 85/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3959 -
acc: 0.8361
Epoch 86/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3964 -
acc: 0.8372
Epoch 87/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3955 -
acc: 0.8386
Epoch 88/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3953 -
acc: 0.8392
Epoch 89/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3953 -
acc: 0.8374
Epoch 90/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3951 -
acc: 0.8382
Epoch 91/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3953 -
acc: 0.8368
Epoch 92/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3944 -
acc: 0.8383
Epoch 93/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3947 -
acc: 0.8367
Epoch 94/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3942 -
acc: 0.8382
Epoch 95/200
```

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7200/7200 [==============================] - 0s 66us/step - loss: 0.3942 -
acc: 0.8381
Epoch 96/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3941 -
acc: 0.8371
Epoch 97/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3936 -
acc: 0.8390
Epoch 98/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3932 -
acc: 0.8385
Epoch 99/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3930 -
acc: 0.8389
Epoch 100/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3931 -
acc: 0.8376
Epoch 101/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3925 -
acc: 0.8399
Epoch 102/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3927 -
acc: 0.8394
Epoch 103/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3923 -
acc: 0.8383
Epoch 104/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3918 -
acc: 0.8397
Epoch 105/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3924 -
acc: 0.8393
Epoch 106/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3917 -
acc: 0.8400
Epoch 107/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3912 -
acc: 0.8397
Epoch 108/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3917 -
acc: 0.8383
Epoch 109/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3914 -
acc: 0.8386
Epoch 110/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3912 -
acc: 0.8378
Epoch 111/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3909 -
acc: 0.8412
Epoch 112/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3905 -
acc: 0.8394
Epoch 113/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3908 -
acc: 0.8383
Epoch 114/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3903 -
acc: 0.8394
Epoch 115/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3901 -
```

```
acc: 0.8392
Epoch 116/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3897 -
acc: 0.8400
Epoch 117/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3900 -
acc: 0.8404
Epoch 118/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3897 -
acc: 0.8389
Epoch 119/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3897 -
acc: 0.8399
Epoch 120/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3896 -
acc: 0.8394
Epoch 121/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3894 -
acc: 0.8403
Epoch 122/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3891 -
acc: 0.8401
Epoch 123/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3891 -
acc: 0.8389
Epoch 124/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3889 -
acc: 0.8386
Epoch 125/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3889 -
acc: 0.8407
Epoch 126/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3890 -
acc: 0.8403
Epoch 127/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3885 -
acc: 0.8415
Epoch 128/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3888 -
acc: 0.8419
Epoch 129/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3888 -
acc: 0.8412
Epoch 130/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3888 -
acc: 0.8400
Epoch 131/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3882 -
acc: 0.8397
Epoch 132/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3875 -
acc: 0.8419
Epoch 133/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3878 -
acc: 0.8422
Epoch 134/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3879 -
acc: 0.8406
Epoch 135/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3875 -
acc: 0.8410
```

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Epoch 136/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3877 -
acc: 0.8411
Epoch 137/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3868 -
acc: 0.8419
Epoch 138/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3867 -
acc: 0.8418
Epoch 139/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3863 -
acc: 0.8418
Epoch 140/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3863 -
acc: 0.8410
Epoch 141/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3856 -
acc: 0.8419
Epoch 142/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3856 -
acc: 0.8442
Epoch 143/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3853 -
acc: 0.8414
Epoch 144/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3853 -
acc: 0.8412
Epoch 145/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3836 -
acc: 0.8417
Epoch 146/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3833 -
acc: 0.8424
Epoch 147/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3825 -
acc: 0.8418
Epoch 148/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3811 -
acc: 0.8432
Epoch 149/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3798 -
acc: 0.8442
Epoch 150/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3786 -
acc: 0.8428
Epoch 151/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3770 -
acc: 0.8440
Epoch 152/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3752 -
acc: 0.8429
Epoch 153/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3736 -
acc: 0.8437
Epoch 154/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3716 -
acc: 0.8439
Epoch 155/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3696 -
acc: 0.8418
Epoch 156/200
```

```
7200/7200 [==============================] - 1s 75us/step - loss: 0.3680 -
acc: 0.8447
Epoch 157/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.3670 -
acc: 0.8465
Epoch 158/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3660 -
acc: 0.8464
Epoch 159/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.3641 -
acc: 0.8475
Epoch 160/200
7200/7200 [==============================] - 1s 86us/step - loss: 0.3631 -
acc: 0.8481: 0s - loss: 0.3514 -
Epoch 161/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3613 -
acc: 0.8489
Epoch 162/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3606 -
acc: 0.8511
Epoch 163/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3579 -
acc: 0.8528
Epoch 164/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.3565 -
acc: 0.8547
Epoch 165/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3543 -
acc: 0.8558
Epoch 166/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3523 -
acc: 0.8578
Epoch 167/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3502 -
acc: 0.8592
Epoch 168/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3489 -
acc: 0.8604
Epoch 169/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3473 -
acc: 0.8604
Epoch 170/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3466 -
acc: 0.8586
Epoch 171/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3453 -
acc: 0.8594
Epoch 172/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.3449 -
acc: 0.8593
Epoch 173/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3439 -
acc: 0.8578
Epoch 174/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3435 -
acc: 0.8625
Epoch 175/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.3435 -
acc: 0.8625
Epoch 176/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3435 -
```

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acc: 0.8593
Epoch 177/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3427 -
acc: 0.8621
Epoch 178/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3428 -
acc: 0.8629
Epoch 179/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3425 -
acc: 0.8622
Epoch 180/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3424 -
acc: 0.8617
Epoch 181/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3421 -
acc: 0.8619
Epoch 182/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3414 -
acc: 0.8625
Epoch 183/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3421 -
acc: 0.8606
Epoch 184/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3420 -
acc: 0.8625
Epoch 185/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3415 -
acc: 0.8642
Epoch 186/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3418 -
acc: 0.8653
Epoch 187/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3418 -
acc: 0.8635
Epoch 188/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3413 -
acc: 0.8621
Epoch 189/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3415 -
acc: 0.8621
Epoch 190/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3410 -
acc: 0.8626
Epoch 191/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3410 -
acc: 0.8608
Epoch 192/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3409 -
acc: 0.8614
Epoch 193/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3402 -
acc: 0.8626
Epoch 194/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.3413 -
acc: 0.8606
Epoch 195/200
7200/7200 [==============================] - 1s 81us/step - loss: 0.3408 -
acc: 0.8625
Epoch 196/200
7200/7200 [==============================] - 1s 69us/step - loss: 0.3401 -
acc: 0.8625
```

