Casey Masamitsu | Week 9 | MLNN Assignment

Neural Networks - intro

Part 1 - XOR

1. Using the XOR dataset below, train (400 epochs) a neural network (NN) using 1, 2, 3, 4, and 5 hidden layers (where each layer has only 2 neurons). For each n layers, store the resulting loss score along with n. Plot the results to find what the optimal number of layers is.
2. Repeat the above with 3 neurons in each Hidden layers. How do these results compare to the 2 neuron layers?
3. Repeat the above with 4 neurons in each Hidden layers. How do these results compare to the 2 and 3 neuron layers?
4. Using the most optimal configuraion (n-layers, k-neurons per layer), compare how `tanh`, `sigmoid`, `softplus` and `relu` effect the loss after 400 epochs. Try other Activation functions as well (https://keras.io/activations/)
5. Again with the most optimal setup, try other optimizers (instead of `SGD`) and report on the loss score. (https://keras.io/optimizers/)

Part 2 - BYOD (Bring your own Dataset)

Using your own dataset, experiment and find the best Neural Network configuration. You may use any resource to improve results, just reference it.

While you may use any dataset, I'd prefer you didn't use the diabetes dataset used in the lesson.

https://stackoverflow.com/questions/34673164/how-to-train-and-tune-an-artificial-multilayer-perceptron-neural-network-using-k

https://keras.io/

In [2]:
```
!pip3 install tensorflow keras
```

```
Requirement already satisfied: tensorflow in c:\users\cneub\desktop\mlnn-masamitsu\ve
nv\lib\site-packages (2.8.0)
Requirement already satisfied: keras in c:\users\cneub\desktop\mlnn-masamitsu\venv\li
b\site-packages (2.8.0)
Requirement already satisfied: setuptools in c:\users\cneub\desktop\mlnn-masamitsu\ve
nv\lib\site-packages (from tensorflow) (57.0.0)
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\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages (from tensorflow) (2.8.0.dev2021
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Requirement already satisfied: h5py>=2.9.0 in c:\users\cneub\desktop\mlnn-masamitsu\v
env\lib\site-packages (from tensorflow) (3.6.0)
Requirement already satisfied: wrapt>=1.11.0 in c:\users\cneub\desktop\mlnn-masamitsu
\venv\lib\site-packages (from tensorflow) (1.14.0)
Requirement already satisfied: flatbuffers>=1.12 in c:\users\cneub\desktop\mlnn-masam
itsu\venv\lib\site-packages (from tensorflow) (2.0)
Requirement already satisfied: tensorboard<2.9,>=2.8 in c:\users\cneub\desktop\mlnn-m
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Requirement already satisfied: gast>=0.2.1 in c:\users\cneub\desktop\mlnn-masamitsu\v
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tsu\venv\lib\site-packages (from tensorflow) (1.1.0)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in c:\users\cneub
\desktop\mlnn-masamitsu\venv\lib\site-packages (from tensorflow) (0.24.0)
Requirement already satisfied: numpy>=1.20 in c:\users\cneub\desktop\mlnn-masamitsu\v
env\lib\site-packages (from tensorflow) (1.22.1)
Requirement already satisfied: opt-einsum>=2.3.2 in c:\users\cneub\desktop\mlnn-masam
itsu\venv\lib\site-packages (from tensorflow) (3.3.0)
Requirement already satisfied: six>=1.12.0 in c:\users\cneub\desktop\mlnn-masamitsu\v
env\lib\site-packages (from tensorflow) (1.16.0)
Requirement already satisfied: absl-py>=0.4.0 in c:\users\cneub\desktop\mlnn-masamits
u\venv\lib\site-packages (from tensorflow) (1.0.0)
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amitsu\venv\lib\site-packages (from tensorflow) (1.44.0)
Requirement already satisfied: typing-extensions>=3.6.6 in c:\users\cneub\desktop\mln
n-masamitsu\venv\lib\site-packages (from tensorflow) (4.0.1)
Requirement already satisfied: libclang>=9.0.1 in c:\users\cneub\desktop\mlnn-masamit
su\venv\lib\site-packages (from tensorflow) (13.0.0)
Requirement already satisfied: keras-preprocessing>=1.1.1 in c:\users\cneub\desktop\m
lnn-masamitsu\venv\lib\site-packages (from tensorflow) (1.1.2)
Requirement already satisfied: astunparse>=1.6.0 in c:\users\cneub\desktop\mlnn-masam
itsu\venv\lib\site-packages (from tensorflow) (1.6.3)
Requirement already satisfied: protobuf>=3.9.2 in c:\users\cneub\desktop\mlnn-masamit
su\venv\lib\site-packages (from tensorflow) (3.20.0)
Requirement already satisfied: wheel<1.0,>=0.23.0 in c:\users\cneub\desktop\mlnn-masa
mitsu\venv\lib\site-packages (from astunparse>=1.6.0->tensorflow) (0.36.2)
Requirement already satisfied: tensorboard-data-server<0.7.0,>=0.6.0 in c:\users\cneu
b\desktop\mlnn-masamitsu\venv\lib\site-packages (from tensorboard<2.9,>=2.8->tensorfl
ow) (0.6.1)
Requirement already satisfied: requests<3,>=2.21.0 in c:\users\cneub\desktop\mlnn-mas
amitsu\venv\lib\site-packages (from tensorboard<2.9,>=2.8->tensorflow) (2.27.1)
Requirement already satisfied: tensorboard-plugin-wit>=1.6.0 in c:\users\cneub\deskto
p\mlnn-masamitsu\venv\lib\site-packages (from tensorboard<2.9,>=2.8->tensorflow) (1.
8.1)
Requirement already satisfied: markdown>=2.6.8 in c:\users\cneub\desktop\mlnn-masamit
su\venv\lib\site-packages (from tensorboard<2.9,>=2.8->tensorflow) (3.3.6)
Requirement already satisfied: google-auth-oauthlib<0.5,>=0.4.1 in c:\users\cneub\des
ktop\mlnn-masamitsu\venv\lib\site-packages (from tensorboard<2.9,>=2.8->tensorflow)
(0.4.6)
```

```
Requirement already satisfied: google-auth<3,>=1.6.3 in c:\users\cneub\desktop\mlnn-m
asamitsu\venv\lib\site-packages (from tensorboard<2.9,>=2.8->tensorflow) (2.6.2)
Requirement already satisfied: werkzeug>=0.11.15 in c:\users\cneub\desktop\mlnn-masam
itsu\venv\lib\site-packages (from tensorboard<2.9,>=2.8->tensorflow) (2.1.1)
Requirement already satisfied: rsa<5,>=3.1.4 in c:\users\cneub\desktop\mlnn-masamitsu
\venv\lib\site-packages (from google-auth<3,>=1.6.3->tensorboard<2.9,>=2.8->tensorflo
w) (4.8)
Requirement already satisfied: cachetools<6.0,>=2.0.0 in c:\users\cneub\desktop\mlnn-
masamitsu\venv\lib\site-packages (from google-auth<3,>=1.6.3->tensorboard<2.9,>=2.8->
tensorflow) (5.0.0)
Requirement already satisfied: pyasn1-modules>=0.2.1 in c:\users\cneub\desktop\mlnn-m
asamitsu\venv\lib\site-packages (from google-auth<3,>=1.6.3->tensorboard<2.9,>=2.8->t
ensorflow) (0.2.8)
Requirement already satisfied: requests-oauthlib>=0.7.0 in c:\users\cneub\desktop\mln
n-masamitsu\venv\lib\site-packages (from google-auth-oauthlib<0.5,>=0.4.1->tensorboar
d<2.9,>=2.8->tensorflow) (1.3.1)
Requirement already satisfied: pyasn1<0.5.0,>=0.4.6 in c:\users\cneub\desktop\mlnn-ma
samitsu\venv\lib\site-packages (from pyasn1-modules>=0.2.1->google-auth<3,>=1.6.3->te
nsorboard<2.9,>=2.8->tensorflow) (0.4.8)
Requirement already satisfied: charset-normalizer~=2.0.0 in c:\users\cneub\desktop\ml
nn-masamitsu\venv\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.9,>=2.8-
>tensorflow) (2.0.12)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\cneub\desktop\mlnn-masa
mitsu\venv\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.9,>=2.8->tensor
flow) (2021.10.8)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\cneub\desktop\mlnn-m
asamitsu\venv\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.9,>=2.8->ten
sorflow) (1.26.9)
Requirement already satisfied: idna<4,>=2.5 in c:\users\cneub\desktop\mlnn-masamitsu
\venv\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.9,>=2.8->tensorflow)
(3.3)
Requirement already satisfied: oauthlib>=3.0.0 in c:\users\cneub\desktop\mlnn-masamit
su\venv\lib\site-packages (from requests-oauthlib>=0.7.0->google-auth-oauthlib<0.5,>=
0.4.1->tensorboard<2.9,>=2.8->tensorflow) (3.2.0)
WARNING: You are using pip version 21.1.2; however, version 22.0.4 is available.
You should consider upgrading via the 'C:\Users\cneub\Desktop\mlnn-masamitsu\venv\Scr
ipts\python.exe -m pip install --upgrade pip' command.
```

In [20]:
```python
from keras.models import Sequential
from keras.layers import Dense
from tensorflow.keras.optimizers import SGD  #Stochastic Gradient Descent

import numpy as np
# fix random seed for reproducibility
np.random.seed(7)

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

In [21]:
```python
n = 40
xx = np.random.random((n,1))
yy = np.random.random((n,1))
```

In [22]:
```python
X = np.array([np.array([xx,-xx,-xx,xx]),np.array([yy,-yy,yy,-yy])]).reshape(2,4*n).T
y = np.array([np.ones([2*n]),np.zeros([2*n])]).reshape(4*n)
```

In [23]:
```python
plt.scatter(*zip(*X), c=y)
```

Out[23]:
```
<matplotlib.collections.PathCollection at 0x180c9c4b850>
```


In [68]:
```python
num_layers = [1,2,3,4,5]
scores = []
for num_layer in num_layers:
    if num_layer == 1:
        model = Sequential()
        model.add(Dense(2, input_dim = 2, activation = 'tanh'))
        model.add(Dense(1, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accu
        model.fit(X, y, batch_size = 2, epochs = 400)
    if num_layer == 2:
        model = Sequential()
        model.add(Dense(2, input_dim = 2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(1, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accu
        model.fit(X, y, batch_size = 2, epochs = 400)
    if num_layer == 3:
        model = Sequential()
        model.add(Dense(2, input_dim = 2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(1, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accu
        model.fit(X, y, batch_size = 2, epochs = 400)
    if num_layer == 4:
        model = Sequential()
        model.add(Dense(2, input_dim = 2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(1, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accu
        model.fit(X, y, batch_size = 2, epochs = 400)
    if num_layer == 5:
        model = Sequential()
```

```python
        model.add(Dense(2, input_dim = 2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(2, activation = 'tanh'))
        model.add(Dense(1, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accu
        model.fit(X, y, batch_size = 2, epochs = 400)

    score = model.evaluate(X, y)
    scores.append(score)
```

```
Epoch 1/400
80/80 [==============================] - 0s 581us/step - loss: 0.6985 - accuracy: 0.4
875
Epoch 2/400
80/80 [==============================] - 0s 568us/step - loss: 0.6975 - accuracy: 0.5
750
Epoch 3/400
80/80 [==============================] - 0s 597us/step - loss: 0.6971 - accuracy: 0.4
625
Epoch 4/400
80/80 [==============================] - 0s 543us/step - loss: 0.6967 - accuracy: 0.5
437
Epoch 5/400
80/80 [==============================] - 0s 543us/step - loss: 0.6962 - accuracy: 0.4
750
Epoch 6/400
80/80 [==============================] - 0s 543us/step - loss: 0.6961 - accuracy: 0.4
938
Epoch 7/400
80/80 [==============================] - 0s 568us/step - loss: 0.6958 - accuracy: 0.5
000
Epoch 8/400
80/80 [==============================] - 0s 555us/step - loss: 0.6954 - accuracy: 0.4
938
Epoch 9/400
80/80 [==============================] - 0s 568us/step - loss: 0.6949 - accuracy: 0.3
875
Epoch 10/400
80/80 [==============================] - 0s 555us/step - loss: 0.6948 - accuracy: 0.4
625
Epoch 11/400
80/80 [==============================] - 0s 555us/step - loss: 0.6947 - accuracy: 0.5
375
Epoch 12/400
80/80 [==============================] - 0s 581us/step - loss: 0.6946 - accuracy: 0.5
063
Epoch 13/400
80/80 [==============================] - 0s 581us/step - loss: 0.6945 - accuracy: 0.5
437
Epoch 14/400
80/80 [==============================] - 0s 568us/step - loss: 0.6941 - accuracy: 0.4
563
Epoch 15/400
80/80 [==============================] - 0s 543us/step - loss: 0.6942 - accuracy: 0.5
312
Epoch 16/400
80/80 [==============================] - 0s 555us/step - loss: 0.6937 - accuracy: 0.5
312
Epoch 17/400
80/80 [==============================] - 0s 555us/step - loss: 0.6938 - accuracy: 0.4
500
Epoch 18/400
80/80 [==============================] - 0s 631us/step - loss: 0.6936 - accuracy: 0.5
188
Epoch 19/400
80/80 [==============================] - 0s 555us/step - loss: 0.6933 - accuracy: 0.5
688
Epoch 20/400
80/80 [==============================] - 0s 555us/step - loss: 0.6933 - accuracy: 0.5
500
```

```
Epoch 21/400
80/80 [==============================] - 0s 530us/step - loss: 0.6928 - accuracy: 0.4
437
Epoch 22/400
80/80 [==============================] - 0s 554us/step - loss: 0.6930 - accuracy: 0.4
563
Epoch 23/400
80/80 [==============================] - 0s 593us/step - loss: 0.6927 - accuracy: 0.4
875
Epoch 24/400
80/80 [==============================] - 0s 592us/step - loss: 0.6924 - accuracy: 0.4
688
Epoch 25/400
80/80 [==============================] - 0s 581us/step - loss: 0.6924 - accuracy: 0.5
250
Epoch 26/400
80/80 [==============================] - 0s 581us/step - loss: 0.6922 - accuracy: 0.5
063
Epoch 27/400
80/80 [==============================] - 0s 555us/step - loss: 0.6920 - accuracy: 0.5
437
Epoch 28/400
80/80 [==============================] - 0s 543us/step - loss: 0.6918 - accuracy: 0.4
938
Epoch 29/400
80/80 [==============================] - 0s 537us/step - loss: 0.6917 - accuracy: 0.5
188
Epoch 30/400
80/80 [==============================] - 0s 581us/step - loss: 0.6916 - accuracy: 0.5
188
Epoch 31/400
80/80 [==============================] - 0s 532us/step - loss: 0.6912 - accuracy: 0.4
688
Epoch 32/400
80/80 [==============================] - 0s 530us/step - loss: 0.6909 - accuracy: 0.5
437
Epoch 33/400
80/80 [==============================] - 0s 546us/step - loss: 0.6906 - accuracy: 0.5
125
Epoch 34/400
80/80 [==============================] - 0s 543us/step - loss: 0.6903 - accuracy: 0.5
188
Epoch 35/400
80/80 [==============================] - 0s 546us/step - loss: 0.6900 - accuracy: 0.5
125
Epoch 36/400
80/80 [==============================] - 0s 543us/step - loss: 0.6898 - accuracy: 0.5
063
Epoch 37/400
80/80 [==============================] - 0s 534us/step - loss: 0.6894 - accuracy: 0.5
063
Epoch 38/400
80/80 [==============================] - 0s 619us/step - loss: 0.6890 - accuracy: 0.5
125
Epoch 39/400
80/80 [==============================] - 0s 631us/step - loss: 0.6886 - accuracy: 0.4
812
Epoch 40/400
80/80 [==============================] - 0s 631us/step - loss: 0.6882 - accuracy: 0.5
250
```