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Epoch 197/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3410 -
acc: 0.8635
Epoch 198/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3404 -
acc: 0.8626
Epoch 199/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3404 -
acc: 0.8626
Epoch 200/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3400 -
acc: 0.8617
Epoch 1/200
7200/7200 [==============================] - 2s 249us/step - loss: 0.5588
 - acc: 0.7947
Epoch 2/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4376 -
acc: 0.7974
Epoch 3/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4320 -
acc: 0.7974
Epoch 4/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4294 -
acc: 0.7974
Epoch 5/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4265 -
acc: 0.7974
Epoch 6/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4240 -
acc: 0.7974
Epoch 7/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4208 -
acc: 0.8042
Epoch 8/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4187 -
acc: 0.8185
Epoch 9/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4171 -
acc: 0.8242
Epoch 10/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4158 -
acc: 0.8275
Epoch 11/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4145 -
acc: 0.8269
Epoch 12/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4134 -
acc: 0.8301
Epoch 13/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4127 -
acc: 0.8312
Epoch 14/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4118 -
acc: 0.8306
Epoch 15/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4108 -
acc: 0.8340
Epoch 16/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4102 -
acc: 0.8333
Epoch 17/200
```

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7200/7200 [==============================] - 0s 66us/step - loss: 0.4098 -
acc: 0.8343
Epoch 18/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4093 -
acc: 0.8349
Epoch 19/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4084 -
acc: 0.8343
Epoch 20/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4083 -
acc: 0.8354
Epoch 21/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4079 -
acc: 0.8346
Epoch 22/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4074 -
acc: 0.8356
Epoch 23/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4072 -
acc: 0.8347
Epoch 24/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4068 -
acc: 0.8349
Epoch 25/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4064 -
acc: 0.8349
Epoch 26/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4063 -
acc: 0.8349
Epoch 27/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4061 -
acc: 0.8365
Epoch 28/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4055 -
acc: 0.8360
Epoch 29/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4053 -
acc: 0.8349
Epoch 30/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4050 -
acc: 0.8365
Epoch 31/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4043 -
acc: 0.8358
Epoch 32/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4047 -
acc: 0.8344
Epoch 33/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4045 -
acc: 0.8350
Epoch 34/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4043 -
acc: 0.8358
Epoch 35/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4042 -
acc: 0.8342
Epoch 36/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4041 -
acc: 0.8346
Epoch 37/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4042 -
```

```
acc: 0.8346
Epoch 38/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4039 -
acc: 0.8353
Epoch 39/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4039 -
acc: 0.8349
Epoch 40/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4040 -
acc: 0.8354
Epoch 41/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4038 -
acc: 0.8349
Epoch 42/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4033 -
acc: 0.8343
Epoch 43/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4031 -
acc: 0.8342
Epoch 44/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4036 -
acc: 0.8358
Epoch 45/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4032 -
acc: 0.8353
Epoch 46/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4032 -
acc: 0.8347
Epoch 47/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4031 -
acc: 0.8356
Epoch 48/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4032 -
acc: 0.8344
Epoch 49/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4030 -
acc: 0.8364
Epoch 50/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4030 -
acc: 0.8347
Epoch 51/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4026 -
acc: 0.8346
Epoch 52/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4029 -
acc: 0.8344
Epoch 53/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4024 -
acc: 0.8349
Epoch 54/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4024 -
acc: 0.8350
Epoch 55/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4025 -
acc: 0.8342
Epoch 56/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4026 -
acc: 0.8351
Epoch 57/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4024 -
acc: 0.8358
```

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Epoch 58/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4024 -
acc: 0.8350
Epoch 59/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4023 -
acc: 0.8344
Epoch 60/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4021 -
acc: 0.8360
Epoch 61/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4022 -
acc: 0.8353
Epoch 62/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4023 -
acc: 0.8347
Epoch 63/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4026 -
acc: 0.8344
Epoch 64/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4018 -
acc: 0.8354
Epoch 65/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4020 -
acc: 0.8349
Epoch 66/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4019 -
acc: 0.8343
Epoch 67/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4019 -
acc: 0.8349
Epoch 68/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4021 -
acc: 0.8349
Epoch 69/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4017 -
acc: 0.8361
Epoch 70/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4020 -
acc: 0.8350
Epoch 71/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4019 -
acc: 0.8360
Epoch 72/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4018 -
acc: 0.8360
Epoch 73/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4017 -
acc: 0.8350
Epoch 74/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4016 -
acc: 0.8340
Epoch 75/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4018 -
acc: 0.8339
Epoch 76/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4016 -
acc: 0.8344
Epoch 77/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4012 -
acc: 0.8358
Epoch 78/200
```

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7200/7200 [==============================] - 0s 67us/step - loss: 0.4013 -
acc: 0.8360
Epoch 79/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4014 -
acc: 0.8354
Epoch 80/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4015 -
acc: 0.8356
Epoch 81/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4011 -
acc: 0.8346
Epoch 82/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4014 -
acc: 0.8339
Epoch 83/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4014 -
acc: 0.8346
Epoch 84/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4012 -
acc: 0.8358
Epoch 85/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4013 -
acc: 0.8364
Epoch 86/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4013 -
acc: 0.8346
Epoch 87/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4013 -
acc: 0.8354
Epoch 88/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4009 -
acc: 0.8349
Epoch 89/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4010 -
acc: 0.8361
Epoch 90/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4008 -
acc: 0.8356
Epoch 91/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4011 -
acc: 0.8351
Epoch 92/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4010 -
acc: 0.8357
Epoch 93/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4006 -
acc: 0.8336
Epoch 94/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4007 -
acc: 0.8364
Epoch 95/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4006 -
acc: 0.8343
Epoch 96/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4011 -
acc: 0.8346
Epoch 97/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4007 -
acc: 0.8351
Epoch 98/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4003 -
```

```
acc: 0.8356
Epoch 99/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4005 -
acc: 0.8357
Epoch 100/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4012 -
acc: 0.8350
Epoch 101/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4011 -
acc: 0.8350
Epoch 102/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4007 -
acc: 0.8357
Epoch 103/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4004 -
acc: 0.8349
Epoch 104/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4006 -
acc: 0.8362
Epoch 105/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4009 -
acc: 0.8358
Epoch 106/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4005 -
acc: 0.8353
Epoch 107/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4009 -
acc: 0.8356
Epoch 108/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4006 -
acc: 0.8350
Epoch 109/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4006 -
acc: 0.8357
Epoch 110/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4013 -
acc: 0.8357
Epoch 111/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4006 -
acc: 0.8343
Epoch 112/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4009 -
acc: 0.8346
Epoch 113/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4006 -
acc: 0.8360
Epoch 114/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4002 -
acc: 0.8368
Epoch 115/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4005 -
acc: 0.8343
Epoch 116/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4009 -
acc: 0.8358
Epoch 117/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4006 -
acc: 0.8353
Epoch 118/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4009 -
acc: 0.8349
```

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Epoch 119/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4006 -
acc: 0.8347
Epoch 120/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4009 -
acc: 0.8351
Epoch 121/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4006 -
acc: 0.8349
Epoch 122/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4001 -
acc: 0.8368
Epoch 123/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4007 -
acc: 0.8350
Epoch 124/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4005 -
acc: 0.8350
Epoch 125/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4007 -
acc: 0.8346
Epoch 126/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4003 -
acc: 0.8337
Epoch 127/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4004 -
acc: 0.8360
Epoch 128/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4004 -
acc: 0.8351
Epoch 129/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4006 -
acc: 0.8360
Epoch 130/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4006 -
acc: 0.8346
Epoch 131/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4006 -
acc: 0.8356
Epoch 132/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.4003 -
acc: 0.8353
Epoch 133/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4003 -
acc: 0.8354
Epoch 134/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4004 -
acc: 0.8349
Epoch 135/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4007 -
acc: 0.8343
Epoch 136/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4005 -
acc: 0.8344
Epoch 137/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4005 -
acc: 0.8358
Epoch 138/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4001 -
acc: 0.8358
Epoch 139/200
```

```
7200/7200 [==============================] - 0s 64us/step - loss: 0.4004 -
acc: 0.8349
Epoch 140/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4004 -
acc: 0.8350
Epoch 141/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4002 -
acc: 0.8357
Epoch 142/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4005 -
acc: 0.8346
Epoch 143/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4006 -
acc: 0.8337
Epoch 144/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4002 -
acc: 0.8356
Epoch 145/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4002 -
acc: 0.8371
Epoch 146/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4005 -
acc: 0.8339
Epoch 147/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.4001 -
acc: 0.8354
Epoch 148/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4003 -
acc: 0.8344
Epoch 149/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4002 -
acc: 0.8361
Epoch 150/200
7200/7200 [==============================] - 1s 95us/step - loss: 0.4006 -
acc: 0.8351
Epoch 151/200
7200/7200 [==============================] - 1s 89us/step - loss: 0.4002 -
acc: 0.8350
Epoch 152/200
7200/7200 [==============================] - 1s 88us/step - loss: 0.4003 -
acc: 0.8350
Epoch 153/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.4005 -
acc: 0.8349
Epoch 154/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4004 -
acc: 0.8354
Epoch 155/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.4002 -
acc: 0.8351
Epoch 156/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.4001 -
acc: 0.8354
Epoch 157/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4005 -
acc: 0.8356
Epoch 158/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4004 -
acc: 0.8365
Epoch 159/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4003 -
```

```
acc: 0.8344
Epoch 160/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4005 -
acc: 0.8354
Epoch 161/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4005 -
acc: 0.8358
Epoch 162/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4003 -
acc: 0.8356
Epoch 163/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3999 -
acc: 0.8339
Epoch 164/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4003 -
acc: 0.8357
Epoch 165/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.4002 -
acc: 0.8360
Epoch 166/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4003 -
acc: 0.8351
Epoch 167/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.4001 -
acc: 0.8360
Epoch 168/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3995 -
acc: 0.8360
Epoch 169/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.4001 -
acc: 0.8358
Epoch 170/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4003 -
acc: 0.8347
Epoch 171/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4001 -
acc: 0.8364
Epoch 172/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4004 -
acc: 0.8349
Epoch 173/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3997 -
acc: 0.8351
Epoch 174/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4002 -
acc: 0.8343
Epoch 175/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4001 -
acc: 0.8356
Epoch 176/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4001 -
acc: 0.8357
Epoch 177/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3999 -
acc: 0.8343
Epoch 178/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4001 -
acc: 0.8357
Epoch 179/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4003 -
acc: 0.8350
```

```
Epoch 180/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4000 -
acc: 0.8353
Epoch 181/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4008 -
acc: 0.8344
Epoch 182/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4004 -
acc: 0.8372
Epoch 183/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4003 -
acc: 0.8349
Epoch 184/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3999 -
acc: 0.8361
Epoch 185/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4002 -
acc: 0.8357
Epoch 186/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4004 -
acc: 0.8343
Epoch 187/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4002 -
acc: 0.8350
Epoch 188/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3994 -
acc: 0.8361
Epoch 189/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4003 -
acc: 0.8371
Epoch 190/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4003 -
acc: 0.8346
Epoch 191/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4001 -
acc: 0.8354
Epoch 192/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3999 -
acc: 0.8351
Epoch 193/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4005 -
acc: 0.8361
Epoch 194/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3999 -
acc: 0.8347
Epoch 195/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4005 -
acc: 0.8351
Epoch 196/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4003 -
acc: 0.8356
Epoch 197/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3999 -
acc: 0.8347
Epoch 198/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4003 -
acc: 0.8340
Epoch 199/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4002 -
acc: 0.8346
Epoch 200/200
```

```
7200/7200 [==============================] - 0s 64us/step - loss: 0.4001 -
acc: 0.8357
Epoch 1/200
7200/7200 [==============================] - 2s 256us/step - loss: 0.5550
 - acc: 0.7956
Epoch 2/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4371 -
acc: 0.7956
Epoch 3/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4297 -
acc: 0.7956
Epoch 4/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4242 -
acc: 0.7996
Epoch 5/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4202 -
acc: 0.8226
Epoch 6/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4164 -
acc: 0.8296
Epoch 7/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.4133 -
acc: 0.8324
Epoch 8/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4108 -
acc: 0.8336
Epoch 9/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4088 -
acc: 0.8356
Epoch 10/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4070 -
acc: 0.8347
Epoch 11/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4055 -
acc: 0.8351
Epoch 12/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4046 -
acc: 0.8368
Epoch 13/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4035 -
acc: 0.8356
Epoch 14/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4024 -
acc: 0.8364
Epoch 15/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4021 -
acc: 0.8365
Epoch 16/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4012 -
acc: 0.8368
Epoch 17/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4012 -
acc: 0.8360
Epoch 18/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3998 -
acc: 0.8356
Epoch 19/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4003 -
acc: 0.8362
Epoch 20/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3998 -
```

```
acc: 0.8351
Epoch 21/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3992 -
acc: 0.8333
Epoch 22/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3994 -
acc: 0.8344
Epoch 23/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3990 -
acc: 0.8385
Epoch 24/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3987 -
acc: 0.8361
Epoch 25/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3983 -
acc: 0.8353
Epoch 26/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3987 -
acc: 0.8381
Epoch 27/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3978 -
acc: 0.8364
Epoch 28/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3982 -
acc: 0.8379
Epoch 29/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3982 -
acc: 0.8360
Epoch 30/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3977 -
acc: 0.8360
Epoch 31/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3975 -
acc: 0.8358
Epoch 32/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3979 -
acc: 0.8364
Epoch 33/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3977 -
acc: 0.8364
Epoch 34/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3973 -
acc: 0.8362
Epoch 35/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3971 -
acc: 0.8385
Epoch 36/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3972 -
acc: 0.8369
Epoch 37/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3970 -
acc: 0.8367
Epoch 38/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3970 -
acc: 0.8378
Epoch 39/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3967 -
acc: 0.8378
Epoch 40/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3963 -
acc: 0.8392
```

```
Epoch 41/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3966 -
acc: 0.8356
Epoch 42/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3964 -
acc: 0.8374
Epoch 43/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3961 -
acc: 0.8399
Epoch 44/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3960 -
acc: 0.8357
Epoch 45/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3956 -
acc: 0.8374
Epoch 46/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3960 -
acc: 0.8379
Epoch 47/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3955 -
acc: 0.8386
Epoch 48/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3956 -
acc: 0.8385
Epoch 49/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3959 -
acc: 0.8367
Epoch 50/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3955 -
acc: 0.8376
Epoch 51/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3952 -
acc: 0.8382
Epoch 52/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3952 -
acc: 0.8383
Epoch 53/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3952 -
acc: 0.8378
Epoch 54/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3952 -
acc: 0.8389
Epoch 55/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3951 -
acc: 0.8392
Epoch 56/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3949 -
acc: 0.8371
Epoch 57/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3948 -
acc: 0.8381
Epoch 58/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3946 -
acc: 0.8392
Epoch 59/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3950 -
acc: 0.8381
Epoch 60/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3951 -
acc: 0.8386
Epoch 61/200
```

```
7200/7200 [==============================] - 1s 71us/step - loss: 0.3950 -
acc: 0.8386
Epoch 62/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3951 -
acc: 0.8396
Epoch 63/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3947 -
acc: 0.8374
Epoch 64/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3948 -
acc: 0.8389
Epoch 65/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3949 -
acc: 0.8376
Epoch 66/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3946 -
acc: 0.8376
Epoch 67/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3946 -
acc: 0.8367
Epoch 68/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3949 -
acc: 0.8392
Epoch 69/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3947 -
acc: 0.8369
Epoch 70/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3948 -
acc: 0.8382
Epoch 71/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3946 -
acc: 0.8375
Epoch 72/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3946 -
acc: 0.8393
Epoch 73/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3950 -
acc: 0.8387
Epoch 74/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3946 -
acc: 0.8379
Epoch 75/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3948 -
acc: 0.8372
Epoch 76/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3946 -
acc: 0.8379
Epoch 77/200
7200/7200 [==============================] - 1s 80us/step - loss: 0.3941 -
acc: 0.8389
Epoch 78/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3949 -
acc: 0.8374
Epoch 79/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3947 -
acc: 0.8393
Epoch 80/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3945 -
acc: 0.8383
Epoch 81/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3944 -
```