```
Epoch 41/400
80/80 [==============================] - 0s 581us/step - loss: 0.6878 - accuracy: 0.4
875
Epoch 42/400
80/80 [==============================] - 0s 619us/step - loss: 0.6872 - accuracy: 0.5
500
Epoch 43/400
80/80 [==============================] - 0s 694us/step - loss: 0.6868 - accuracy: 0.5
063
Epoch 44/400
80/80 [==============================] - 0s 619us/step - loss: 0.6861 - accuracy: 0.4
812
Epoch 45/400
80/80 [==============================] - 0s 808us/step - loss: 0.6857 - accuracy: 0.4
938
Epoch 46/400
80/80 [==============================] - 0s 619us/step - loss: 0.6851 - accuracy: 0.5
125
Epoch 47/400
80/80 [==============================] - 0s 619us/step - loss: 0.6846 - accuracy: 0.5
125
Epoch 48/400
80/80 [==============================] - 0s 593us/step - loss: 0.6837 - accuracy: 0.5
188
Epoch 49/400
80/80 [==============================] - 0s 606us/step - loss: 0.6833 - accuracy: 0.5
000
Epoch 50/400
80/80 [==============================] - 0s 593us/step - loss: 0.6821 - accuracy: 0.5
063
Epoch 51/400
80/80 [==============================] - 0s 555us/step - loss: 0.6815 - accuracy: 0.5
500
Epoch 52/400
80/80 [==============================] - 0s 555us/step - loss: 0.6806 - accuracy: 0.5
250
Epoch 53/400
80/80 [==============================] - 0s 581us/step - loss: 0.6798 - accuracy: 0.5
375
Epoch 54/400
80/80 [==============================] - 0s 555us/step - loss: 0.6790 - accuracy: 0.5
125
Epoch 55/400
80/80 [==============================] - 0s 543us/step - loss: 0.6776 - accuracy: 0.5
125
Epoch 56/400
80/80 [==============================] - 0s 568us/step - loss: 0.6766 - accuracy: 0.5
312
Epoch 57/400
80/80 [==============================] - 0s 543us/step - loss: 0.6756 - accuracy: 0.5
000
Epoch 58/400
80/80 [==============================] - 0s 555us/step - loss: 0.6745 - accuracy: 0.5
250
Epoch 59/400
80/80 [==============================] - 0s 543us/step - loss: 0.6731 - accuracy: 0.5
250
Epoch 60/400
80/80 [==============================] - 0s 535us/step - loss: 0.6718 - accuracy: 0.5
312
```

```
Epoch 61/400
80/80 [==============================] - 0s 543us/step - loss: 0.6706 - accuracy: 0.5
312
Epoch 62/400
80/80 [==============================] - 0s 575us/step - loss: 0.6691 - accuracy: 0.5
250
Epoch 63/400
80/80 [==============================] - 0s 555us/step - loss: 0.6677 - accuracy: 0.5
312
Epoch 64/400
80/80 [==============================] - 0s 543us/step - loss: 0.6660 - accuracy: 0.5
250
Epoch 65/400
80/80 [==============================] - 0s 543us/step - loss: 0.6644 - accuracy: 0.5
125
Epoch 66/400
80/80 [==============================] - 0s 555us/step - loss: 0.6628 - accuracy: 0.5
250
Epoch 67/400
80/80 [==============================] - 0s 568us/step - loss: 0.6611 - accuracy: 0.5
250
Epoch 68/400
80/80 [==============================] - 0s 557us/step - loss: 0.6593 - accuracy: 0.5
188
Epoch 69/400
80/80 [==============================] - 0s 530us/step - loss: 0.6575 - accuracy: 0.5
250
Epoch 70/400
80/80 [==============================] - 0s 555us/step - loss: 0.6557 - accuracy: 0.5
188
Epoch 71/400
80/80 [==============================] - 0s 561us/step - loss: 0.6535 - accuracy: 0.5
375
Epoch 72/400
80/80 [==============================] - 0s 530us/step - loss: 0.6518 - accuracy: 0.5
188
Epoch 73/400
80/80 [==============================] - 0s 538us/step - loss: 0.6496 - accuracy: 0.5
437
Epoch 74/400
80/80 [==============================] - 0s 593us/step - loss: 0.6473 - accuracy: 0.5
250
Epoch 75/400
80/80 [==============================] - 0s 554us/step - loss: 0.6453 - accuracy: 0.5
312
Epoch 76/400
80/80 [==============================] - 0s 530us/step - loss: 0.6429 - accuracy: 0.5
125
Epoch 77/400
80/80 [==============================] - 0s 543us/step - loss: 0.6409 - accuracy: 0.5
437
Epoch 78/400
80/80 [==============================] - 0s 555us/step - loss: 0.6383 - accuracy: 0.5
312
Epoch 79/400
80/80 [==============================] - 0s 555us/step - loss: 0.6364 - accuracy: 0.5
375
Epoch 80/400
80/80 [==============================] - 0s 543us/step - loss: 0.6339 - accuracy: 0.5
500
```

```
Epoch 81/400
80/80 [==============================] - 0s 568us/step - loss: 0.6315 - accuracy: 0.5
250
Epoch 82/400
80/80 [==============================] - 0s 556us/step - loss: 0.6291 - accuracy: 0.5
188
Epoch 83/400
80/80 [==============================] - 0s 543us/step - loss: 0.6266 - accuracy: 0.5
375
Epoch 84/400
80/80 [==============================] - 0s 581us/step - loss: 0.6242 - accuracy: 0.5
562
Epoch 85/400
80/80 [==============================] - 0s 555us/step - loss: 0.6215 - accuracy: 0.5
688
Epoch 86/400
80/80 [==============================] - 0s 543us/step - loss: 0.6195 - accuracy: 0.5
500
Epoch 87/400
80/80 [==============================] - 0s 581us/step - loss: 0.6168 - accuracy: 0.5
625
Epoch 88/400
80/80 [==============================] - 0s 569us/step - loss: 0.6142 - accuracy: 0.5
437
Epoch 89/400
80/80 [==============================] - 0s 555us/step - loss: 0.6117 - accuracy: 0.5
312
Epoch 90/400
80/80 [==============================] - 0s 530us/step - loss: 0.6091 - accuracy: 0.5
813
Epoch 91/400
80/80 [==============================] - 0s 555us/step - loss: 0.6065 - accuracy: 0.5
437
Epoch 92/400
80/80 [==============================] - 0s 555us/step - loss: 0.6037 - accuracy: 0.5
250
Epoch 93/400
80/80 [==============================] - 0s 543us/step - loss: 0.6017 - accuracy: 0.5
562
Epoch 94/400
80/80 [==============================] - 0s 543us/step - loss: 0.5988 - accuracy: 0.5
750
Epoch 95/400
80/80 [==============================] - 0s 543us/step - loss: 0.5963 - accuracy: 0.5
813
Epoch 96/400
80/80 [==============================] - 0s 543us/step - loss: 0.5939 - accuracy: 0.5
375
Epoch 97/400
80/80 [==============================] - 0s 555us/step - loss: 0.5914 - accuracy: 0.5
500
Epoch 98/400
80/80 [==============================] - 0s 555us/step - loss: 0.5893 - accuracy: 0.5
813
Epoch 99/400
80/80 [==============================] - 0s 530us/step - loss: 0.5863 - accuracy: 0.5
688
Epoch 100/400
80/80 [==============================] - 0s 530us/step - loss: 0.5845 - accuracy: 0.5
375
```

```
Epoch 101/400
80/80 [==============================] - 0s 543us/step - loss: 0.5819 - accuracy: 0.5
312
Epoch 102/400
80/80 [==============================] - 0s 543us/step - loss: 0.5794 - accuracy: 0.5
688
Epoch 103/400
80/80 [==============================] - 0s 543us/step - loss: 0.5771 - accuracy: 0.5
375
Epoch 104/400
80/80 [==============================] - 0s 564us/step - loss: 0.5751 - accuracy: 0.5
500
Epoch 105/400
80/80 [==============================] - 0s 568us/step - loss: 0.5725 - accuracy: 0.5
875
Epoch 106/400
80/80 [==============================] - 0s 556us/step - loss: 0.5707 - accuracy: 0.5
562
Epoch 107/400
80/80 [==============================] - 0s 555us/step - loss: 0.5683 - accuracy: 0.5
063
Epoch 108/400
80/80 [==============================] - 0s 543us/step - loss: 0.5662 - accuracy: 0.5
500
Epoch 109/400
80/80 [==============================] - 0s 543us/step - loss: 0.5640 - accuracy: 0.5
375
Epoch 110/400
80/80 [==============================] - 0s 543us/step - loss: 0.5619 - accuracy: 0.5
250
Epoch 111/400
80/80 [==============================] - 0s 530us/step - loss: 0.5598 - accuracy: 0.5
375
Epoch 112/400
80/80 [==============================] - 0s 555us/step - loss: 0.5578 - accuracy: 0.5
125
Epoch 113/400
80/80 [==============================] - 0s 555us/step - loss: 0.5561 - accuracy: 0.5
625
Epoch 114/400
80/80 [==============================] - 0s 543us/step - loss: 0.5539 - accuracy: 0.5
250
Epoch 115/400
80/80 [==============================] - 0s 568us/step - loss: 0.5521 - accuracy: 0.5
500
Epoch 116/400
80/80 [==============================] - 0s 530us/step - loss: 0.5504 - accuracy: 0.5
500
Epoch 117/400
80/80 [==============================] - 0s 543us/step - loss: 0.5485 - accuracy: 0.5
562
Epoch 118/400
80/80 [==============================] - 0s 543us/step - loss: 0.5466 - accuracy: 0.5
063
Epoch 119/400
80/80 [==============================] - 0s 530us/step - loss: 0.5446 - accuracy: 0.5
250
Epoch 120/400
80/80 [==============================] - 0s 543us/step - loss: 0.5432 - accuracy: 0.5
188
```