```
acc: 0.8394
Epoch 82/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3945 -
acc: 0.8386
Epoch 83/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3943 -
acc: 0.8392
Epoch 84/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3945 -
acc: 0.8383: 0s - loss: 0.3918 - acc
Epoch 85/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3944 -
acc: 0.8382
Epoch 86/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3945 -
acc: 0.8383
Epoch 87/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3942 -
acc: 0.8383
Epoch 88/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3946 -
acc: 0.8378
Epoch 89/200
7200/7200 [==============================] - 1s 84us/step - loss: 0.3942 -
acc: 0.8394
Epoch 90/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3942 -
acc: 0.8386
Epoch 91/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3941 -
acc: 0.8367
Epoch 92/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3942 -
acc: 0.8381
Epoch 93/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3940 -
acc: 0.8378
Epoch 94/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3938 -
acc: 0.8386
Epoch 95/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3940 -
acc: 0.8381
Epoch 96/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3941 -
acc: 0.8382
Epoch 97/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3942 -
acc: 0.8396
Epoch 98/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3943 -
acc: 0.8394
Epoch 99/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3940 -
acc: 0.8383
Epoch 100/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3940 -
acc: 0.8399
Epoch 101/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3941 -
acc: 0.8378
```

```
Epoch 102/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3941 -
acc: 0.8399
Epoch 103/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3942 -
acc: 0.8404
Epoch 104/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3940 -
acc: 0.8393
Epoch 105/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3939 -
acc: 0.8389
Epoch 106/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3938 -
acc: 0.8387
Epoch 107/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3936 -
acc: 0.8392
Epoch 108/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3943 -
acc: 0.8389
Epoch 109/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3938 -
acc: 0.8386
Epoch 110/200
7200/7200 [==============================] - ETA: 0s - loss: 0.3929 - acc:
0.840 - 0s 69us/step - loss: 0.3940 - acc: 0.8397
Epoch 111/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3937 -
acc: 0.8375
Epoch 112/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3936 -
acc: 0.8379
Epoch 113/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3939 -
acc: 0.8417
Epoch 114/200
7200/7200 [==============================] - 1s 69us/step - loss: 0.3939 -
acc: 0.8389
Epoch 115/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3934 -
acc: 0.8385
Epoch 116/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.3939 -
acc: 0.8397
Epoch 117/200
7200/7200 [==============================] - 1s 84us/step - loss: 0.3936 -
acc: 0.8386
Epoch 118/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3935 -
acc: 0.8392
Epoch 119/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3937 -
acc: 0.8385
Epoch 120/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3936 -
acc: 0.8404
Epoch 121/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3935 -
acc: 0.8394
Epoch 122/200
```

```
7200/7200 [==============================] - 1s 70us/step - loss: 0.3938 -
acc: 0.8385
Epoch 123/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3934 -
acc: 0.8394
Epoch 124/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3933 -
acc: 0.8381
Epoch 125/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3935 -
acc: 0.8396
Epoch 126/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3936 -
acc: 0.8397
Epoch 127/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3933 -
acc: 0.8407
Epoch 128/200
7200/7200 [==============================] - ETA: 0s - loss: 0.3919 - acc:
0.840 - 0s 69us/step - loss: 0.3934 - acc: 0.8394
Epoch 129/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3926 -
acc: 0.8389
Epoch 130/200
7200/7200 [==============================] - 0s 60us/step - loss: 0.3935 -
acc: 0.8383
Epoch 131/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3929 -
acc: 0.8411
Epoch 132/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3931 -
acc: 0.8408
Epoch 133/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3935 -
acc: 0.8393
Epoch 134/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3932 -
acc: 0.8385
Epoch 135/200
7200/7200 [==============================] - 1s 81us/step - loss: 0.3932 -
acc: 0.8403
Epoch 136/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3932 -
acc: 0.8387
Epoch 137/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3932 -
acc: 0.8392
Epoch 138/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3932 -
acc: 0.8399
Epoch 139/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3929 -
acc: 0.8407
Epoch 140/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3929 -
acc: 0.8399
Epoch 141/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3931 -
acc: 0.8399
Epoch 142/200
7200/7200 [==============================] - 0s 59us/step - loss: 0.3928 -
```

```
acc: 0.8401
Epoch 143/200
7200/7200 [==============================] - 0s 59us/step - loss: 0.3930 -
acc: 0.8401
Epoch 144/200
7200/7200 [==============================] - 0s 60us/step - loss: 0.3925 -
acc: 0.8411
Epoch 145/200
7200/7200 [==============================] - 0s 59us/step - loss: 0.3925 -
acc: 0.8411
Epoch 146/200
7200/7200 [==============================] - 0s 60us/step - loss: 0.3928 -
acc: 0.8376
Epoch 147/200
7200/7200 [==============================] - 0s 60us/step - loss: 0.3925 -
acc: 0.8397
Epoch 148/200
7200/7200 [==============================] - 0s 59us/step - loss: 0.3924 -
acc: 0.8394
Epoch 149/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3925 -
acc: 0.8400
Epoch 150/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3923 -
acc: 0.8386
Epoch 151/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3923 -
acc: 0.8390
Epoch 152/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3923 -
acc: 0.8399
Epoch 153/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3924 -
acc: 0.8382
Epoch 154/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3923 -
acc: 0.8406
Epoch 155/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3923 -
acc: 0.8404
Epoch 156/200
7200/7200 [==============================] - 0s 59us/step - loss: 0.3925 -
acc: 0.8383
Epoch 157/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3923 -
acc: 0.8390
Epoch 158/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3919 -
acc: 0.8394
Epoch 159/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3925 -
acc: 0.8390
Epoch 160/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3923 -
acc: 0.8408
Epoch 161/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3921 -
acc: 0.8404
Epoch 162/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3921 -
acc: 0.8390
```

```
Epoch 163/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3920 -
acc: 0.8401
Epoch 164/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3921 -
acc: 0.8393
Epoch 165/200
7200/7200 [==============================] - 0s 61us/step - loss: 0.3917 -
acc: 0.8389
Epoch 166/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3922 -
acc: 0.8389
Epoch 167/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3917 -
acc: 0.8382
Epoch 168/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3919 -
acc: 0.8396
Epoch 169/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.3918 -
acc: 0.8399
Epoch 170/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3915 -
acc: 0.8399
Epoch 171/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3916 -
acc: 0.8399
Epoch 172/200
7200/7200 [==============================] - 0s 58us/step - loss: 0.3916 -
acc: 0.8389
Epoch 173/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3917 -
acc: 0.8392
Epoch 174/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3912 -
acc: 0.8404
Epoch 175/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3914 -
acc: 0.8383
Epoch 176/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3913 -
acc: 0.8393
Epoch 177/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.3911 -
acc: 0.8383
Epoch 178/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3910 -
acc: 0.8410
Epoch 179/200
7200/7200 [==============================] - 1s 84us/step - loss: 0.3910 -
acc: 0.8396
Epoch 180/200
7200/7200 [==============================] - 1s 88us/step - loss: 0.3910 -
acc: 0.8396
Epoch 181/200
7200/7200 [==============================] - 1s 90us/step - loss: 0.3901 -
acc: 0.8403
Epoch 182/200
7200/7200 [==============================] - 1s 89us/step - loss: 0.3900 -
acc: 0.8403
Epoch 183/200
```

```
7200/7200 [==============================] - 1s 70us/step - loss: 0.3888 -
acc: 0.8403
Epoch 184/200
7200/7200 [==============================] - 1s 92us/step - loss: 0.3878 -
acc: 0.8415
Epoch 185/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3857 -
acc: 0.8386
Epoch 186/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3842 -
acc: 0.8410
Epoch 187/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3824 -
acc: 0.8394
Epoch 188/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3806 -
acc: 0.8399
Epoch 189/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.3793 -
acc: 0.8401
Epoch 190/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3786 -
acc: 0.8392
Epoch 191/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3769 -
acc: 0.8406
Epoch 192/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.3753 -
acc: 0.8390
Epoch 193/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3745 -
acc: 0.8390
Epoch 194/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3729 -
acc: 0.8501
Epoch 195/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3708 -
acc: 0.8504
Epoch 196/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3686 -
acc: 0.8507
Epoch 197/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3672 -
acc: 0.8518
Epoch 198/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.3659 -
acc: 0.8551
Epoch 199/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3651 -
acc: 0.8556
Epoch 200/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3641 -
acc: 0.8561
Epoch 1/200
7200/7200 [==============================] - 2s 265us/step - loss: 0.5506
 - acc: 0.7971
Epoch 2/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4349 -
acc: 0.7971
Epoch 3/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4288 -
```

```
acc: 0.7971
Epoch 4/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.4252 -
acc: 0.7971
Epoch 5/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4225 -
acc: 0.7971
Epoch 6/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4202 -
acc: 0.8008
Epoch 7/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4181 -
acc: 0.8206
Epoch 8/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.4171 -
acc: 0.8239
Epoch 9/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4159 -
acc: 0.8242
Epoch 10/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4148 -
acc: 0.8286
Epoch 11/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4137 -
acc: 0.8279
Epoch 12/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.4129 -
acc: 0.8293
Epoch 13/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4124 -
acc: 0.8310
Epoch 14/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4116 -
acc: 0.8310
Epoch 15/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4106 -
acc: 0.8325
Epoch 16/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.4104 -
acc: 0.8317
Epoch 17/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4098 -
acc: 0.8337
Epoch 18/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.4091 -
acc: 0.8312
Epoch 19/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.4084 -
acc: 0.8329
Epoch 20/200
7200/7200 [==============================] - 1s 83us/step - loss: 0.4078 -
acc: 0.8344
Epoch 21/200
7200/7200 [==============================] - 1s 84us/step - loss: 0.4075 -
acc: 0.8332
Epoch 22/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.4073 -
acc: 0.8333
Epoch 23/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.4068 -
acc: 0.8335
```

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Epoch 24/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.4065 -
acc: 0.8340
Epoch 25/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4062 -
acc: 0.8343
Epoch 26/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4055 -
acc: 0.8342
Epoch 27/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4055 -
acc: 0.8339: 0s - loss: 0.4091 - acc:
Epoch 28/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4052 -
acc: 0.8336
Epoch 29/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4050 -
acc: 0.8342
Epoch 30/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4049 -
acc: 0.8336
Epoch 31/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4050 -
acc: 0.8328
Epoch 32/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.4045 -
acc: 0.8337
Epoch 33/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4041 -
acc: 0.8344
Epoch 34/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4041 -
acc: 0.8351
Epoch 35/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4040 -
acc: 0.8332
Epoch 36/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4037 -
acc: 0.8350
Epoch 37/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4041 -
acc: 0.8344
Epoch 38/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4036 -
acc: 0.8339
Epoch 39/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4037 -
acc: 0.8339
Epoch 40/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4039 -
acc: 0.8336
Epoch 41/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.4034 -
acc: 0.8351
Epoch 42/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4033 -
acc: 0.8340
Epoch 43/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4034 -
acc: 0.8344
Epoch 44/200
```

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7200/7200 [==============================] - 0s 64us/step - loss: 0.4029 -
acc: 0.8344
Epoch 45/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4026 -
acc: 0.8356
Epoch 46/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.4034 -
acc: 0.8331
Epoch 47/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.4027 -
acc: 0.8335
Epoch 48/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4027 -
acc: 0.8346
Epoch 49/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4028 -
acc: 0.8344
Epoch 50/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.4028 -
acc: 0.8349
Epoch 51/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.4024 -
acc: 0.8356
Epoch 52/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4027 -
acc: 0.8347
Epoch 53/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4020 -
acc: 0.8351
Epoch 54/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4026 -
acc: 0.8343
Epoch 55/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4023 -
acc: 0.8335
Epoch 56/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4023 -
acc: 0.8342
Epoch 57/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4023 -
acc: 0.8350
Epoch 58/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4018 -
acc: 0.8339
Epoch 59/200
7200/7200 [==============================] - ETA: 0s - loss: 0.4036 - acc:
0.835 - 1s 85us/step - loss: 0.4022 - acc: 0.8361
Epoch 60/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.4020 -
acc: 0.8335
Epoch 61/200
7200/7200 [==============================] - 1s 84us/step - loss: 0.4023 -
acc: 0.8343
Epoch 62/200
7200/7200 [==============================] - 1s 83us/step - loss: 0.4020 -
acc: 0.8347
Epoch 63/200
7200/7200 [==============================] - 1s 92us/step - loss: 0.4021 -
acc: 0.8339
Epoch 64/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.4016 -
```

```
acc: 0.8367
Epoch 65/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4012 -
acc: 0.8333
Epoch 66/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4016 -
acc: 0.8346
Epoch 67/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4015 -
acc: 0.8344
Epoch 68/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.4019 -
acc: 0.8358
Epoch 69/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.4014 -
acc: 0.8343
Epoch 70/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.4016 -
acc: 0.8340
Epoch 71/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4007 -
acc: 0.8344
Epoch 72/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4009 -
acc: 0.8336
Epoch 73/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.4007 -
acc: 0.8331
Epoch 74/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.4008 -
acc: 0.8354
Epoch 75/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4007 -
acc: 0.8353
Epoch 76/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.4010 -
acc: 0.8346
Epoch 77/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4008 -
acc: 0.8356
Epoch 78/200
7200/7200 [==============================] - 1s 81us/step - loss: 0.4001 -
acc: 0.8351
Epoch 79/200
7200/7200 [==============================] - 1s 80us/step - loss: 0.4005 -
acc: 0.8361
Epoch 80/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4002 -
acc: 0.8365
Epoch 81/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.4008 -
acc: 0.8358
Epoch 82/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3998 -
acc: 0.8354
Epoch 83/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3996 -
acc: 0.8360
Epoch 84/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3997 -
acc: 0.8349
```

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Epoch 85/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3998 -
acc: 0.8351
Epoch 86/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3995 -
acc: 0.8358
Epoch 87/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3993 -
acc: 0.8360
Epoch 88/200
7200/7200 [==============================] - 0s 64us/step - loss: 0.3997 -
acc: 0.8343
Epoch 89/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3991 -
acc: 0.8360
Epoch 90/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3987 -
acc: 0.8357
Epoch 91/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3991 -
acc: 0.8367
Epoch 92/200
7200/7200 [==============================] - 0s 63us/step - loss: 0.3987 -
acc: 0.8349
Epoch 93/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3982 -
acc: 0.8351
Epoch 94/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3984 -
acc: 0.8346
Epoch 95/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3983 -
acc: 0.8344
Epoch 96/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3978 -
acc: 0.8360
Epoch 97/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3980 -
acc: 0.8347
Epoch 98/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3979 -
acc: 0.8353
Epoch 99/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3978 -
acc: 0.8344
Epoch 100/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3980 -
acc: 0.8349
Epoch 101/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3978 -
acc: 0.8361
Epoch 102/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3975 -
acc: 0.8340
Epoch 103/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3976 -
acc: 0.8347
Epoch 104/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3977 -
acc: 0.8354
Epoch 105/200
```