```
Epoch 121/400
80/80 [==============================] - 0s 555us/step - loss: 0.5414 - accuracy: 0.5
250
Epoch 122/400
80/80 [==============================] - 0s 543us/step - loss: 0.5398 - accuracy: 0.5
500
Epoch 123/400
80/80 [==============================] - 0s 555us/step - loss: 0.5382 - accuracy: 0.5
188
Epoch 124/400
80/80 [==============================] - 0s 543us/step - loss: 0.5365 - accuracy: 0.5
312
Epoch 125/400
80/80 [==============================] - 0s 593us/step - loss: 0.5348 - accuracy: 0.5
562
Epoch 126/400
80/80 [==============================] - 0s 593us/step - loss: 0.5336 - accuracy: 0.5
875
Epoch 127/400
80/80 [==============================] - 0s 544us/step - loss: 0.5321 - accuracy: 0.5
063
Epoch 128/400
80/80 [==============================] - 0s 530us/step - loss: 0.5305 - accuracy: 0.5
437
Epoch 129/400
80/80 [==============================] - 0s 543us/step - loss: 0.5291 - accuracy: 0.5
562
Epoch 130/400
80/80 [==============================] - 0s 556us/step - loss: 0.5277 - accuracy: 0.5
437
Epoch 131/400
80/80 [==============================] - 0s 543us/step - loss: 0.5264 - accuracy: 0.5
688
Epoch 132/400
80/80 [==============================] - 0s 543us/step - loss: 0.5250 - accuracy: 0.5
188
Epoch 133/400
80/80 [==============================] - 0s 543us/step - loss: 0.5239 - accuracy: 0.5
437
Epoch 134/400
80/80 [==============================] - 0s 543us/step - loss: 0.5227 - accuracy: 0.5
250
Epoch 135/400
80/80 [==============================] - 0s 543us/step - loss: 0.5211 - accuracy: 0.5
437
Epoch 136/400
80/80 [==============================] - 0s 543us/step - loss: 0.5201 - accuracy: 0.5
875
Epoch 137/400
80/80 [==============================] - 0s 568us/step - loss: 0.5188 - accuracy: 0.5
375
Epoch 138/400
80/80 [==============================] - 0s 555us/step - loss: 0.5176 - accuracy: 0.5
625
Epoch 139/400
80/80 [==============================] - 0s 542us/step - loss: 0.5164 - accuracy: 0.5
875
Epoch 140/400
80/80 [==============================] - 0s 568us/step - loss: 0.5153 - accuracy: 0.5
375
```

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Epoch 141/400
80/80 [==============================] - 0s 543us/step - loss: 0.5142 - accuracy: 0.5
562
Epoch 142/400
80/80 [==============================] - 0s 581us/step - loss: 0.5129 - accuracy: 0.5
750
Epoch 143/400
80/80 [==============================] - 0s 530us/step - loss: 0.5121 - accuracy: 0.5
000
Epoch 144/400
80/80 [==============================] - 0s 543us/step - loss: 0.5113 - accuracy: 0.5
312
Epoch 145/400
80/80 [==============================] - 0s 568us/step - loss: 0.5101 - accuracy: 0.5
250
Epoch 146/400
80/80 [==============================] - 0s 543us/step - loss: 0.5090 - accuracy: 0.5
188
Epoch 147/400
80/80 [==============================] - 0s 543us/step - loss: 0.5077 - accuracy: 0.5
750
Epoch 148/400
80/80 [==============================] - 0s 530us/step - loss: 0.5071 - accuracy: 0.5
250
Epoch 149/400
80/80 [==============================] - 0s 555us/step - loss: 0.5064 - accuracy: 0.5
375
Epoch 150/400
80/80 [==============================] - 0s 581us/step - loss: 0.5053 - accuracy: 0.5
750
Epoch 151/400
80/80 [==============================] - 0s 530us/step - loss: 0.5045 - accuracy: 0.5
750
Epoch 152/400
80/80 [==============================] - 0s 543us/step - loss: 0.5036 - accuracy: 0.5
250
Epoch 153/400
80/80 [==============================] - 0s 555us/step - loss: 0.5024 - accuracy: 0.5
750
Epoch 154/400
80/80 [==============================] - 0s 543us/step - loss: 0.5020 - accuracy: 0.5
312
Epoch 155/400
80/80 [==============================] - 0s 530us/step - loss: 0.5009 - accuracy: 0.5
375
Epoch 156/400
80/80 [==============================] - 0s 543us/step - loss: 0.5001 - accuracy: 0.5
500
Epoch 157/400
80/80 [==============================] - 0s 543us/step - loss: 0.4994 - accuracy: 0.5
125
Epoch 158/400
80/80 [==============================] - 0s 530us/step - loss: 0.4984 - accuracy: 0.5
750
Epoch 159/400
80/80 [==============================] - 0s 555us/step - loss: 0.4977 - accuracy: 0.5
813
Epoch 160/400
80/80 [==============================] - 0s 543us/step - loss: 0.4968 - accuracy: 0.5
813
```

```
Epoch 161/400
80/80 [==============================] - 0s 530us/step - loss: 0.4963 - accuracy: 0.5
312
Epoch 162/400
80/80 [==============================] - 0s 555us/step - loss: 0.4954 - accuracy: 0.5
750
Epoch 163/400
80/80 [==============================] - 0s 530us/step - loss: 0.4948 - accuracy: 0.4
938
Epoch 164/400
80/80 [==============================] - 0s 530us/step - loss: 0.4943 - accuracy: 0.5
188
Epoch 165/400
80/80 [==============================] - 0s 532us/step - loss: 0.4937 - accuracy: 0.5
625
Epoch 166/400
80/80 [==============================] - 0s 543us/step - loss: 0.4927 - accuracy: 0.5
688
Epoch 167/400
80/80 [==============================] - 0s 518us/step - loss: 0.4923 - accuracy: 0.5
625
Epoch 168/400
80/80 [==============================] - 0s 530us/step - loss: 0.4916 - accuracy: 0.5
188
Epoch 169/400
80/80 [==============================] - 0s 555us/step - loss: 0.4909 - accuracy: 0.5
312
Epoch 170/400
80/80 [==============================] - 0s 543us/step - loss: 0.4902 - accuracy: 0.5
688
Epoch 171/400
80/80 [==============================] - 0s 543us/step - loss: 0.4894 - accuracy: 0.5
312
Epoch 172/400
80/80 [==============================] - 0s 549us/step - loss: 0.4889 - accuracy: 0.5
688
Epoch 173/400
80/80 [==============================] - 0s 530us/step - loss: 0.4882 - accuracy: 0.5
437
Epoch 174/400
80/80 [==============================] - 0s 528us/step - loss: 0.4876 - accuracy: 0.5
688
Epoch 175/400
80/80 [==============================] - 0s 543us/step - loss: 0.4873 - accuracy: 0.5
437
Epoch 176/400
80/80 [==============================] - 0s 543us/step - loss: 0.4865 - accuracy: 0.5
625
Epoch 177/400
80/80 [==============================] - 0s 539us/step - loss: 0.4858 - accuracy: 0.5
688
Epoch 178/400
80/80 [==============================] - 0s 555us/step - loss: 0.4855 - accuracy: 0.5
312
Epoch 179/400
80/80 [==============================] - 0s 543us/step - loss: 0.4849 - accuracy: 0.5
688
Epoch 180/400
80/80 [==============================] - 0s 543us/step - loss: 0.4844 - accuracy: 0.5
562
```

```
Epoch 181/400
80/80 [==============================] - 0s 649us/step - loss: 0.4840 - accuracy: 0.5
750
Epoch 182/400
80/80 [==============================] - 0s 530us/step - loss: 0.4835 - accuracy: 0.5
312
Epoch 183/400
80/80 [==============================] - 0s 568us/step - loss: 0.4830 - accuracy: 0.5
688
Epoch 184/400
80/80 [==============================] - 0s 565us/step - loss: 0.4825 - accuracy: 0.5
312
Epoch 185/400
80/80 [==============================] - 0s 539us/step - loss: 0.4820 - accuracy: 0.5
688
Epoch 186/400
80/80 [==============================] - 0s 530us/step - loss: 0.4813 - accuracy: 0.5
750
Epoch 187/400
80/80 [==============================] - 0s 543us/step - loss: 0.4810 - accuracy: 0.5
625
Epoch 188/400
80/80 [==============================] - 0s 556us/step - loss: 0.4803 - accuracy: 0.5
750
Epoch 189/400
80/80 [==============================] - 0s 543us/step - loss: 0.4801 - accuracy: 0.5
500
Epoch 190/400
80/80 [==============================] - 0s 555us/step - loss: 0.4795 - accuracy: 0.6
000
Epoch 191/400
80/80 [==============================] - 0s 543us/step - loss: 0.4790 - accuracy: 0.5
437
Epoch 192/400
80/80 [==============================] - 0s 556us/step - loss: 0.4788 - accuracy: 0.5
562
Epoch 193/400
80/80 [==============================] - 0s 555us/step - loss: 0.4781 - accuracy: 0.5
875
Epoch 194/400
80/80 [==============================] - 0s 555us/step - loss: 0.4778 - accuracy: 0.5
562
Epoch 195/400
80/80 [==============================] - 0s 555us/step - loss: 0.4776 - accuracy: 0.5
500
Epoch 196/400
80/80 [==============================] - 0s 544us/step - loss: 0.4766 - accuracy: 0.5
312
Epoch 197/400
80/80 [==============================] - 0s 543us/step - loss: 0.4767 - accuracy: 0.5
312
Epoch 198/400
80/80 [==============================] - 0s 543us/step - loss: 0.4758 - accuracy: 0.5
500
Epoch 199/400
80/80 [==============================] - 0s 568us/step - loss: 0.4758 - accuracy: 0.5
562
Epoch 200/400
80/80 [==============================] - 0s 555us/step - loss: 0.4753 - accuracy: 0.5
688
```

```
Epoch 201/400
80/80 [==============================] - 0s 543us/step - loss: 0.4749 - accuracy: 0.5
750
Epoch 202/400
80/80 [==============================] - 0s 543us/step - loss: 0.4745 - accuracy: 0.6
125
Epoch 203/400
80/80 [==============================] - 0s 555us/step - loss: 0.4742 - accuracy: 0.5
562
Epoch 204/400
80/80 [==============================] - 0s 555us/step - loss: 0.4737 - accuracy: 0.5
437
Epoch 205/400
80/80 [==============================] - 0s 543us/step - loss: 0.4735 - accuracy: 0.5
437
Epoch 206/400
80/80 [==============================] - 0s 544us/step - loss: 0.4731 - accuracy: 0.5
813
Epoch 207/400
80/80 [==============================] - 0s 543us/step - loss: 0.4730 - accuracy: 0.5
500
Epoch 208/400
80/80 [==============================] - 0s 568us/step - loss: 0.4726 - accuracy: 0.5
688
Epoch 209/400
80/80 [==============================] - 0s 539us/step - loss: 0.4723 - accuracy: 0.5
562
Epoch 210/400
80/80 [==============================] - 0s 543us/step - loss: 0.4718 - accuracy: 0.5
938
Epoch 211/400
80/80 [==============================] - 0s 543us/step - loss: 0.4712 - accuracy: 0.5
625
Epoch 212/400
80/80 [==============================] - 0s 530us/step - loss: 0.4710 - accuracy: 0.5
813
Epoch 213/400
80/80 [==============================] - 0s 530us/step - loss: 0.4707 - accuracy: 0.6
062
Epoch 214/400
80/80 [==============================] - 0s 555us/step - loss: 0.4705 - accuracy: 0.5
688
Epoch 215/400
80/80 [==============================] - 0s 543us/step - loss: 0.4702 - accuracy: 0.5
437
Epoch 216/400
80/80 [==============================] - 0s 550us/step - loss: 0.4700 - accuracy: 0.5
437
Epoch 217/400
80/80 [==============================] - 0s 530us/step - loss: 0.4695 - accuracy: 0.5
688
Epoch 218/400
80/80 [==============================] - 0s 563us/step - loss: 0.4692 - accuracy: 0.5
688
Epoch 219/400
80/80 [==============================] - 0s 543us/step - loss: 0.4688 - accuracy: 0.5
688
Epoch 220/400
80/80 [==============================] - 0s 555us/step - loss: 0.4686 - accuracy: 0.6
313
```

```
Epoch 221/400
80/80 [==============================] - 0s 543us/step - loss: 0.4684 - accuracy: 0.5
688
Epoch 222/400
80/80 [==============================] - 0s 568us/step - loss: 0.4682 - accuracy: 0.5
688
Epoch 223/400
80/80 [==============================] - 0s 555us/step - loss: 0.4678 - accuracy: 0.5
875
Epoch 224/400
80/80 [==============================] - 0s 543us/step - loss: 0.4674 - accuracy: 0.6
250
Epoch 225/400
80/80 [==============================] - 0s 568us/step - loss: 0.4670 - accuracy: 0.6
000
Epoch 226/400
80/80 [==============================] - 0s 555us/step - loss: 0.4671 - accuracy: 0.5
813
Epoch 227/400
80/80 [==============================] - 0s 543us/step - loss: 0.4666 - accuracy: 0.5
938
Epoch 228/400
80/80 [==============================] - 0s 543us/step - loss: 0.4663 - accuracy: 0.5
688
Epoch 229/400
80/80 [==============================] - 0s 555us/step - loss: 0.4662 - accuracy: 0.6
125
Epoch 230/400
80/80 [==============================] - 0s 542us/step - loss: 0.4660 - accuracy: 0.5
750
Epoch 231/400
80/80 [==============================] - 0s 555us/step - loss: 0.4657 - accuracy: 0.5
625
Epoch 232/400
80/80 [==============================] - 0s 530us/step - loss: 0.4654 - accuracy: 0.5
750
Epoch 233/400
80/80 [==============================] - 0s 543us/step - loss: 0.4652 - accuracy: 0.5
312
Epoch 234/400
80/80 [==============================] - 0s 543us/step - loss: 0.4647 - accuracy: 0.5
688
Epoch 235/400
80/80 [==============================] - 0s 555us/step - loss: 0.4647 - accuracy: 0.5
625
Epoch 236/400
80/80 [==============================] - 0s 568us/step - loss: 0.4642 - accuracy: 0.5
688
Epoch 237/400
80/80 [==============================] - 0s 543us/step - loss: 0.4641 - accuracy: 0.5
938
Epoch 238/400
80/80 [==============================] - 0s 555us/step - loss: 0.4637 - accuracy: 0.5
875
Epoch 239/400
80/80 [==============================] - 0s 530us/step - loss: 0.4634 - accuracy: 0.6
000
Epoch 240/400
80/80 [==============================] - 0s 543us/step - loss: 0.4635 - accuracy: 0.5
437
```

```
Epoch 241/400
80/80 [==============================] - 0s 543us/step - loss: 0.4631 - accuracy: 0.5
688
Epoch 242/400
80/80 [==============================] - 0s 543us/step - loss: 0.4627 - accuracy: 0.6
062
Epoch 243/400
80/80 [==============================] - 0s 566us/step - loss: 0.4627 - accuracy: 0.5
750
Epoch 244/400
80/80 [==============================] - 0s 543us/step - loss: 0.4626 - accuracy: 0.5
750
Epoch 245/400
80/80 [==============================] - 0s 550us/step - loss: 0.4622 - accuracy: 0.5
875
Epoch 246/400
80/80 [==============================] - 0s 518us/step - loss: 0.4617 - accuracy: 0.5
500
Epoch 247/400
80/80 [==============================] - 0s 555us/step - loss: 0.4618 - accuracy: 0.6
187
Epoch 248/400
80/80 [==============================] - 0s 530us/step - loss: 0.4615 - accuracy: 0.5
437
Epoch 249/400
80/80 [==============================] - 0s 543us/step - loss: 0.4613 - accuracy: 0.6
000
Epoch 250/400
80/80 [==============================] - 0s 543us/step - loss: 0.4611 - accuracy: 0.5
938
Epoch 251/400
80/80 [==============================] - 0s 546us/step - loss: 0.4608 - accuracy: 0.5
813
Epoch 252/400
80/80 [==============================] - 0s 543us/step - loss: 0.4607 - accuracy: 0.5
875
Epoch 253/400
80/80 [==============================] - 0s 543us/step - loss: 0.4606 - accuracy: 0.6
250
Epoch 254/400
80/80 [==============================] - 0s 568us/step - loss: 0.4605 - accuracy: 0.5
813
Epoch 255/400
80/80 [==============================] - 0s 543us/step - loss: 0.4602 - accuracy: 0.6
000
Epoch 256/400
80/80 [==============================] - 0s 568us/step - loss: 0.4599 - accuracy: 0.5
437
Epoch 257/400
80/80 [==============================] - 0s 543us/step - loss: 0.4598 - accuracy: 0.6
250
Epoch 258/400
80/80 [==============================] - 0s 543us/step - loss: 0.4597 - accuracy: 0.5
625
Epoch 259/400
80/80 [==============================] - 0s 550us/step - loss: 0.4593 - accuracy: 0.5
938
Epoch 260/400
80/80 [==============================] - 0s 543us/step - loss: 0.4595 - accuracy: 0.5
500
```

```
Epoch 261/400
80/80 [==============================] - 0s 543us/step - loss: 0.4590 - accuracy: 0.6
125
Epoch 262/400
80/80 [==============================] - 0s 555us/step - loss: 0.4588 - accuracy: 0.5
938
Epoch 263/400
80/80 [==============================] - 0s 543us/step - loss: 0.4585 - accuracy: 0.5
875
Epoch 264/400
80/80 [==============================] - 0s 543us/step - loss: 0.4586 - accuracy: 0.6
375
Epoch 265/400
80/80 [==============================] - 0s 555us/step - loss: 0.4582 - accuracy: 0.5
750
Epoch 266/400
80/80 [==============================] - 0s 543us/step - loss: 0.4582 - accuracy: 0.5
562
Epoch 267/400
80/80 [==============================] - 0s 543us/step - loss: 0.4578 - accuracy: 0.5
875
Epoch 268/400
80/80 [==============================] - 0s 581us/step - loss: 0.4578 - accuracy: 0.5
813
Epoch 269/400
80/80 [==============================] - 0s 563us/step - loss: 0.4577 - accuracy: 0.5
625
Epoch 270/400
80/80 [==============================] - 0s 555us/step - loss: 0.4573 - accuracy: 0.5
938
Epoch 271/400
80/80 [==============================] - 0s 555us/step - loss: 0.4573 - accuracy: 0.6
000
Epoch 272/400
80/80 [==============================] - 0s 555us/step - loss: 0.4571 - accuracy: 0.6
187
Epoch 273/400
80/80 [==============================] - 0s 543us/step - loss: 0.4568 - accuracy: 0.5
813
Epoch 274/400
80/80 [==============================] - 0s 555us/step - loss: 0.4568 - accuracy: 0.5
938
Epoch 275/400
80/80 [==============================] - 0s 555us/step - loss: 0.4564 - accuracy: 0.5
688
Epoch 276/400
80/80 [==============================] - 0s 537us/step - loss: 0.4563 - accuracy: 0.6
000
Epoch 277/400
80/80 [==============================] - 0s 568us/step - loss: 0.4564 - accuracy: 0.5
875
Epoch 278/400
80/80 [==============================] - 0s 555us/step - loss: 0.4563 - accuracy: 0.6
000
Epoch 279/400
80/80 [==============================] - 0s 556us/step - loss: 0.4560 - accuracy: 0.6
000
Epoch 280/400
80/80 [==============================] - 0s 552us/step - loss: 0.4559 - accuracy: 0.6
125
```

```
Epoch 281/400
80/80 [==============================] - 0s 543us/step - loss: 0.4556 - accuracy: 0.6
000
Epoch 282/400
80/80 [==============================] - 0s 543us/step - loss: 0.4553 - accuracy: 0.6
562
Epoch 283/400
80/80 [==============================] - 0s 543us/step - loss: 0.4553 - accuracy: 0.5
750
Epoch 284/400
80/80 [==============================] - 0s 537us/step - loss: 0.4553 - accuracy: 0.6
125
Epoch 285/400
80/80 [==============================] - 0s 530us/step - loss: 0.4553 - accuracy: 0.6
125
Epoch 286/400
80/80 [==============================] - 0s 555us/step - loss: 0.4549 - accuracy: 0.6
313
Epoch 287/400
80/80 [==============================] - 0s 555us/step - loss: 0.4547 - accuracy: 0.5
312
Epoch 288/400
80/80 [==============================] - 0s 555us/step - loss: 0.4546 - accuracy: 0.5
750
Epoch 289/400
80/80 [==============================] - 0s 555us/step - loss: 0.4545 - accuracy: 0.6
000
Epoch 290/400
80/80 [==============================] - 0s 555us/step - loss: 0.4545 - accuracy: 0.5
437
Epoch 291/400
80/80 [==============================] - 0s 555us/step - loss: 0.4541 - accuracy: 0.5
813
Epoch 292/400
80/80 [==============================] - 0s 555us/step - loss: 0.4541 - accuracy: 0.6
062
Epoch 293/400
80/80 [==============================] - 0s 555us/step - loss: 0.4538 - accuracy: 0.6
250
Epoch 294/400
80/80 [==============================] - 0s 555us/step - loss: 0.4538 - accuracy: 0.5
938
Epoch 295/400
80/80 [==============================] - 0s 549us/step - loss: 0.4536 - accuracy: 0.6
000
Epoch 296/400
80/80 [==============================] - 0s 543us/step - loss: 0.4537 - accuracy: 0.6
062
Epoch 297/400
80/80 [==============================] - 0s 555us/step - loss: 0.4537 - accuracy: 0.5
938
Epoch 298/400
80/80 [==============================] - 0s 555us/step - loss: 0.4532 - accuracy: 0.6
313
Epoch 299/400
80/80 [==============================] - 0s 555us/step - loss: 0.4530 - accuracy: 0.5
500
Epoch 300/400
80/80 [==============================] - 0s 555us/step - loss: 0.4529 - accuracy: 0.5
688
```

```
Epoch 301/400
80/80 [==============================] - 0s 555us/step - loss: 0.4527 - accuracy: 0.5
875
Epoch 302/400
80/80 [==============================] - 0s 555us/step - loss: 0.4527 - accuracy: 0.6
187
Epoch 303/400
80/80 [==============================] - 0s 543us/step - loss: 0.4525 - accuracy: 0.5
938
Epoch 304/400
80/80 [==============================] - 0s 543us/step - loss: 0.4523 - accuracy: 0.6
000
Epoch 305/400
80/80 [==============================] - 0s 555us/step - loss: 0.4525 - accuracy: 0.5
625
Epoch 306/400
80/80 [==============================] - 0s 562us/step - loss: 0.4525 - accuracy: 0.5
813
Epoch 307/400
80/80 [==============================] - 0s 543us/step - loss: 0.4520 - accuracy: 0.6
438
Epoch 308/400
80/80 [==============================] - 0s 543us/step - loss: 0.4521 - accuracy: 0.5
562
Epoch 309/400
80/80 [==============================] - 0s 568us/step - loss: 0.4519 - accuracy: 0.6
313
Epoch 310/400
80/80 [==============================] - 0s 555us/step - loss: 0.4517 - accuracy: 0.6
062
Epoch 311/400
80/80 [==============================] - 0s 568us/step - loss: 0.4519 - accuracy: 0.5
875
Epoch 312/400
80/80 [==============================] - 0s 555us/step - loss: 0.4514 - accuracy: 0.5
938
Epoch 313/400
80/80 [==============================] - 0s 543us/step - loss: 0.4510 - accuracy: 0.6
313
Epoch 314/400
80/80 [==============================] - 0s 543us/step - loss: 0.4513 - accuracy: 0.5
375
Epoch 315/400
80/80 [==============================] - 0s 552us/step - loss: 0.4511 - accuracy: 0.5
688
Epoch 316/400
80/80 [==============================] - 0s 555us/step - loss: 0.4513 - accuracy: 0.5
625
Epoch 317/400
80/80 [==============================] - 0s 543us/step - loss: 0.4509 - accuracy: 0.5
813
Epoch 318/400
80/80 [==============================] - 0s 555us/step - loss: 0.4509 - accuracy: 0.5
813
Epoch 319/400
80/80 [==============================] - 0s 562us/step - loss: 0.4509 - accuracy: 0.6
000
Epoch 320/400
80/80 [==============================] - 0s 568us/step - loss: 0.4505 - accuracy: 0.5
813
```

```
Epoch 321/400
80/80 [==============================] - 0s 654us/step - loss: 0.4505 - accuracy: 0.6
000
Epoch 322/400
80/80 [==============================] - 0s 556us/step - loss: 0.4504 - accuracy: 0.5
688
Epoch 323/400
80/80 [==============================] - 0s 581us/step - loss: 0.4501 - accuracy: 0.6
125
Epoch 324/400
80/80 [==============================] - 0s 555us/step - loss: 0.4504 - accuracy: 0.6
000
Epoch 325/400
80/80 [==============================] - 0s 568us/step - loss: 0.4500 - accuracy: 0.6
375
Epoch 326/400
80/80 [==============================] - 0s 543us/step - loss: 0.4499 - accuracy: 0.6
000
Epoch 327/400
80/80 [==============================] - 0s 568us/step - loss: 0.4498 - accuracy: 0.6
500
Epoch 328/400
80/80 [==============================] - 0s 555us/step - loss: 0.4496 - accuracy: 0.6
000
Epoch 329/400
80/80 [==============================] - 0s 555us/step - loss: 0.4498 - accuracy: 0.5
625
Epoch 330/400
80/80 [==============================] - 0s 568us/step - loss: 0.4495 - accuracy: 0.5
750
Epoch 331/400
80/80 [==============================] - 0s 555us/step - loss: 0.4498 - accuracy: 0.6
062
Epoch 332/400
80/80 [==============================] - 0s 560us/step - loss: 0.4494 - accuracy: 0.6
187
Epoch 333/400
80/80 [==============================] - 0s 543us/step - loss: 0.4490 - accuracy: 0.6
250
Epoch 334/400
80/80 [==============================] - 0s 568us/step - loss: 0.4489 - accuracy: 0.6
125
Epoch 335/400
80/80 [==============================] - 0s 543us/step - loss: 0.4488 - accuracy: 0.5
875
Epoch 336/400
80/80 [==============================] - 0s 543us/step - loss: 0.4488 - accuracy: 0.6
313
Epoch 337/400
80/80 [==============================] - 0s 568us/step - loss: 0.4488 - accuracy: 0.5
750
Epoch 338/400
80/80 [==============================] - 0s 555us/step - loss: 0.4487 - accuracy: 0.6
187
Epoch 339/400
80/80 [==============================] - 0s 568us/step - loss: 0.4486 - accuracy: 0.6
000
Epoch 340/400
80/80 [==============================] - 0s 568us/step - loss: 0.4485 - accuracy: 0.6
500
```

```
Epoch 341/400
80/80 [==============================] - 0s 568us/step - loss: 0.4483 - accuracy: 0.5
688
Epoch 342/400
80/80 [==============================] - 0s 555us/step - loss: 0.4483 - accuracy: 0.6
000
Epoch 343/400
80/80 [==============================] - 0s 556us/step - loss: 0.4482 - accuracy: 0.5
938
Epoch 344/400
80/80 [==============================] - 0s 543us/step - loss: 0.4480 - accuracy: 0.6
562
Epoch 345/400
80/80 [==============================] - 0s 555us/step - loss: 0.4479 - accuracy: 0.5
938
Epoch 346/400
80/80 [==============================] - 0s 555us/step - loss: 0.4477 - accuracy: 0.6
000
Epoch 347/400
80/80 [==============================] - 0s 560us/step - loss: 0.4479 - accuracy: 0.6
125
Epoch 348/400
80/80 [==============================] - 0s 555us/step - loss: 0.4479 - accuracy: 0.5
875
Epoch 349/400
80/80 [==============================] - 0s 555us/step - loss: 0.4478 - accuracy: 0.6
125
Epoch 350/400
80/80 [==============================] - 0s 555us/step - loss: 0.4477 - accuracy: 0.6
313
Epoch 351/400
80/80 [==============================] - 0s 543us/step - loss: 0.4475 - accuracy: 0.5
938
Epoch 352/400
80/80 [==============================] - 0s 537us/step - loss: 0.4472 - accuracy: 0.6
000
Epoch 353/400
80/80 [==============================] - 0s 543us/step - loss: 0.4473 - accuracy: 0.6
438
Epoch 354/400
80/80 [==============================] - 0s 550us/step - loss: 0.4472 - accuracy: 0.6
438
Epoch 355/400
80/80 [==============================] - 0s 530us/step - loss: 0.4472 - accuracy: 0.5
625
Epoch 356/400
80/80 [==============================] - 0s 568us/step - loss: 0.4472 - accuracy: 0.5
875
Epoch 357/400
80/80 [==============================] - 0s 566us/step - loss: 0.4470 - accuracy: 0.5
688
Epoch 358/400
80/80 [==============================] - 0s 543us/step - loss: 0.4471 - accuracy: 0.5
813
Epoch 359/400
80/80 [==============================] - 0s 568us/step - loss: 0.4469 - accuracy: 0.5
938
Epoch 360/400
80/80 [==============================] - 0s 566us/step - loss: 0.4468 - accuracy: 0.5
562
```

```
Epoch 361/400
80/80 [==============================] - 0s 553us/step - loss: 0.4465 - accuracy: 0.6
000
Epoch 362/400
80/80 [==============================] - 0s 543us/step - loss: 0.4468 - accuracy: 0.5
813
Epoch 363/400
80/80 [==============================] - 0s 562us/step - loss: 0.4467 - accuracy: 0.5
938
Epoch 364/400
80/80 [==============================] - 0s 568us/step - loss: 0.4464 - accuracy: 0.6
000
Epoch 365/400
80/80 [==============================] - 0s 549us/step - loss: 0.4461 - accuracy: 0.5
688
Epoch 366/400
80/80 [==============================] - 0s 543us/step - loss: 0.4461 - accuracy: 0.6
125
Epoch 367/400
80/80 [==============================] - 0s 567us/step - loss: 0.4462 - accuracy: 0.6
187
Epoch 368/400
80/80 [==============================] - 0s 555us/step - loss: 0.4460 - accuracy: 0.6
000
Epoch 369/400
80/80 [==============================] - 0s 555us/step - loss: 0.4462 - accuracy: 0.5
813
Epoch 370/400
80/80 [==============================] - 0s 581us/step - loss: 0.4458 - accuracy: 0.6
500
Epoch 371/400
80/80 [==============================] - 0s 568us/step - loss: 0.4457 - accuracy: 0.6
562
Epoch 372/400
80/80 [==============================] - 0s 555us/step - loss: 0.4457 - accuracy: 0.6
438
Epoch 373/400
80/80 [==============================] - 0s 543us/step - loss: 0.4457 - accuracy: 0.5
938
Epoch 374/400
80/80 [==============================] - 0s 555us/step - loss: 0.4453 - accuracy: 0.6
062
Epoch 375/400
80/80 [==============================] - 0s 543us/step - loss: 0.4457 - accuracy: 0.5
688
Epoch 376/400
80/80 [==============================] - 0s 555us/step - loss: 0.4458 - accuracy: 0.5
938
Epoch 377/400
80/80 [==============================] - 0s 543us/step - loss: 0.4454 - accuracy: 0.6
125
Epoch 378/400
80/80 [==============================] - 0s 555us/step - loss: 0.4455 - accuracy: 0.5
813
Epoch 379/400
80/80 [==============================] - 0s 555us/step - loss: 0.4452 - accuracy: 0.5
813
Epoch 380/400
80/80 [==============================] - 0s 555us/step - loss: 0.4451 - accuracy: 0.6
500
```

```
Epoch 381/400
80/80 [==============================] - 0s 568us/step - loss: 0.4451 - accuracy: 0.6
125
Epoch 382/400
80/80 [==============================] - 0s 555us/step - loss: 0.4451 - accuracy: 0.6
313
Epoch 383/400
80/80 [==============================] - 0s 568us/step - loss: 0.4448 - accuracy: 0.6
250
Epoch 384/400
80/80 [==============================] - 0s 555us/step - loss: 0.4447 - accuracy: 0.6
812
Epoch 385/400
80/80 [==============================] - 0s 606us/step - loss: 0.4448 - accuracy: 0.6
187
Epoch 386/400
80/80 [==============================] - 0s 783us/step - loss: 0.4448 - accuracy: 0.6
250
Epoch 387/400
80/80 [==============================] - 0s 720us/step - loss: 0.4446 - accuracy: 0.5
875
Epoch 388/400
80/80 [==============================] - 0s 656us/step - loss: 0.4446 - accuracy: 0.5
938
Epoch 389/400
80/80 [==============================] - 0s 656us/step - loss: 0.4444 - accuracy: 0.5
875
Epoch 390/400
80/80 [==============================] - 0s 619us/step - loss: 0.4445 - accuracy: 0.6
000
Epoch 391/400
80/80 [==============================] - 0s 619us/step - loss: 0.4441 - accuracy: 0.6
562
Epoch 392/400
80/80 [==============================] - 0s 606us/step - loss: 0.4443 - accuracy: 0.5
875
Epoch 393/400
80/80 [==============================] - 0s 619us/step - loss: 0.4440 - accuracy: 0.5
938
Epoch 394/400
80/80 [==============================] - 0s 593us/step - loss: 0.4443 - accuracy: 0.6
187
Epoch 395/400
80/80 [==============================] - 0s 606us/step - loss: 0.4440 - accuracy: 0.6
313
Epoch 396/400
80/80 [==============================] - 0s 629us/step - loss: 0.4441 - accuracy: 0.6
500
Epoch 397/400
80/80 [==============================] - 0s 568us/step - loss: 0.4438 - accuracy: 0.6
500
Epoch 398/400
80/80 [==============================] - 0s 581us/step - loss: 0.4440 - accuracy: 0.5
813
Epoch 399/400
80/80 [==============================] - 0s 581us/step - loss: 0.4436 - accuracy: 0.6
313
Epoch 400/400
80/80 [==============================] - 0s 581us/step - loss: 0.4439 - accuracy: 0.5
875
```

```
5/5 [==============================] - 0s 998us/step - loss: 0.4423 - accuracy: 0.587
5
Epoch 1/400
80/80 [==============================] - 0s 597us/step - loss: 0.7023 - accuracy: 0.4
875
Epoch 2/400
80/80 [==============================] - 0s 555us/step - loss: 0.6924 - accuracy: 0.4
938
Epoch 3/400
80/80 [==============================] - 0s 568us/step - loss: 0.6856 - accuracy: 0.5
750
Epoch 4/400
80/80 [==============================] - 0s 549us/step - loss: 0.6797 - accuracy: 0.5
813
Epoch 5/400
80/80 [==============================] - 0s 543us/step - loss: 0.6747 - accuracy: 0.5
375
Epoch 6/400
80/80 [==============================] - 0s 543us/step - loss: 0.6699 - accuracy: 0.5
375
Epoch 7/400
80/80 [==============================] - 0s 555us/step - loss: 0.6649 - accuracy: 0.5
437
Epoch 8/400
80/80 [==============================] - 0s 593us/step - loss: 0.6611 - accuracy: 0.5
500
Epoch 9/400
80/80 [==============================] - 0s 593us/step - loss: 0.6567 - accuracy: 0.5
312
Epoch 10/400
80/80 [==============================] - 0s 581us/step - loss: 0.6526 - accuracy: 0.5
688
Epoch 11/400
80/80 [==============================] - 0s 619us/step - loss: 0.6478 - accuracy: 0.5
625
Epoch 12/400
80/80 [==============================] - 0s 619us/step - loss: 0.6438 - accuracy: 0.5
750
Epoch 13/400
80/80 [==============================] - 0s 555us/step - loss: 0.6391 - accuracy: 0.5
375
Epoch 14/400
80/80 [==============================] - 0s 543us/step - loss: 0.6344 - accuracy: 0.5
625
Epoch 15/400
80/80 [==============================] - 0s 543us/step - loss: 0.6300 - accuracy: 0.5
813
Epoch 16/400
80/80 [==============================] - 0s 555us/step - loss: 0.6254 - accuracy: 0.5
750
Epoch 17/400
80/80 [==============================] - 0s 555us/step - loss: 0.6205 - accuracy: 0.5
688
Epoch 18/400
80/80 [==============================] - 0s 556us/step - loss: 0.6155 - accuracy: 0.5
625
Epoch 19/400
80/80 [==============================] - 0s 555us/step - loss: 0.6105 - accuracy: 0.5
625
Epoch 20/400
```

```
80/80 [==============================] - 0s 556us/step - loss: 0.6058 - accuracy: 0.5
875
Epoch 21/400
80/80 [==============================] - 0s 555us/step - loss: 0.6009 - accuracy: 0.5
688
Epoch 22/400
80/80 [==============================] - 0s 545us/step - loss: 0.5962 - accuracy: 0.5
875
Epoch 23/400
80/80 [==============================] - 0s 543us/step - loss: 0.5912 - accuracy: 0.6
000
Epoch 24/400
80/80 [==============================] - 0s 555us/step - loss: 0.5870 - accuracy: 0.5
938
Epoch 25/400
80/80 [==============================] - 0s 562us/step - loss: 0.5816 - accuracy: 0.5
938
Epoch 26/400
80/80 [==============================] - 0s 568us/step - loss: 0.5774 - accuracy: 0.5
500
Epoch 27/400
80/80 [==============================] - 0s 544us/step - loss: 0.5729 - accuracy: 0.5
562
Epoch 28/400
80/80 [==============================] - 0s 555us/step - loss: 0.5685 - accuracy: 0.5