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7200/7200 [==============================] - 0s 65us/step - loss: 0.3973 -
acc: 0.8369
Epoch 106/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3972 -
acc: 0.8353
Epoch 107/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3973 -
acc: 0.8344
Epoch 108/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3974 -
acc: 0.8362
Epoch 109/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3969 -
acc: 0.8353
Epoch 110/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3968 -
acc: 0.8358
Epoch 111/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3971 -
acc: 0.8360
Epoch 112/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3966 -
acc: 0.8349
Epoch 113/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3968 -
acc: 0.8343
Epoch 114/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3967 -
acc: 0.8362
Epoch 115/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3970 -
acc: 0.8349
Epoch 116/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3969 -
acc: 0.8369
Epoch 117/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3964 -
acc: 0.8351
Epoch 118/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3968 -
acc: 0.8362
Epoch 119/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3965 -
acc: 0.8362
Epoch 120/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3963 -
acc: 0.8361
Epoch 121/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3965 -
acc: 0.8367
Epoch 122/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3961 -
acc: 0.8367
Epoch 123/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3965 -
acc: 0.8376
Epoch 124/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3962 -
acc: 0.8361
Epoch 125/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3963 -
```

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acc: 0.8344
Epoch 126/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3964 -
acc: 0.8374
Epoch 127/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3964 -
acc: 0.8367
Epoch 128/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3963 -
acc: 0.8364: 0s - loss: 0.3997 - acc: 0.
Epoch 129/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3963 -
acc: 0.8358
Epoch 130/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3964 -
acc: 0.8351
Epoch 131/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3958 -
acc: 0.8371
Epoch 132/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3960 -
acc: 0.8365
Epoch 133/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3962 -
acc: 0.8375
Epoch 134/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3964 -
acc: 0.8371
Epoch 135/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3960 -
acc: 0.8362
Epoch 136/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3963 -
acc: 0.8358: 0s - loss: 0.3915 - acc
Epoch 137/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3964 -
acc: 0.8375: 0s - loss: 0.4107 - acc
Epoch 138/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3962 -
acc: 0.8365
Epoch 139/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3961 -
acc: 0.8374: 0s - loss: 0.4106 - a
Epoch 140/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3962 -
acc: 0.8369
Epoch 141/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3956 -
acc: 0.8374
Epoch 142/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3958 -
acc: 0.8371
Epoch 143/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3960 -
acc: 0.8375
Epoch 144/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3962 -
acc: 0.8392
Epoch 145/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3957 -
acc: 0.8376
```

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Epoch 146/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3956 -
acc: 0.8356
Epoch 147/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.3959 -
acc: 0.8368
Epoch 148/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3960 -
acc: 0.8367
Epoch 149/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3956 -
acc: 0.8376
Epoch 150/200
7200/7200 [==============================] - 1s 83us/step - loss: 0.3955 -
acc: 0.8379
Epoch 151/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3952 -
acc: 0.8365
Epoch 152/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3957 -
acc: 0.8362
Epoch 153/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3952 -
acc: 0.8382
Epoch 154/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3955 -
acc: 0.8379
Epoch 155/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3959 -
acc: 0.8382
Epoch 156/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3955 -
acc: 0.8385
Epoch 157/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3956 -
acc: 0.8371
Epoch 158/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3954 -
acc: 0.8364
Epoch 159/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3955 -
acc: 0.8383
Epoch 160/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3952 -
acc: 0.8378
Epoch 161/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3957 -
acc: 0.8375
Epoch 162/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3957 -
acc: 0.8369: 0s - loss: 0.3940 - acc: 0.
Epoch 163/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3954 -
acc: 0.8378
Epoch 164/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3954 -
acc: 0.8378
Epoch 165/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3954 -
acc: 0.8376
Epoch 166/200
```

```
7200/7200 [==============================] - 1s 70us/step - loss: 0.3952 -
acc: 0.8372
Epoch 167/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3947 -
acc: 0.8383
Epoch 168/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3950 -
acc: 0.8376
Epoch 169/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3952 -
acc: 0.8368
Epoch 170/200
7200/7200 [==============================] - 1s 81us/step - loss: 0.3952 -
acc: 0.8368
Epoch 171/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3953 -
acc: 0.8365
Epoch 172/200
7200/7200 [==============================] - 1s 83us/step - loss: 0.3953 -
acc: 0.8374
Epoch 173/200
7200/7200 [==============================] - 1s 80us/step - loss: 0.3952 -
acc: 0.8378
Epoch 174/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.3950 -
acc: 0.8383
Epoch 175/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3952 -
acc: 0.8378
Epoch 176/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3951 -
acc: 0.8382
Epoch 177/200
7200/7200 [==============================] - 1s 83us/step - loss: 0.3950 -
acc: 0.8389
Epoch 178/200
7200/7200 [==============================] - 1s 82us/step - loss: 0.3950 -
acc: 0.8372
Epoch 179/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.3949 -
acc: 0.8381
Epoch 180/200
7200/7200 [==============================] - 1s 86us/step - loss: 0.3956 -
acc: 0.8376
Epoch 181/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.3949 -
acc: 0.8385
Epoch 182/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3955 -
acc: 0.8375
Epoch 183/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3947 -
acc: 0.8374
Epoch 184/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3951 -
acc: 0.8372
Epoch 185/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3952 -
acc: 0.8374
Epoch 186/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3951 -
```

```
acc: 0.8376
Epoch 187/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3954 -
acc: 0.8375
Epoch 188/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3952 -
acc: 0.8369
Epoch 189/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3950 -
acc: 0.8382
Epoch 190/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3951 -
acc: 0.8379
Epoch 191/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3955 -
acc: 0.8368
Epoch 192/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3950 -
acc: 0.8378
Epoch 193/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3949 -
acc: 0.8382
Epoch 194/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3949 -
acc: 0.8392
Epoch 195/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3948 -
acc: 0.8372
Epoch 196/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3948 -
acc: 0.8389
Epoch 197/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3948 -
acc: 0.8385
Epoch 198/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3947 -
acc: 0.8365
Epoch 199/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3952 -
acc: 0.8356
Epoch 200/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3949 -
acc: 0.8386
Epoch 1/200
7200/7200 [==============================] - 2s 270us/step - loss: 0.5568
 - acc: 0.7983
Epoch 2/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.4212 -
acc: 0.8118
Epoch 3/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.4037 -
acc: 0.8264
Epoch 4/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3934 -
acc: 0.8300
Epoch 5/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3853 -
acc: 0.8314
Epoch 6/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3799 -
acc: 0.8322
```

```
Epoch 7/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3753 -
acc: 0.8314
Epoch 8/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3726 -
acc: 0.8396
Epoch 9/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3694 -
acc: 0.8433
Epoch 10/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3671 -
acc: 0.8471
Epoch 11/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3642 -
acc: 0.8504
Epoch 12/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3624 -
acc: 0.8500
Epoch 13/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3605 -
acc: 0.8525
Epoch 14/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3594 -
acc: 0.8524
Epoch 15/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3567 -
acc: 0.8539
Epoch 16/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3559 -
acc: 0.8550
Epoch 17/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3548 -
acc: 0.8561
Epoch 18/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3533 -
acc: 0.8543
Epoch 19/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3532 -
acc: 0.8551
Epoch 20/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3517 -
acc: 0.8569
Epoch 21/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3511 -
acc: 0.8590
Epoch 22/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3508 -
acc: 0.8564
Epoch 23/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3502 -
acc: 0.8571
Epoch 24/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3494 -
acc: 0.8565
Epoch 25/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3490 -
acc: 0.8578
Epoch 26/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3489 -
acc: 0.8557
Epoch 27/200
```