813
Epoch 29/400
80/80 [==============================] - 0s 568us/step - loss: 0.5642 - accuracy: 0.5
938
Epoch 30/400
80/80 [==============================] - 0s 568us/step - loss: 0.5600 - accuracy: 0.5
312
Epoch 31/400
80/80 [==============================] - 0s 555us/step - loss: 0.5565 - accuracy: 0.5
688
Epoch 32/400
80/80 [==============================] - 0s 555us/step - loss: 0.5521 - accuracy: 0.5
813
Epoch 33/400
80/80 [==============================] - 0s 555us/step - loss: 0.5486 - accuracy: 0.5
562
Epoch 34/400
80/80 [==============================] - 0s 566us/step - loss: 0.5450 - accuracy: 0.5
312
Epoch 35/400
80/80 [==============================] - 0s 568us/step - loss: 0.5407 - accuracy: 0.5
063
Epoch 36/400
80/80 [==============================] - 0s 619us/step - loss: 0.5375 - accuracy: 0.5
625
Epoch 37/400
80/80 [==============================] - 0s 656us/step - loss: 0.5343 - accuracy: 0.5
312
Epoch 38/400
80/80 [==============================] - 0s 682us/step - loss: 0.5308 - accuracy: 0.6
062
Epoch 39/400
80/80 [==============================] - 0s 707us/step - loss: 0.5277 - accuracy: 0.5
188
Epoch 40/400
```

```
80/80 [==============================] - 0s 720us/step - loss: 0.5249 - accuracy: 0.5
250
Epoch 41/400
80/80 [==============================] - 0s 732us/step - loss: 0.5219 - accuracy: 0.5
125
Epoch 42/400
80/80 [==============================] - 0s 720us/step - loss: 0.5192 - accuracy: 0.5
188
Epoch 43/400
80/80 [==============================] - 0s 720us/step - loss: 0.5165 - accuracy: 0.5
312
Epoch 44/400
80/80 [==============================] - 0s 732us/step - loss: 0.5138 - accuracy: 0.5
250
Epoch 45/400
80/80 [==============================] - 0s 745us/step - loss: 0.5115 - accuracy: 0.5
500
Epoch 46/400
80/80 [==============================] - 0s 720us/step - loss: 0.5090 - accuracy: 0.5
500
Epoch 47/400
80/80 [==============================] - 0s 740us/step - loss: 0.5072 - accuracy: 0.5
312
Epoch 48/400
80/80 [==============================] - 0s 757us/step - loss: 0.5047 - accuracy: 0.5
625
Epoch 49/400
80/80 [==============================] - 0s 808us/step - loss: 0.5025 - accuracy: 0.5
375
Epoch 50/400
80/80 [==============================] - 0s 833us/step - loss: 0.5007 - accuracy: 0.5
250
Epoch 51/400
80/80 [==============================] - 0s 833us/step - loss: 0.4985 - accuracy: 0.5
625
Epoch 52/400
80/80 [==============================] - 0s 774us/step - loss: 0.4969 - accuracy: 0.5
625
Epoch 53/400
80/80 [==============================] - 0s 777us/step - loss: 0.4952 - accuracy: 0.5
000
Epoch 54/400
80/80 [==============================] - 0s 783us/step - loss: 0.4935 - accuracy: 0.5
188
Epoch 55/400
80/80 [==============================] - 0s 846us/step - loss: 0.4918 - accuracy: 0.5
375
Epoch 56/400
80/80 [==============================] - 0s 890us/step - loss: 0.4894 - accuracy: 0.5
375
Epoch 57/400
80/80 [==============================] - 0s 837us/step - loss: 0.4884 - accuracy: 0.5
813
Epoch 58/400
80/80 [==============================] - 0s 934us/step - loss: 0.4871 - accuracy: 0.6
062
Epoch 59/400
80/80 [==============================] - 0s 846us/step - loss: 0.4856 - accuracy: 0.6
000
Epoch 60/400
```

```
80/80 [==============================] - 0s 909us/step - loss: 0.4846 - accuracy: 0.5
437
Epoch 61/400
80/80 [==============================] - 0s 909us/step - loss: 0.4832 - accuracy: 0.5
188
Epoch 62/400
80/80 [==============================] - 0s 846us/step - loss: 0.4814 - accuracy: 0.5
562
Epoch 63/400
80/80 [==============================] - 0s 808us/step - loss: 0.4808 - accuracy: 0.5
875
Epoch 64/400
80/80 [==============================] - 0s 821us/step - loss: 0.4794 - accuracy: 0.6
187
Epoch 65/400
80/80 [==============================] - 0s 947us/step - loss: 0.4783 - accuracy: 0.5
813
Epoch 66/400
80/80 [==============================] - 0s 896us/step - loss: 0.4771 - accuracy: 0.5
938
Epoch 67/400
80/80 [==============================] - 0s 846us/step - loss: 0.4762 - accuracy: 0.5
875
Epoch 68/400
80/80 [==============================] - 0s 808us/step - loss: 0.4751 - accuracy: 0.6
313
Epoch 69/400
80/80 [==============================] - 0s 807us/step - loss: 0.4742 - accuracy: 0.5
750
Epoch 70/400
80/80 [==============================] - 0s 783us/step - loss: 0.4733 - accuracy: 0.6
500
Epoch 71/400
80/80 [==============================] - 0s 770us/step - loss: 0.4724 - accuracy: 0.6
000
Epoch 72/400
80/80 [==============================] - 0s 794us/step - loss: 0.4712 - accuracy: 0.6
375
Epoch 73/400
80/80 [==============================] - 0s 783us/step - loss: 0.4706 - accuracy: 0.5
437
Epoch 74/400
80/80 [==============================] - 0s 806us/step - loss: 0.4695 - accuracy: 0.6
125
Epoch 75/400
80/80 [==============================] - 0s 770us/step - loss: 0.4688 - accuracy: 0.6
750
Epoch 76/400
80/80 [==============================] - 0s 783us/step - loss: 0.4679 - accuracy: 0.6
500
Epoch 77/400
80/80 [==============================] - 0s 770us/step - loss: 0.4671 - accuracy: 0.5
750
Epoch 78/400
80/80 [==============================] - 0s 757us/step - loss: 0.4660 - accuracy: 0.6
375
Epoch 79/400
80/80 [==============================] - 0s 745us/step - loss: 0.4661 - accuracy: 0.6
438
Epoch 80/400
```

```
80/80 [==============================] - 0s 761us/step - loss: 0.4653 - accuracy: 0.6
000
Epoch 81/400
80/80 [==============================] - 0s 757us/step - loss: 0.4643 - accuracy: 0.6
812
Epoch 82/400
80/80 [==============================] - 0s 739us/step - loss: 0.4633 - accuracy: 0.6
000
Epoch 83/400
80/80 [==============================] - 0s 757us/step - loss: 0.4633 - accuracy: 0.5
813
Epoch 84/400
80/80 [==============================] - 0s 757us/step - loss: 0.4623 - accuracy: 0.6
687
Epoch 85/400
80/80 [==============================] - 0s 770us/step - loss: 0.4612 - accuracy: 0.6
625
Epoch 86/400
80/80 [==============================] - 0s 732us/step - loss: 0.4610 - accuracy: 0.6
687
Epoch 87/400
80/80 [==============================] - 0s 757us/step - loss: 0.4608 - accuracy: 0.5
938
Epoch 88/400
80/80 [==============================] - 0s 783us/step - loss: 0.4602 - accuracy: 0.6
750
Epoch 89/400
80/80 [==============================] - 0s 770us/step - loss: 0.4593 - accuracy: 0.6
750
Epoch 90/400
80/80 [==============================] - 0s 745us/step - loss: 0.4584 - accuracy: 0.6
438
Epoch 91/400
80/80 [==============================] - 0s 745us/step - loss: 0.4584 - accuracy: 0.6
187
Epoch 92/400
80/80 [==============================] - 0s 732us/step - loss: 0.4577 - accuracy: 0.6
375
Epoch 93/400
80/80 [==============================] - 0s 788us/step - loss: 0.4573 - accuracy: 0.6
625
Epoch 94/400
80/80 [==============================] - 0s 770us/step - loss: 0.4568 - accuracy: 0.6
500
Epoch 95/400
80/80 [==============================] - 0s 770us/step - loss: 0.4565 - accuracy: 0.6
812
Epoch 96/400
80/80 [==============================] - 0s 795us/step - loss: 0.4555 - accuracy: 0.6
438
Epoch 97/400
80/80 [==============================] - 0s 783us/step - loss: 0.4551 - accuracy: 0.6
625
Epoch 98/400
80/80 [==============================] - 0s 783us/step - loss: 0.4549 - accuracy: 0.6
687
Epoch 99/400
80/80 [==============================] - 0s 833us/step - loss: 0.4545 - accuracy: 0.6
812
Epoch 100/400
```

```
80/80 [==============================] - 0s 814us/step - loss: 0.4533 - accuracy: 0.6
375
Epoch 101/400
80/80 [==============================] - 0s 821us/step - loss: 0.4534 - accuracy: 0.6
812
Epoch 102/400
80/80 [==============================] - 0s 871us/step - loss: 0.4533 - accuracy: 0.6
125
Epoch 103/400
80/80 [==============================] - 0s 896us/step - loss: 0.4524 - accuracy: 0.6
562
Epoch 104/400
80/80 [==============================] - 0s 947us/step - loss: 0.4523 - accuracy: 0.6
375
Epoch 105/400
80/80 [==============================] - 0s 875us/step - loss: 0.4515 - accuracy: 0.6
562
Epoch 106/400
80/80 [==============================] - 0s 928us/step - loss: 0.4515 - accuracy: 0.7
000
Epoch 107/400
80/80 [==============================] - 0s 896us/step - loss: 0.4508 - accuracy: 0.6
938
Epoch 108/400
80/80 [==============================] - 0s 896us/step - loss: 0.4504 - accuracy: 0.6
812
Epoch 109/400
80/80 [==============================] - 0s 858us/step - loss: 0.4502 - accuracy: 0.6
375
Epoch 110/400
80/80 [==============================] - 0s 858us/step - loss: 0.4499 - accuracy: 0.7
063
Epoch 111/400
80/80 [==============================] - 0s 858us/step - loss: 0.4492 - accuracy: 0.6
875
Epoch 112/400
80/80 [==============================] - 0s 846us/step - loss: 0.4493 - accuracy: 0.6
750
Epoch 113/400
80/80 [==============================] - 0s 833us/step - loss: 0.4481 - accuracy: 0.6
562
Epoch 114/400
80/80 [==============================] - 0s 884us/step - loss: 0.4483 - accuracy: 0.6
625
Epoch 115/400
80/80 [==============================] - 0s 858us/step - loss: 0.4475 - accuracy: 0.6
313
Epoch 116/400
80/80 [==============================] - 0s 821us/step - loss: 0.4470 - accuracy: 0.7
063
Epoch 117/400
80/80 [==============================] - 0s 808us/step - loss: 0.4472 - accuracy: 0.6
812
Epoch 118/400
80/80 [==============================] - 0s 833us/step - loss: 0.4463 - accuracy: 0.7
000
Epoch 119/400
80/80 [==============================] - 0s 825us/step - loss: 0.4455 - accuracy: 0.6
875
Epoch 120/400
```

```
80/80 [==============================] - 0s 833us/step - loss: 0.4462 - accuracy: 0.6
812
Epoch 121/400
80/80 [==============================] - 0s 808us/step - loss: 0.4458 - accuracy: 0.6
375
Epoch 122/400
80/80 [==============================] - 0s 859us/step - loss: 0.4450 - accuracy: 0.6
687
Epoch 123/400
80/80 [==============================] - 0s 833us/step - loss: 0.4452 - accuracy: 0.7
000
Epoch 124/400
80/80 [==============================] - 0s 821us/step - loss: 0.4444 - accuracy: 0.6
875
Epoch 125/400
80/80 [==============================] - 0s 821us/step - loss: 0.4442 - accuracy: 0.6
625
Epoch 126/400
80/80 [==============================] - 0s 828us/step - loss: 0.4434 - accuracy: 0.6
875
Epoch 127/400
80/80 [==============================] - 0s 846us/step - loss: 0.4430 - accuracy: 0.6
938
Epoch 128/400
80/80 [==============================] - 0s 882us/step - loss: 0.4437 - accuracy: 0.6
938
Epoch 129/400
80/80 [==============================] - 0s 827us/step - loss: 0.4430 - accuracy: 0.6
750
Epoch 130/400
80/80 [==============================] - 0s 834us/step - loss: 0.4427 - accuracy: 0.7
063
Epoch 131/400
80/80 [==============================] - 0s 833us/step - loss: 0.4426 - accuracy: 0.6
687
Epoch 132/400
80/80 [==============================] - 0s 856us/step - loss: 0.4417 - accuracy: 0.7
125
Epoch 133/400
80/80 [==============================] - 0s 814us/step - loss: 0.4416 - accuracy: 0.6
875
Epoch 134/400
80/80 [==============================] - 0s 833us/step - loss: 0.4413 - accuracy: 0.6
625
Epoch 135/400
80/80 [==============================] - 0s 843us/step - loss: 0.4412 - accuracy: 0.6
875
Epoch 136/400
80/80 [==============================] - 0s 858us/step - loss: 0.4411 - accuracy: 0.7
000
Epoch 137/400
80/80 [==============================] - 0s 846us/step - loss: 0.4402 - accuracy: 0.6
625
Epoch 138/400
80/80 [==============================] - 0s 846us/step - loss: 0.4397 - accuracy: 0.7
000
Epoch 139/400
80/80 [==============================] - 0s 795us/step - loss: 0.4400 - accuracy: 0.6
875
Epoch 140/400
```

```
80/80 [==============================] - 0s 846us/step - loss: 0.4397 - accuracy: 0.7
063
Epoch 141/400
80/80 [==============================] - 0s 884us/step - loss: 0.4392 - accuracy: 0.6
938
Epoch 142/400
80/80 [==============================] - 0s 947us/step - loss: 0.4392 - accuracy: 0.6
875
Epoch 143/400
80/80 [==============================] - 0s 922us/step - loss: 0.4388 - accuracy: 0.6
687
Epoch 144/400
80/80 [==============================] - 0s 884us/step - loss: 0.4381 - accuracy: 0.7
000
Epoch 145/400
80/80 [==============================] - 0s 887us/step - loss: 0.4380 - accuracy: 0.7
063
Epoch 146/400
80/80 [==============================] - 0s 922us/step - loss: 0.4380 - accuracy: 0.7
000
Epoch 147/400
80/80 [==============================] - 0s 922us/step - loss: 0.4372 - accuracy: 0.7
063
Epoch 148/400
80/80 [==============================] - 0s 884us/step - loss: 0.4369 - accuracy: 0.6
938
Epoch 149/400
80/80 [==============================] - 0s 922us/step - loss: 0.4372 - accuracy: 0.7
000
Epoch 150/400
80/80 [==============================] - 0s 901us/step - loss: 0.4364 - accuracy: 0.7
125
Epoch 151/400
80/80 [==============================] - 0s 871us/step - loss: 0.4363 - accuracy: 0.6
812
Epoch 152/400
80/80 [==============================] - 0s 896us/step - loss: 0.4363 - accuracy: 0.6
938
Epoch 153/400
80/80 [==============================] - 0s 1000us/step - loss: 0.4359 - accuracy: 0.
6438
Epoch 154/400
80/80 [==============================] - 0s 965us/step - loss: 0.4356 - accuracy: 0.7
063
Epoch 155/400
80/80 [==============================] - 0s 943us/step - loss: 0.4358 - accuracy: 0.6
875
Epoch 156/400
80/80 [==============================] - 0s 871us/step - loss: 0.4354 - accuracy: 0.6
938
Epoch 157/400
80/80 [==============================] - 0s 871us/step - loss: 0.4354 - accuracy: 0.7
063
Epoch 158/400
80/80 [==============================] - 0s 884us/step - loss: 0.4347 - accuracy: 0.7
063
Epoch 159/400
80/80 [==============================] - 0s 894us/step - loss: 0.4343 - accuracy: 0.7
063
Epoch 160/400
```

```
80/80 [==============================] - 0s 934us/step - loss: 0.4344 - accuracy: 0.6
812
Epoch 161/400
80/80 [==============================] - 0s 871us/step - loss: 0.4340 - accuracy: 0.7
000
Epoch 162/400
80/80 [==============================] - 0s 884us/step - loss: 0.4338 - accuracy: 0.7
000
Epoch 163/400
80/80 [==============================] - 0s 985us/step - loss: 0.4334 - accuracy: 0.7
000
Epoch 164/400
80/80 [==============================] - 0s 922us/step - loss: 0.4330 - accuracy: 0.6
750
Epoch 165/400
80/80 [==============================] - 0s 871us/step - loss: 0.4326 - accuracy: 0.7
063
Epoch 166/400
80/80 [==============================] - 0s 884us/step - loss: 0.4327 - accuracy: 0.6
812
Epoch 167/400
80/80 [==============================] - 0s 891us/step - loss: 0.4322 - accuracy: 0.6
625
Epoch 168/400
80/80 [==============================] - 0s 871us/step - loss: 0.4318 - accuracy: 0.6
938
Epoch 169/400
80/80 [==============================] - 0s 875us/step - loss: 0.4311 - accuracy: 0.7
000
Epoch 170/400
80/80 [==============================] - 0s 891us/step - loss: 0.4313 - accuracy: 0.7
125
Epoch 171/400
80/80 [==============================] - 0s 896us/step - loss: 0.4314 - accuracy: 0.7
125
Epoch 172/400
80/80 [==============================] - 0s 884us/step - loss: 0.4311 - accuracy: 0.7
063
Epoch 173/400
80/80 [==============================] - 0s 879us/step - loss: 0.4308 - accuracy: 0.6
375
Epoch 174/400
80/80 [==============================] - 0s 891us/step - loss: 0.4303 - accuracy: 0.6
938
Epoch 175/400
80/80 [==============================] - 0s 895us/step - loss: 0.4299 - accuracy: 0.7
125
Epoch 176/400
80/80 [==============================] - 0s 898us/step - loss: 0.4298 - accuracy: 0.6
938
Epoch 177/400
80/80 [==============================] - 0s 884us/step - loss: 0.4296 - accuracy: 0.6
938
Epoch 178/400
80/80 [==============================] - 0s 896us/step - loss: 0.4295 - accuracy: 0.7
063
Epoch 179/400
80/80 [==============================] - 0s 884us/step - loss: 0.4287 - accuracy: 0.6
375
Epoch 180/400
```

```
80/80 [==============================] - 0s 902us/step - loss: 0.4291 - accuracy: 0.6
875
Epoch 181/400
80/80 [==============================] - 0s 896us/step - loss: 0.4286 - accuracy: 0.7
125
Epoch 182/400
80/80 [==============================] - 0s 871us/step - loss: 0.4282 - accuracy: 0.6
750
Epoch 183/400
80/80 [==============================] - 0s 947us/step - loss: 0.4279 - accuracy: 0.6
750
Epoch 184/400
80/80 [==============================] - 0s 892us/step - loss: 0.4277 - accuracy: 0.7
063
Epoch 185/400
80/80 [==============================] - 0s 891us/step - loss: 0.4275 - accuracy: 0.7
063
Epoch 186/400
80/80 [==============================] - 0s 884us/step - loss: 0.4273 - accuracy: 0.6
875
Epoch 187/400
80/80 [==============================] - 0s 884us/step - loss: 0.4265 - accuracy: 0.7
125
Epoch 188/400
80/80 [==============================] - 0s 898us/step - loss: 0.4267 - accuracy: 0.6
938
Epoch 189/400
80/80 [==============================] - 0s 896us/step - loss: 0.4262 - accuracy: 0.6
750
Epoch 190/400
80/80 [==============================] - 0s 933us/step - loss: 0.4258 - accuracy: 0.7
125
Epoch 191/400
80/80 [==============================] - 0s 909us/step - loss: 0.4260 - accuracy: 0.7
063
Epoch 192/400
80/80 [==============================] - 0s 896us/step - loss: 0.4256 - accuracy: 0.7
000
Epoch 193/400
80/80 [==============================] - 0s 896us/step - loss: 0.4252 - accuracy: 0.7
125
Epoch 194/400
80/80 [==============================] - 0s 903us/step - loss: 0.4255 - accuracy: 0.7
000
Epoch 195/400
80/80 [==============================] - 0s 884us/step - loss: 0.4252 - accuracy: 0.7
000
Epoch 196/400
80/80 [==============================] - 0s 909us/step - loss: 0.4245 - accuracy: 0.7
000
Epoch 197/400
80/80 [==============================] - 0s 871us/step - loss: 0.4246 - accuracy: 0.7
063
Epoch 198/400
80/80 [==============================] - 0s 909us/step - loss: 0.4240 - accuracy: 0.7
000
Epoch 199/400
80/80 [==============================] - 0s 884us/step - loss: 0.4237 - accuracy: 0.6
875
Epoch 200/400
```

```
80/80 [==============================] - 0s 884us/step - loss: 0.4238 - accuracy: 0.6
562
Epoch 201/400
80/80 [==============================] - 0s 922us/step - loss: 0.4235 - accuracy: 0.7
125
Epoch 202/400
80/80 [==============================] - 0s 922us/step - loss: 0.4235 - accuracy: 0.7
000
Epoch 203/400
80/80 [==============================] - 0s 896us/step - loss: 0.4226 - accuracy: 0.6
375
Epoch 204/400
80/80 [==============================] - 0s 896us/step - loss: 0.4229 - accuracy: 0.6
562
Epoch 205/400
80/80 [==============================] - 0s 909us/step - loss: 0.4222 - accuracy: 0.6
500
Epoch 206/400
80/80 [==============================] - 0s 871us/step - loss: 0.4224 - accuracy: 0.7
188
Epoch 207/400
80/80 [==============================] - 0s 884us/step - loss: 0.4217 - accuracy: 0.7
125
Epoch 208/400
80/80 [==============================] - 0s 934us/step - loss: 0.4218 - accuracy: 0.6
938
Epoch 209/400
80/80 [==============================] - 0s 896us/step - loss: 0.4217 - accuracy: 0.6
875
Epoch 210/400
80/80 [==============================] - 0s 896us/step - loss: 0.4212 - accuracy: 0.6
875
Epoch 211/400
80/80 [==============================] - 0s 896us/step - loss: 0.4209 - accuracy: 0.6
812
Epoch 212/400
80/80 [==============================] - 0s 896us/step - loss: 0.4204 - accuracy: 0.7
188
Epoch 213/400
80/80 [==============================] - 0s 934us/step - loss: 0.4203 - accuracy: 0.7
063
Epoch 214/400
80/80 [==============================] - 0s 896us/step - loss: 0.4201 - accuracy: 0.7
063
Epoch 215/400
80/80 [==============================] - 0s 922us/step - loss: 0.4200 - accuracy: 0.6
875
Epoch 216/400
80/80 [==============================] - 0s 888us/step - loss: 0.4203 - accuracy: 0.6
562
Epoch 217/400
80/80 [==============================] - 0s 894us/step - loss: 0.4194 - accuracy: 0.6
812
Epoch 218/400
80/80 [==============================] - 0s 896us/step - loss: 0.4189 - accuracy: 0.7
063
Epoch 219/400
80/80 [==============================] - 0s 922us/step - loss: 0.4191 - accuracy: 0.6
500
Epoch 220/400
```

```
80/80 [==============================] - 0s 940us/step - loss: 0.4185 - accuracy: 0.6
812
Epoch 221/400
80/80 [==============================] - 0s 909us/step - loss: 0.4183 - accuracy: 0.6
938
Epoch 222/400
80/80 [==============================] - 0s 884us/step - loss: 0.4181 - accuracy: 0.6
938
Epoch 223/400
80/80 [==============================] - 0s 955us/step - loss: 0.4175 - accuracy: 0.7
063
Epoch 224/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4173 - accuracy: 0.681
2
Epoch 225/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4171 - accuracy: 0.656
2
Epoch 226/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4172 - accuracy: 0.712
5
Epoch 227/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4162 - accuracy: 0.700
0
Epoch 228/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4167 - accuracy: 0.706
3
Epoch 229/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4163 - accuracy: 0.700
0
Epoch 230/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4156 - accuracy: 0.712
5
Epoch 231/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4155 - accuracy: 0.587
5
Epoch 232/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4157 - accuracy: 0.706
3
Epoch 233/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4150 - accuracy: 0.712
5
Epoch 234/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4150 - accuracy: 0.662
5
Epoch 235/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4149 - accuracy: 0.675
0
Epoch 236/400
80/80 [==============================] - 0s 985us/step - loss: 0.4148 - accuracy: 0.7
188
Epoch 237/400
80/80 [==============================] - 0s 972us/step - loss: 0.4139 - accuracy: 0.6
687
Epoch 238/400
80/80 [==============================] - 0s 937us/step - loss: 0.4137 - accuracy: 0.6
313
Epoch 239/400
80/80 [==============================] - 0s 985us/step - loss: 0.4134 - accuracy: 0.7
063
Epoch 240/400
```

```
80/80 [==============================] - 0s 926us/step - loss: 0.4131 - accuracy: 0.6
938
Epoch 241/400
80/80 [==============================] - 0s 898us/step - loss: 0.4132 - accuracy: 0.6
562
Epoch 242/400
80/80 [==============================] - 0s 884us/step - loss: 0.4125 - accuracy: 0.7
063
Epoch 243/400
80/80 [==============================] - 0s 888us/step - loss: 0.4127 - accuracy: 0.7
125
Epoch 244/400
80/80 [==============================] - 0s 893us/step - loss: 0.4125 - accuracy: 0.7
063
Epoch 245/400
80/80 [==============================] - 0s 892us/step - loss: 0.4118 - accuracy: 0.6
250
Epoch 246/400
80/80 [==============================] - 0s 901us/step - loss: 0.4114 - accuracy: 0.6
375
Epoch 247/400
80/80 [==============================] - 0s 884us/step - loss: 0.4114 - accuracy: 0.7
125
Epoch 248/400
80/80 [==============================] - 0s 871us/step - loss: 0.4111 - accuracy: 0.6
562
Epoch 249/400
80/80 [==============================] - 0s 896us/step - loss: 0.4106 - accuracy: 0.6
625
Epoch 250/400
80/80 [==============================] - 0s 892us/step - loss: 0.4107 - accuracy: 0.7
000
Epoch 251/400
80/80 [==============================] - 0s 856us/step - loss: 0.4105 - accuracy: 0.6
938
Epoch 252/400
80/80 [==============================] - 0s 846us/step - loss: 0.4100 - accuracy: 0.6
812
Epoch 253/400
80/80 [==============================] - 0s 871us/step - loss: 0.4097 - accuracy: 0.6
938
Epoch 254/400
80/80 [==============================] - 0s 887us/step - loss: 0.4095 - accuracy: 0.6
812
Epoch 255/400
80/80 [==============================] - 0s 871us/step - loss: 0.4092 - accuracy: 0.7
125
Epoch 256/400
80/80 [==============================] - 0s 895us/step - loss: 0.4093 - accuracy: 0.6
062
Epoch 257/400
80/80 [==============================] - 0s 858us/step - loss: 0.4089 - accuracy: 0.6
187
Epoch 258/400
80/80 [==============================] - 0s 846us/step - loss: 0.4091 - accuracy: 0.7
063
Epoch 259/400
80/80 [==============================] - 0s 858us/step - loss: 0.4086 - accuracy: 0.6
375
Epoch 260/400
```

```
80/80 [==============================] - 0s 884us/step - loss: 0.4079 - accuracy: 0.6
438
Epoch 261/400
80/80 [==============================] - 0s 909us/step - loss: 0.4080 - accuracy: 0.7
125
Epoch 262/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4075 - accuracy: 0.712
5
Epoch 263/400
80/80 [==============================] - 0s 940us/step - loss: 0.4072 - accuracy: 0.6
187
Epoch 264/400
80/80 [==============================] - 0s 909us/step - loss: 0.4069 - accuracy: 0.7
125
Epoch 265/400
80/80 [==============================] - 0s 898us/step - loss: 0.4070 - accuracy: 0.6
375
Epoch 266/400
80/80 [==============================] - 0s 909us/step - loss: 0.4066 - accuracy: 0.6
938
Epoch 267/400
80/80 [==============================] - 0s 884us/step - loss: 0.4061 - accuracy: 0.6
687
Epoch 268/400
80/80 [==============================] - 0s 858us/step - loss: 0.4062 - accuracy: 0.7
063
Epoch 269/400
80/80 [==============================] - 0s 850us/step - loss: 0.4054 - accuracy: 0.7
000
Epoch 270/400
80/80 [==============================] - 0s 858us/step - loss: 0.4054 - accuracy: 0.6
625
Epoch 271/400
80/80 [==============================] - 0s 871us/step - loss: 0.4053 - accuracy: 0.6
938
Epoch 272/400
80/80 [==============================] - 0s 904us/step - loss: 0.4046 - accuracy: 0.7
063
Epoch 273/400
80/80 [==============================] - 0s 884us/step - loss: 0.4045 - accuracy: 0.6
187
Epoch 274/400
80/80 [==============================] - 0s 866us/step - loss: 0.4048 - accuracy: 0.6
750
Epoch 275/400
80/80 [==============================] - 0s 875us/step - loss: 0.4039 - accuracy: 0.6
687
Epoch 276/400
80/80 [==============================] - 0s 851us/step - loss: 0.4039 - accuracy: 0.7
063
Epoch 277/400
80/80 [==============================] - 0s 877us/step - loss: 0.4039 - accuracy: 0.6
500
Epoch 278/400
80/80 [==============================] - 0s 871us/step - loss: 0.4034 - accuracy: 0.6
500
Epoch 279/400
80/80 [==============================] - 0s 889us/step - loss: 0.4032 - accuracy: 0.6
438
Epoch 280/400
```

```
80/80 [==============================] - 0s 855us/step - loss: 0.4031 - accuracy: 0.6
938
Epoch 281/400
80/80 [==============================] - 0s 878us/step - loss: 0.4028 - accuracy: 0.6
750
Epoch 282/400
80/80 [==============================] - 0s 858us/step - loss: 0.4022 - accuracy: 0.6
562
Epoch 283/400
80/80 [==============================] - 0s 891us/step - loss: 0.4022 - accuracy: 0.6
313
Epoch 284/400
80/80 [==============================] - 0s 881us/step - loss: 0.4019 - accuracy: 0.6
313
Epoch 285/400
80/80 [==============================] - 0s 858us/step - loss: 0.4018 - accuracy: 0.7
000
Epoch 286/400
80/80 [==============================] - 0s 955us/step - loss: 0.4016 - accuracy: 0.6
875
Epoch 287/400
80/80 [==============================] - 0s 909us/step - loss: 0.4015 - accuracy: 0.6
250
Epoch 288/400
80/80 [==============================] - 0s 896us/step - loss: 0.4013 - accuracy: 0.6
000
Epoch 289/400
80/80 [==============================] - 0s 921us/step - loss: 0.4013 - accuracy: 0.6
687
Epoch 290/400
80/80 [==============================] - 0s 889us/step - loss: 0.4007 - accuracy: 0.6
812
Epoch 291/400
80/80 [==============================] - 0s 871us/step - loss: 0.4006 - accuracy: 0.7
125
Epoch 292/400
80/80 [==============================] - 0s 858us/step - loss: 0.4000 - accuracy: 0.5
875
Epoch 293/400
80/80 [==============================] - 0s 902us/step - loss: 0.4001 - accuracy: 0.7
125
Epoch 294/400
80/80 [==============================] - 0s 896us/step - loss: 0.3999 - accuracy: 0.6
938
Epoch 295/400
80/80 [==============================] - 0s 950us/step - loss: 0.3994 - accuracy: 0.6
438
Epoch 296/400
80/80 [==============================] - 0s 858us/step - loss: 0.3996 - accuracy: 0.6
438
Epoch 297/400
80/80 [==============================] - 0s 896us/step - loss: 0.3996 - accuracy: 0.6
875
Epoch 298/400
80/80 [==============================] - 0s 909us/step - loss: 0.3989 - accuracy: 0.6
750
Epoch 299/400
80/80 [==============================] - 0s 871us/step - loss: 0.3987 - accuracy: 0.6
313
Epoch 300/400
```

```
80/80 [==============================] - 0s 871us/step - loss: 0.3984 - accuracy: 0.7
063
Epoch 301/400
80/80 [==============================] - 0s 846us/step - loss: 0.3983 - accuracy: 0.7
188
Epoch 302/400
80/80 [==============================] - 0s 871us/step - loss: 0.3982 - accuracy: 0.7
188
Epoch 303/400
80/80 [==============================] - 0s 918us/step - loss: 0.3976 - accuracy: 0.6
875
Epoch 304/400
80/80 [==============================] - 0s 935us/step - loss: 0.3973 - accuracy: 0.6
812
Epoch 305/400
80/80 [==============================] - 0s 909us/step - loss: 0.3970 - accuracy: 0.7
063
Epoch 306/400
80/80 [==============================] - 0s 926us/step - loss: 0.3972 - accuracy: 0.7
000
Epoch 307/400
80/80 [==============================] - 0s 934us/step - loss: 0.3971 - accuracy: 0.6
562
Epoch 308/400
80/80 [==============================] - 0s 882us/step - loss: 0.3965 - accuracy: 0.7
188
Epoch 309/400
80/80 [==============================] - 0s 901us/step - loss: 0.3960 - accuracy: 0.6
562
Epoch 310/400
80/80 [==============================] - 0s 909us/step - loss: 0.3964 - accuracy: 0.6
062
Epoch 311/400
80/80 [==============================] - 0s 921us/step - loss: 0.3964 - accuracy: 0.6
438
Epoch 312/400
80/80 [==============================] - 0s 907us/step - loss: 0.3960 - accuracy: 0.6
687
Epoch 313/400
80/80 [==============================] - 0s 930us/step - loss: 0.3958 - accuracy: 0.7
125
Epoch 314/400
80/80 [==============================] - 0s 972us/step - loss: 0.3955 - accuracy: 0.7
188
Epoch 315/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3951 - accuracy: 0.650
0
Epoch 316/400
80/80 [==============================] - 0s 974us/step - loss: 0.3952 - accuracy: 0.6
562
Epoch 317/400
80/80 [==============================] - 0s 950us/step - loss: 0.3952 - accuracy: 0.7
188
Epoch 318/400
80/80 [==============================] - 0s 934us/step - loss: 0.3946 - accuracy: 0.6
375
Epoch 319/400
80/80 [==============================] - 0s 894us/step - loss: 0.3946 - accuracy: 0.7
063
Epoch 320/400
```

```
80/80 [==============================] - 0s 896us/step - loss: 0.3945 - accuracy: 0.6
000
Epoch 321/400
80/80 [==============================] - 0s 896us/step - loss: 0.3942 - accuracy: 0.6
125
Epoch 322/400
80/80 [==============================] - 0s 896us/step - loss: 0.3943 - accuracy: 0.6
313
Epoch 323/400
80/80 [==============================] - 0s 896us/step - loss: 0.3939 - accuracy: 0.6
562
Epoch 324/400
80/80 [==============================] - 0s 896us/step - loss: 0.3938 - accuracy: 0.6
562
Epoch 325/400
80/80 [==============================] - 0s 871us/step - loss: 0.3933 - accuracy: 0.7
063
Epoch 326/400
80/80 [==============================] - 0s 936us/step - loss: 0.3935 - accuracy: 0.5
875
Epoch 327/400
80/80 [==============================] - 0s 909us/step - loss: 0.3932 - accuracy: 0.7
125
Epoch 328/400
80/80 [==============================] - 0s 922us/step - loss: 0.3930 - accuracy: 0.6
562
Epoch 329/400
80/80 [==============================] - 0s 918us/step - loss: 0.3927 - accuracy: 0.7
000
Epoch 330/400
80/80 [==============================] - 0s 909us/step - loss: 0.3925 - accuracy: 0.6
875
Epoch 331/400
80/80 [==============================] - 0s 896us/step - loss: 0.3926 - accuracy: 0.6
687
Epoch 332/400
80/80 [==============================] - 0s 922us/step - loss: 0.3923 - accuracy: 0.6
187
Epoch 333/400
80/80 [==============================] - 0s 936us/step - loss: 0.3920 - accuracy: 0.6
250
Epoch 334/400
80/80 [==============================] - 0s 896us/step - loss: 0.3919 - accuracy: 0.6
500
Epoch 335/400
80/80 [==============================] - 0s 930us/step - loss: 0.3919 - accuracy: 0.7
125
Epoch 336/400
80/80 [==============================] - 0s 922us/step - loss: 0.3918 - accuracy: 0.6
187
Epoch 337/400
80/80 [==============================] - 0s 916us/step - loss: 0.3916 - accuracy: 0.6
438
Epoch 338/400
80/80 [==============================] - 0s 909us/step - loss: 0.3913 - accuracy: 0.7
063
Epoch 339/400
80/80 [==============================] - 0s 911us/step - loss: 0.3911 - accuracy: 0.6
438
Epoch 340/400
```