```
7200/7200 [==============================] - 0s 68us/step - loss: 0.3474 -
acc: 0.8593
Epoch 28/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3482 -
acc: 0.8589
Epoch 29/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3469 -
acc: 0.8596
Epoch 30/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3454 -
acc: 0.8579
Epoch 31/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3447 -
acc: 0.8621
Epoch 32/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3456 -
acc: 0.8583
Epoch 33/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3443 -
acc: 0.8592
Epoch 34/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3445 -
acc: 0.8581
Epoch 35/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3436 -
acc: 0.8600
Epoch 36/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3440 -
acc: 0.8610
Epoch 37/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3440 -
acc: 0.8587
Epoch 38/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3440 -
acc: 0.8600
Epoch 39/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3433 -
acc: 0.8612
Epoch 40/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3415 -
acc: 0.8601
Epoch 41/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3404 -
acc: 0.8618
Epoch 42/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3406 -
acc: 0.8593
Epoch 43/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3409 -
acc: 0.8594
Epoch 44/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3404 -
acc: 0.8611
Epoch 45/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3396 -
acc: 0.8625
Epoch 46/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3394 -
acc: 0.8600
Epoch 47/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3398 -
```

```
acc: 0.8618
Epoch 48/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3393 -
acc: 0.8601
Epoch 49/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3389 -
acc: 0.8600
Epoch 50/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3387 -
acc: 0.8619
Epoch 51/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3383 -
acc: 0.8624
Epoch 52/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3387 -
acc: 0.8612
Epoch 53/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3384 -
acc: 0.8632
Epoch 54/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3381 -
acc: 0.8622
Epoch 55/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3380 -
acc: 0.8617
Epoch 56/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3384 -
acc: 0.8607
Epoch 57/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.3389 -
acc: 0.8618
Epoch 58/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3377 -
acc: 0.8615
Epoch 59/200
7200/7200 [==============================] - 1s 84us/step - loss: 0.3379 -
acc: 0.8607
Epoch 60/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3378 -
acc: 0.8618
Epoch 61/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.3375 -
acc: 0.8628
Epoch 62/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3372 -
acc: 0.8637
Epoch 63/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3376 -
acc: 0.8635
Epoch 64/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3370 -
acc: 0.8593
Epoch 65/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3373 -
acc: 0.8628
Epoch 66/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.3373 -
acc: 0.8619
Epoch 67/200
7200/7200 [==============================] - 1s 82us/step - loss: 0.3359 -
acc: 0.8662
```

```
Epoch 68/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3358 -
acc: 0.8625
Epoch 69/200
7200/7200 [==============================] - ETA: 0s - loss: 0.3339 - acc:
0.863 - 1s 77us/step - loss: 0.3361 - acc: 0.8618
Epoch 70/200
7200/7200 [==============================] - 1s 81us/step - loss: 0.3367 -
acc: 0.8639
Epoch 71/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.3365 -
acc: 0.8639
Epoch 72/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3356 -
acc: 0.8615
Epoch 73/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3353 -
acc: 0.8643
Epoch 74/200
7200/7200 [==============================] - 0s 66us/step - loss: 0.3363 -
acc: 0.8618
Epoch 75/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3362 -
acc: 0.8629
Epoch 76/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3360 -
acc: 0.8631
Epoch 77/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3353 -
acc: 0.8626
Epoch 78/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3367 -
acc: 0.8628
Epoch 79/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3359 -
acc: 0.8635
Epoch 80/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3360 -
acc: 0.8643
Epoch 81/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3348 -
acc: 0.8632
Epoch 82/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3355 -
acc: 0.8632
Epoch 83/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3362 -
acc: 0.8618
Epoch 84/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3345 -
acc: 0.8647
Epoch 85/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3349 -
acc: 0.8637
Epoch 86/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3357 -
acc: 0.8631
Epoch 87/200
7200/7200 [==============================] - 1s 79us/step - loss: 0.3349 -
acc: 0.8635
Epoch 88/200
```

```
7200/7200 [==============================] - 1s 86us/step - loss: 0.3348 -
acc: 0.8633
Epoch 89/200
7200/7200 [==============================] - 1s 80us/step - loss: 0.3353 -
acc: 0.8635
Epoch 90/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.3352 -
acc: 0.8636
Epoch 91/200
7200/7200 [==============================] - 1s 90us/step - loss: 0.3348 -
acc: 0.8644
Epoch 92/200
7200/7200 [==============================] - ETA: 0s - loss: 0.3331 - acc:
0.865 - 1s 78us/step - loss: 0.3343 - acc: 0.8651
Epoch 93/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3358 -
acc: 0.8619
Epoch 94/200
7200/7200 [==============================] - 1s 80us/step - loss: 0.3347 -
acc: 0.8647
Epoch 95/200
7200/7200 [==============================] - 1s 82us/step - loss: 0.3353 -
acc: 0.8651
Epoch 96/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.3353 -
acc: 0.8662
Epoch 97/200
7200/7200 [==============================] - 1s 81us/step - loss: 0.3353 -
acc: 0.8629
Epoch 98/200
7200/7200 [==============================] - 1s 96us/step - loss: 0.3342 -
acc: 0.8651
Epoch 99/200
7200/7200 [==============================] - 1s 78us/step - loss: 0.3354 -
acc: 0.8653
Epoch 100/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3346 -
acc: 0.8660
Epoch 101/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3348 -
acc: 0.8647
Epoch 102/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3342 -
acc: 0.8646
Epoch 103/200
7200/7200 [==============================] - 1s 74us/step - loss: 0.3340 -
acc: 0.8632
Epoch 104/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3339 -
acc: 0.8646
Epoch 105/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3343 -
acc: 0.8649
Epoch 106/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3338 -
acc: 0.8639
Epoch 107/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3338 -
acc: 0.8653
Epoch 108/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3340 -
```

```
acc: 0.8642
Epoch 109/200
7200/7200 [==============================] - 1s 73us/step - loss: 0.3340 -
acc: 0.8657
Epoch 110/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3329 -
acc: 0.8654
Epoch 111/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3346 -
acc: 0.8643
Epoch 112/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3340 -
acc: 0.8643
Epoch 113/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3332 -
acc: 0.8664
Epoch 114/200
7200/7200 [==============================] - 1s 72us/step - loss: 0.3350 -
acc: 0.8612
Epoch 115/200
7200/7200 [==============================] - ETA: 0s - loss: 0.3331 - acc:
0.865 - 0s 69us/step - loss: 0.3341 - acc: 0.8654
Epoch 116/200
7200/7200 [==============================] - 0s 69us/step - loss: 0.3350 -
acc: 0.8640
Epoch 117/200
7200/7200 [==============================] - 1s 71us/step - loss: 0.3336 -
acc: 0.8640
Epoch 118/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3349 -
acc: 0.8618
Epoch 119/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3341 -
acc: 0.8647
Epoch 120/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.3330 -
acc: 0.8658
Epoch 121/200
7200/7200 [==============================] - 1s 76us/step - loss: 0.3338 -
acc: 0.8656
Epoch 122/200
7200/7200 [==============================] - 0s 67us/step - loss: 0.3343 -
acc: 0.8636
Epoch 123/200
7200/7200 [==============================] - 1s 70us/step - loss: 0.3343 -
acc: 0.8644
Epoch 124/200
7200/7200 [==============================] - 0s 68us/step - loss: 0.3341 -
acc: 0.8660
Epoch 125/200
7200/7200 [==============================] - 1s 85us/step - loss: 0.3339 -
acc: 0.8646
Epoch 126/200
7200/7200 [==============================] - 0s 65us/step - loss: 0.3341 -
acc: 0.8637
Epoch 127/200
7200/7200 [==============================] - 1s 86us/step - loss: 0.3343 -
acc: 0.8647
Epoch 128/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3342 -
acc: 0.8643
```