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80/80 [==============================] - 0s 922us/step - loss: 0.3908 - accuracy: 0.6
313
Epoch 341/400
80/80 [==============================] - 0s 938us/step - loss: 0.3910 - accuracy: 0.6
938
Epoch 342/400
80/80 [==============================] - 0s 922us/step - loss: 0.3907 - accuracy: 0.7
063
Epoch 343/400
80/80 [==============================] - 0s 934us/step - loss: 0.3905 - accuracy: 0.6
938
Epoch 344/400
80/80 [==============================] - 0s 938us/step - loss: 0.3905 - accuracy: 0.6
562
Epoch 345/400
80/80 [==============================] - 0s 937us/step - loss: 0.3898 - accuracy: 0.6
000
Epoch 346/400
80/80 [==============================] - 0s 934us/step - loss: 0.3901 - accuracy: 0.6
875
Epoch 347/400
80/80 [==============================] - 0s 947us/step - loss: 0.3899 - accuracy: 0.6
562
Epoch 348/400
80/80 [==============================] - 0s 921us/step - loss: 0.3899 - accuracy: 0.7
188
Epoch 349/400
80/80 [==============================] - 0s 909us/step - loss: 0.3894 - accuracy: 0.6
375
Epoch 350/400
80/80 [==============================] - 0s 905us/step - loss: 0.3895 - accuracy: 0.7
063
Epoch 351/400
80/80 [==============================] - 0s 941us/step - loss: 0.3893 - accuracy: 0.6
500
Epoch 352/400
80/80 [==============================] - 0s 946us/step - loss: 0.3891 - accuracy: 0.6
625
Epoch 353/400
80/80 [==============================] - 0s 898us/step - loss: 0.3892 - accuracy: 0.6
750
Epoch 354/400
80/80 [==============================] - 0s 908us/step - loss: 0.3891 - accuracy: 0.5
813
Epoch 355/400
80/80 [==============================] - 0s 923us/step - loss: 0.3887 - accuracy: 0.6
812
Epoch 356/400
80/80 [==============================] - 0s 928us/step - loss: 0.3887 - accuracy: 0.6
500
Epoch 357/400
80/80 [==============================] - 0s 905us/step - loss: 0.3887 - accuracy: 0.6
438
Epoch 358/400
80/80 [==============================] - 0s 904us/step - loss: 0.3884 - accuracy: 0.6
438
Epoch 359/400
80/80 [==============================] - 0s 907us/step - loss: 0.3878 - accuracy: 0.6
750
Epoch 360/400
```