```
Epoch 129/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3335 -
acc: 0.8644
Epoch 130/200
7200/7200 [==============================] - 0s 62us/step - loss: 0.3334 -
acc: 0.8654
Epoch 131/200
7200/7200 [==============================] - 1s 77us/step - loss: 0.3335 -
acc: 0.8654
Epoch 132/200
7200/7200 [==============================] - 1s 75us/step - loss: 0.3340 -
acc: 0.8647
Epoch 133/200
7200/7200 [==============================] - 1s 95us/step - loss: 0.3338 -
acc: 0.8635
Epoch 134/200
7200/7200 [==============================] - 1s 81us/step - loss: 0.3332 -
acc: 0.8640
Epoch 135/200
 675/7200 [=>............................] - ETA: 0s - loss: 0.3474 - acc:
0.8622
```

```
---------------------------------------------------------------------------
-
KeyboardInterrupt                         Traceback (most recent call las
t)
<ipython-input-60-b1dca45e7ae4> in <module>
     24                           )
     25
---> 26 grid_search_cv_model = grid_search.fit(X_train, y_train)

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\model_selection\_searc
h.py in fit(self, X, y, groups, **fit_params)
    720                 return results_container[0]
    721
--> 722             self._run_search(evaluate_candidates)
    723
    724         results = results_container[0]

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\model_selection\_searc
h.py in _run_search(self, evaluate_candidates)
   1189     def _run_search(self, evaluate_candidates):
   1190         """Search all candidates in param_grid"""
-> 1191         evaluate_candidates(ParameterGrid(self.param_grid))
   1192
   1193

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\model_selection\_searc
h.py in evaluate_candidates(candidate_params)
    709                                   for parameters, (train, test)
    710                                   in product(candidate_params,
--> 711                                              cv.split(X, y, groups)))
    712
    713                 all_candidate_params.extend(candidate_params)

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\joblib\parall
el.py in __call__(self, iterable)
    918                 self._iterating = self._original_iterator is not N
one
    919
--> 920             while self.dispatch_one_batch(iterator):
    921                 pass
    922

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\joblib\parall
el.py in dispatch_one_batch(self, iterator)
    757                 return False
    758             else:
--> 759                 self._dispatch(tasks)
    760                 return True
    761

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\joblib\parall
el.py in _dispatch(self, batch)
    714         with self._lock:
    715             job_idx = len(self._jobs)
--> 716             job = self._backend.apply_async(batch, callback=cb)
    717             # A job can complete so quickly than its callback is
    718             # called before we get here, causing self._jobs to

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\joblib\_paral
lel_backends.py in apply_async(self, func, callback)
    180     def apply_async(self, func, callback=None):
```

```
    181         """Schedule a func to be run"""
--> 182         result = ImmediateResult(func)
    183         if callback:
    184             callback(result)

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\joblib\_paral
lel_backends.py in __init__(self, batch)
    547         # Don't delay the application, to avoid keeping the input
    548         # arguments in memory
--> 549         self.results = batch()
    550
    551     def get(self):

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\joblib\parall
el.py in __call__(self)
    223         with parallel_backend(self._backend, n_jobs=self._n_jobs):
    224             return [func(*args, **kwargs)
--> 225                     for func, args, kwargs in self.items]
    226
    227     def __len__(self):

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\externals\joblib\parall
el.py in <listcomp>(.0)
    223         with parallel_backend(self._backend, n_jobs=self._n_jobs):
    224             return [func(*args, **kwargs)
--> 225                     for func, args, kwargs in self.items]
    226
    227     def __len__(self):

C:\ProgramData\Anaconda3\lib\site-packages\sklearn\model_selection\_valida
tion.py in _fit_and_score(estimator, X, y, scorer, train, test, verbose, p
arameters, fit_params, return_train_score, return_parameters, return_n_tes
t_samples, return_times, return_estimator, error_score)
    526             estimator.fit(X_train, **fit_params)
    527         else:
--> 528             estimator.fit(X_train, y_train, **fit_params)
    529
    530     except Exception as e:

C:\ProgramData\Anaconda3\lib\site-packages\keras\wrappers\scikit_learn.py
 in fit(self, x, y, sample_weight, **kwargs)
    208         if sample_weight is not None:
    209             kwargs['sample_weight'] = sample_weight
--> 210         return super(KerasClassifier, self).fit(x, y, **kwargs)
    211
    212     def predict(self, x, **kwargs):

C:\ProgramData\Anaconda3\lib\site-packages\keras\wrappers\scikit_learn.py
 in fit(self, x, y, **kwargs)
    150         fit_args.update(kwargs)
    151
--> 152         history = self.model.fit(x, y, **fit_args)
    153
    154         return history

C:\ProgramData\Anaconda3\lib\site-packages\keras\engine\training.py in fit
(self, x, y, batch_size, epochs, verbose, callbacks, validation_split, val
idation_data, shuffle, class_weight, sample_weight, initial_epoch, steps_p
er_epoch, validation_steps, **kwargs)
   1037                                         initial_epoch=initial_epoc
h,
```

```
   1038                                    steps_per_epoch=steps_per_
epoch,
-> 1039                                    validation_steps=validatio
n_steps)
   1040
   1041     def evaluate(self, x=None, y=None,

C:\ProgramData\Anaconda3\lib\site-packages\keras\engine\training_arrays.py
in fit_loop(model, f, ins, out_labels, batch_size, epochs, verbose, callba
cks, val_f, val_ins, shuffle, callback_metrics, initial_epoch, steps_per_e
poch, validation_steps)
    193                 batch_logs['batch'] = batch_index
    194                 batch_logs['size'] = len(batch_ids)
--> 195                 callbacks.on_batch_begin(batch_index, batch_logs)
    196                 for i in indices_for_conversion_to_dense:
    197                     ins_batch[i] = ins_batch[i].toarray()

C:\ProgramData\Anaconda3\lib\site-packages\keras\callbacks.py in on_batch_
begin(self, batch, logs)
     91             callback.on_batch_begin(batch, logs)
     92         self._delta_ts_batch_begin.append(time.time() - t_before_c
allbacks)
---> 93         delta_t_median = np.median(self._delta_ts_batch_begin)
     94         if (self._delta_t_batch > 0. and
     95            delta_t_median > 0.95 * self._delta_t_batch and

C:\ProgramData\Anaconda3\lib\site-packages\numpy\lib\function_base.py in m
edian(a, axis, out, overwrite_input, keepdims)
   3334     """
   3335     r, k = _ureduce(a, func=_median, axis=axis, out=out,
-> 3336                     overwrite_input=overwrite_input)
   3337     if keepdims:
   3338         return r.reshape(k)

C:\ProgramData\Anaconda3\lib\site-packages\numpy\lib\function_base.py in _
ureduce(a, func, **kwargs)
   3248         keepdim = (1,) * a.ndim
   3249
-> 3250     r = func(a, **kwargs)
   3251     return r, keepdim
   3252

C:\ProgramData\Anaconda3\lib\site-packages\numpy\lib\function_base.py in _
median(a, axis, out, overwrite_input)
   3367             part = a
   3368     else:
-> 3369         part = partition(a, kth, axis=axis)
   3370
   3371     if part.shape == ():

C:\ProgramData\Anaconda3\lib\site-packages\numpy\core\fromnumeric.py in pa
rtition(a, kth, axis, kind, order)
    686     else:
    687         a = asanyarray(a).copy(order="K")
--> 688     a.partition(kth, axis=axis, kind=kind, order=order)
    689     return a
    690

KeyboardInterrupt:
```

I intentionally stop training the above model as it takes more than 4 hrs.
I have already trained this model, refer to the attached another notebook's html to see the result of the above training (why just HTML?? because the size of notebook is too big)

In [ ]:

```
# best parameters for optimal model

grid_search_cv_model.best_params_
```

In [ ]:

```
# best score of acc at this best configuration of hyperparameters

grid_search_cv_model.best_score_
```