```
80/80 [==============================] - 0s 943us/step - loss: 0.3881 - accuracy: 0.6
500
Epoch 361/400
80/80 [==============================] - 0s 934us/step - loss: 0.3875 - accuracy: 0.7
188
Epoch 362/400
80/80 [==============================] - 0s 884us/step - loss: 0.3878 - accuracy: 0.6
062
Epoch 363/400
80/80 [==============================] - 0s 957us/step - loss: 0.3878 - accuracy: 0.6
438
Epoch 364/400
80/80 [==============================] - 0s 954us/step - loss: 0.3877 - accuracy: 0.6
500
Epoch 365/400
80/80 [==============================] - 0s 958us/step - loss: 0.3874 - accuracy: 0.6
375
Epoch 366/400
80/80 [==============================] - 0s 922us/step - loss: 0.3869 - accuracy: 0.7
125
Epoch 367/400
80/80 [==============================] - 0s 902us/step - loss: 0.3870 - accuracy: 0.6
687
Epoch 368/400
80/80 [==============================] - 0s 935us/step - loss: 0.3868 - accuracy: 0.6
750
Epoch 369/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3866 - accuracy: 0.693
8
Epoch 370/400
80/80 [==============================] - 0s 952us/step - loss: 0.3865 - accuracy: 0.6
687
Epoch 371/400
80/80 [==============================] - 0s 896us/step - loss: 0.3866 - accuracy: 0.6
187
Epoch 372/400
80/80 [==============================] - 0s 934us/step - loss: 0.3865 - accuracy: 0.6
750
Epoch 373/400
80/80 [==============================] - 0s 947us/step - loss: 0.3862 - accuracy: 0.5
813
Epoch 374/400
80/80 [==============================] - 0s 962us/step - loss: 0.3862 - accuracy: 0.7
000
Epoch 375/400
80/80 [==============================] - 0s 952us/step - loss: 0.3860 - accuracy: 0.6
313
Epoch 376/400
80/80 [==============================] - 0s 922us/step - loss: 0.3859 - accuracy: 0.6
812
Epoch 377/400
80/80 [==============================] - 0s 922us/step - loss: 0.3858 - accuracy: 0.6
562
Epoch 378/400
80/80 [==============================] - 0s 917us/step - loss: 0.3857 - accuracy: 0.6
687
Epoch 379/400
80/80 [==============================] - 0s 918us/step - loss: 0.3859 - accuracy: 0.6
500
Epoch 380/400
```

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80/80 [==============================] - 0s 922us/step - loss: 0.3853 - accuracy: 0.5
875
Epoch 381/400
80/80 [==============================] - 0s 948us/step - loss: 0.3853 - accuracy: 0.6
250
Epoch 382/400
80/80 [==============================] - 0s 972us/step - loss: 0.3851 - accuracy: 0.6
875
Epoch 383/400
80/80 [==============================] - 0s 956us/step - loss: 0.3851 - accuracy: 0.7
188
Epoch 384/400
80/80 [==============================] - 0s 922us/step - loss: 0.3848 - accuracy: 0.6
438
Epoch 385/400
80/80 [==============================] - 0s 909us/step - loss: 0.3846 - accuracy: 0.6
500
Epoch 386/400
80/80 [==============================] - 0s 959us/step - loss: 0.3848 - accuracy: 0.6
687
Epoch 387/400
80/80 [==============================] - 0s 959us/step - loss: 0.3847 - accuracy: 0.6
313
Epoch 388/400
80/80 [==============================] - 0s 909us/step - loss: 0.3846 - accuracy: 0.7
063
Epoch 389/400
80/80 [==============================] - 0s 947us/step - loss: 0.3844 - accuracy: 0.5
688
Epoch 390/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3843 - accuracy: 0.662
5
Epoch 391/400
80/80 [==============================] - 0s 959us/step - loss: 0.3840 - accuracy: 0.7
375
Epoch 392/400
80/80 [==============================] - 0s 946us/step - loss: 0.3840 - accuracy: 0.5
938
Epoch 393/400
80/80 [==============================] - 0s 914us/step - loss: 0.3837 - accuracy: 0.6
687
Epoch 394/400
80/80 [==============================] - 0s 913us/step - loss: 0.3841 - accuracy: 0.6
375
Epoch 395/400
80/80 [==============================] - 0s 915us/step - loss: 0.3833 - accuracy: 0.5
938
Epoch 396/400
80/80 [==============================] - 0s 916us/step - loss: 0.3834 - accuracy: 0.6
938
Epoch 397/400
80/80 [==============================] - 0s 909us/step - loss: 0.3836 - accuracy: 0.6
500
Epoch 398/400
80/80 [==============================] - 0s 896us/step - loss: 0.3835 - accuracy: 0.5
938
Epoch 399/400
80/80 [==============================] - 0s 922us/step - loss: 0.3833 - accuracy: 0.6
500
Epoch 400/400
```

```
80/80 [==============================] - 0s 908us/step - loss: 0.3831 - accuracy: 0.6
938
5/5 [==============================] - 0s 1ms/step - loss: 0.3807 - accuracy: 0.5250
Epoch 1/400
80/80 [==============================] - 0s 783us/step - loss: 0.6964 - accuracy: 0.5
312
Epoch 2/400
80/80 [==============================] - 0s 783us/step - loss: 0.6943 - accuracy: 0.5
437
Epoch 3/400
80/80 [==============================] - 0s 802us/step - loss: 0.6921 - accuracy: 0.5
688
Epoch 4/400
80/80 [==============================] - 0s 819us/step - loss: 0.6903 - accuracy: 0.5
813
Epoch 5/400
80/80 [==============================] - 0s 823us/step - loss: 0.6885 - accuracy: 0.5
938
Epoch 6/400
80/80 [==============================] - 0s 841us/step - loss: 0.6868 - accuracy: 0.5
625
Epoch 7/400
80/80 [==============================] - 0s 851us/step - loss: 0.6850 - accuracy: 0.6
187
Epoch 8/400
80/80 [==============================] - 0s 846us/step - loss: 0.6829 - accuracy: 0.6
187
Epoch 9/400
80/80 [==============================] - 0s 846us/step - loss: 0.6806 - accuracy: 0.6
187
Epoch 10/400
80/80 [==============================] - 0s 899us/step - loss: 0.6781 - accuracy: 0.6
187
Epoch 11/400
80/80 [==============================] - 0s 909us/step - loss: 0.6756 - accuracy: 0.6
250
Epoch 12/400
80/80 [==============================] - 0s 878us/step - loss: 0.6731 - accuracy: 0.6
438
Epoch 13/400
80/80 [==============================] - 0s 871us/step - loss: 0.6700 - accuracy: 0.6
438
Epoch 14/400
80/80 [==============================] - 0s 934us/step - loss: 0.6668 - accuracy: 0.6
438
Epoch 15/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6637 - accuracy: 0.668
7
Epoch 16/400
80/80 [==============================] - 0s 997us/step - loss: 0.6606 - accuracy: 0.6
687
Epoch 17/400
80/80 [==============================] - 0s 949us/step - loss: 0.6573 - accuracy: 0.6
625
Epoch 18/400
80/80 [==============================] - 0s 947us/step - loss: 0.6533 - accuracy: 0.6
750
Epoch 19/400
80/80 [==============================] - 0s 908us/step - loss: 0.6497 - accuracy: 0.6
812
```

```
Epoch 20/400
80/80 [==============================] - 0s 907us/step - loss: 0.6462 - accuracy: 0.6
812
Epoch 21/400
80/80 [==============================] - 0s 907us/step - loss: 0.6421 - accuracy: 0.6
812
Epoch 22/400
80/80 [==============================] - 0s 914us/step - loss: 0.6380 - accuracy: 0.6
812
Epoch 23/400
80/80 [==============================] - 0s 959us/step - loss: 0.6337 - accuracy: 0.6
875
Epoch 24/400
80/80 [==============================] - 0s 954us/step - loss: 0.6295 - accuracy: 0.6
875
Epoch 25/400
80/80 [==============================] - 0s 947us/step - loss: 0.6253 - accuracy: 0.6
875
Epoch 26/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6208 - accuracy: 0.687
5
Epoch 27/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6165 - accuracy: 0.687
5
Epoch 28/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6114 - accuracy: 0.687
5
Epoch 29/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6067 - accuracy: 0.681
2
Epoch 30/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6005 - accuracy: 0.681
2
Epoch 31/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5952 - accuracy: 0.693
8
Epoch 32/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5895 - accuracy: 0.687
5
Epoch 33/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5826 - accuracy: 0.687
5
Epoch 34/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5756 - accuracy: 0.687
5
Epoch 35/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5670 - accuracy: 0.687
5
Epoch 36/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5574 - accuracy: 0.693
8
Epoch 37/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5461 - accuracy: 0.793
7
Epoch 38/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5340 - accuracy: 0.762
5
Epoch 39/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5212 - accuracy: 0.793
7
```

```
Epoch 40/400
80/80 [==============================] - 0s 985us/step - loss: 0.5057 - accuracy: 0.8
313
Epoch 41/400
80/80 [==============================] - 0s 975us/step - loss: 0.4904 - accuracy: 0.8
438
Epoch 42/400
80/80 [==============================] - 0s 985us/step - loss: 0.4741 - accuracy: 0.8
438
Epoch 43/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4606 - accuracy: 0.843
8
Epoch 44/400
80/80 [==============================] - 0s 985us/step - loss: 0.4469 - accuracy: 0.8
313
Epoch 45/400
80/80 [==============================] - 0s 922us/step - loss: 0.4316 - accuracy: 0.8
500
Epoch 46/400
80/80 [==============================] - 0s 958us/step - loss: 0.4190 - accuracy: 0.8
500
Epoch 47/400
80/80 [==============================] - 0s 922us/step - loss: 0.4101 - accuracy: 0.8
562
Epoch 48/400
80/80 [==============================] - 0s 934us/step - loss: 0.4001 - accuracy: 0.8
438
Epoch 49/400
80/80 [==============================] - 0s 897us/step - loss: 0.3925 - accuracy: 0.8
500
Epoch 50/400
80/80 [==============================] - 0s 884us/step - loss: 0.3861 - accuracy: 0.8
625
Epoch 51/400
80/80 [==============================] - 0s 871us/step - loss: 0.3785 - accuracy: 0.8
500
Epoch 52/400
80/80 [==============================] - 0s 882us/step - loss: 0.3733 - accuracy: 0.8
625
Epoch 53/400
80/80 [==============================] - 0s 884us/step - loss: 0.3700 - accuracy: 0.8
750
Epoch 54/400
80/80 [==============================] - 0s 865us/step - loss: 0.3657 - accuracy: 0.8
687
Epoch 55/400
80/80 [==============================] - 0s 882us/step - loss: 0.3618 - accuracy: 0.8
687
Epoch 56/400
80/80 [==============================] - 0s 884us/step - loss: 0.3567 - accuracy: 0.8
500
Epoch 57/400
80/80 [==============================] - 0s 871us/step - loss: 0.3593 - accuracy: 0.8
687
Epoch 58/400
80/80 [==============================] - 0s 934us/step - loss: 0.3558 - accuracy: 0.8
625
Epoch 59/400
80/80 [==============================] - 0s 919us/step - loss: 0.3527 - accuracy: 0.8
687
```

```
Epoch 60/400
80/80 [==============================] - 0s 925us/step - loss: 0.3504 - accuracy: 0.8
687
Epoch 61/400
80/80 [==============================] - 0s 985us/step - loss: 0.3516 - accuracy: 0.8
750
Epoch 62/400
80/80 [==============================] - 0s 922us/step - loss: 0.3471 - accuracy: 0.8
687
Epoch 63/400
80/80 [==============================] - 0s 909us/step - loss: 0.3495 - accuracy: 0.8
687
Epoch 64/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3462 - accuracy: 0.856
2
Epoch 65/400
80/80 [==============================] - 0s 909us/step - loss: 0.3487 - accuracy: 0.8
687
Epoch 66/400
80/80 [==============================] - 0s 909us/step - loss: 0.3479 - accuracy: 0.8
687
Epoch 67/400
80/80 [==============================] - 0s 909us/step - loss: 0.3465 - accuracy: 0.8
562
Epoch 68/400
80/80 [==============================] - 0s 909us/step - loss: 0.3457 - accuracy: 0.8
687
Epoch 69/400
80/80 [==============================] - 0s 975us/step - loss: 0.3465 - accuracy: 0.8
562
Epoch 70/400
80/80 [==============================] - 0s 957us/step - loss: 0.3450 - accuracy: 0.8
625
Epoch 71/400
80/80 [==============================] - 0s 940us/step - loss: 0.3421 - accuracy: 0.8
750
Epoch 72/400
80/80 [==============================] - 0s 922us/step - loss: 0.3415 - accuracy: 0.8
687
Epoch 73/400
80/80 [==============================] - 0s 922us/step - loss: 0.3442 - accuracy: 0.8
750
Epoch 74/400
80/80 [==============================] - 0s 894us/step - loss: 0.3310 - accuracy: 0.8
500
Epoch 75/400
80/80 [==============================] - 0s 870us/step - loss: 0.3478 - accuracy: 0.8
687
Epoch 76/400
80/80 [==============================] - 0s 862us/step - loss: 0.3453 - accuracy: 0.8
625
Epoch 77/400
80/80 [==============================] - 0s 846us/step - loss: 0.3404 - accuracy: 0.8
750
Epoch 78/400
80/80 [==============================] - 0s 858us/step - loss: 0.3443 - accuracy: 0.8
687
Epoch 79/400
80/80 [==============================] - 0s 871us/step - loss: 0.3431 - accuracy: 0.8
750
```

```
Epoch 80/400
80/80 [==============================] - 0s 871us/step - loss: 0.3453 - accuracy: 0.8
562
Epoch 81/400
80/80 [==============================] - 0s 909us/step - loss: 0.3456 - accuracy: 0.8
687
Epoch 82/400
80/80 [==============================] - 0s 896us/step - loss: 0.3431 - accuracy: 0.8
750
Epoch 83/400
80/80 [==============================] - 0s 908us/step - loss: 0.3343 - accuracy: 0.8
750
Epoch 84/400
80/80 [==============================] - 0s 879us/step - loss: 0.3457 - accuracy: 0.8
500
Epoch 85/400
80/80 [==============================] - 0s 865us/step - loss: 0.3381 - accuracy: 0.8
687
Epoch 86/400
80/80 [==============================] - 0s 917us/step - loss: 0.3439 - accuracy: 0.8
562
Epoch 87/400
80/80 [==============================] - 0s 858us/step - loss: 0.3440 - accuracy: 0.8
625
Epoch 88/400
80/80 [==============================] - 0s 858us/step - loss: 0.3439 - accuracy: 0.8
625
Epoch 89/400
80/80 [==============================] - 0s 885us/step - loss: 0.3415 - accuracy: 0.8
687
Epoch 90/400
80/80 [==============================] - 0s 867us/step - loss: 0.3437 - accuracy: 0.8
562
Epoch 91/400
80/80 [==============================] - 0s 858us/step - loss: 0.3435 - accuracy: 0.8
687
Epoch 92/400
80/80 [==============================] - 0s 862us/step - loss: 0.3383 - accuracy: 0.8
562
Epoch 93/400
80/80 [==============================] - 0s 871us/step - loss: 0.3420 - accuracy: 0.8
750
Epoch 94/400
80/80 [==============================] - 0s 858us/step - loss: 0.3418 - accuracy: 0.8
687
Epoch 95/400
80/80 [==============================] - 0s 896us/step - loss: 0.3446 - accuracy: 0.8
625
Epoch 96/400
80/80 [==============================] - 0s 880us/step - loss: 0.3447 - accuracy: 0.8
625
Epoch 97/400
80/80 [==============================] - 0s 858us/step - loss: 0.3426 - accuracy: 0.8
687
Epoch 98/400
80/80 [==============================] - 0s 898us/step - loss: 0.3385 - accuracy: 0.8
750
Epoch 99/400
80/80 [==============================] - 0s 877us/step - loss: 0.3458 - accuracy: 0.8
687
```

```
Epoch 100/400
80/80 [==============================] - 0s 869us/step - loss: 0.3400 - accuracy: 0.8
687
Epoch 101/400
80/80 [==============================] - 0s 878us/step - loss: 0.3454 - accuracy: 0.8
562
Epoch 102/400
80/80 [==============================] - 0s 929us/step - loss: 0.3372 - accuracy: 0.8
687
Epoch 103/400
80/80 [==============================] - 0s 903us/step - loss: 0.3427 - accuracy: 0.8
750
Epoch 104/400
80/80 [==============================] - 0s 871us/step - loss: 0.3409 - accuracy: 0.8
562
Epoch 105/400
80/80 [==============================] - 0s 871us/step - loss: 0.3415 - accuracy: 0.8
625
Epoch 106/400
80/80 [==============================] - 0s 858us/step - loss: 0.3447 - accuracy: 0.8
625
Epoch 107/400
80/80 [==============================] - 0s 835us/step - loss: 0.3406 - accuracy: 0.8
500
Epoch 108/400
80/80 [==============================] - 0s 833us/step - loss: 0.3434 - accuracy: 0.8
687
Epoch 109/400
80/80 [==============================] - 0s 821us/step - loss: 0.3403 - accuracy: 0.8
562
Epoch 110/400
80/80 [==============================] - 0s 833us/step - loss: 0.3446 - accuracy: 0.8
625
Epoch 111/400
80/80 [==============================] - 0s 846us/step - loss: 0.3355 - accuracy: 0.8
438
Epoch 112/400
80/80 [==============================] - 0s 887us/step - loss: 0.3442 - accuracy: 0.8
750
Epoch 113/400
80/80 [==============================] - 0s 857us/step - loss: 0.3386 - accuracy: 0.8
625
Epoch 114/400
80/80 [==============================] - 0s 871us/step - loss: 0.3426 - accuracy: 0.8
750
Epoch 115/400
80/80 [==============================] - 0s 896us/step - loss: 0.3441 - accuracy: 0.8
562
Epoch 116/400
80/80 [==============================] - 0s 876us/step - loss: 0.3436 - accuracy: 0.8
500
Epoch 117/400
80/80 [==============================] - 0s 871us/step - loss: 0.3396 - accuracy: 0.8
687
Epoch 118/400
80/80 [==============================] - 0s 884us/step - loss: 0.3419 - accuracy: 0.8
687
Epoch 119/400
80/80 [==============================] - 0s 867us/step - loss: 0.3440 - accuracy: 0.8
687
```

```
Epoch 120/400
80/80 [==============================] - 0s 858us/step - loss: 0.3428 - accuracy: 0.8
687
Epoch 121/400
80/80 [==============================] - 0s 866us/step - loss: 0.3420 - accuracy: 0.8
687
Epoch 122/400
80/80 [==============================] - 0s 858us/step - loss: 0.3424 - accuracy: 0.8
750
Epoch 123/400
80/80 [==============================] - 0s 865us/step - loss: 0.3417 - accuracy: 0.8
687
Epoch 124/400
80/80 [==============================] - 0s 871us/step - loss: 0.3430 - accuracy: 0.8
687
Epoch 125/400
80/80 [==============================] - 0s 884us/step - loss: 0.3415 - accuracy: 0.8
687
Epoch 126/400
80/80 [==============================] - 0s 909us/step - loss: 0.3337 - accuracy: 0.8
625
Epoch 127/400
80/80 [==============================] - 0s 846us/step - loss: 0.3412 - accuracy: 0.8
750
Epoch 128/400
80/80 [==============================] - 0s 854us/step - loss: 0.3362 - accuracy: 0.8
687
Epoch 129/400
80/80 [==============================] - 0s 895us/step - loss: 0.3454 - accuracy: 0.8
625
Epoch 130/400
80/80 [==============================] - 0s 897us/step - loss: 0.3362 - accuracy: 0.8
562
Epoch 131/400
80/80 [==============================] - 0s 857us/step - loss: 0.3375 - accuracy: 0.8
750
Epoch 132/400
80/80 [==============================] - 0s 843us/step - loss: 0.3435 - accuracy: 0.8
625
Epoch 133/400
80/80 [==============================] - 0s 871us/step - loss: 0.3383 - accuracy: 0.8
750
Epoch 134/400
80/80 [==============================] - 0s 846us/step - loss: 0.3399 - accuracy: 0.8
750
Epoch 135/400
80/80 [==============================] - 0s 858us/step - loss: 0.3404 - accuracy: 0.8
625
Epoch 136/400
80/80 [==============================] - 0s 873us/step - loss: 0.3397 - accuracy: 0.8
813
Epoch 137/400
80/80 [==============================] - 0s 871us/step - loss: 0.3410 - accuracy: 0.8
562
Epoch 138/400
80/80 [==============================] - 0s 934us/step - loss: 0.3428 - accuracy: 0.8
687
Epoch 139/400
80/80 [==============================] - 0s 871us/step - loss: 0.3324 - accuracy: 0.8
750
```

```
Epoch 140/400
80/80 [==============================] - 0s 871us/step - loss: 0.3445 - accuracy: 0.8
750
Epoch 141/400
80/80 [==============================] - 0s 858us/step - loss: 0.3394 - accuracy: 0.8
687
Epoch 142/400
80/80 [==============================] - 0s 896us/step - loss: 0.3418 - accuracy: 0.8
687
Epoch 143/400
80/80 [==============================] - 0s 896us/step - loss: 0.3366 - accuracy: 0.8
625
Epoch 144/400
80/80 [==============================] - 0s 890us/step - loss: 0.3433 - accuracy: 0.8
750
Epoch 145/400
80/80 [==============================] - 0s 846us/step - loss: 0.3379 - accuracy: 0.8
562
Epoch 146/400
80/80 [==============================] - 0s 871us/step - loss: 0.3400 - accuracy: 0.8
687
Epoch 147/400
80/80 [==============================] - 0s 884us/step - loss: 0.3349 - accuracy: 0.8
687
Epoch 148/400
80/80 [==============================] - 0s 884us/step - loss: 0.3396 - accuracy: 0.8
625
Epoch 149/400
80/80 [==============================] - 0s 871us/step - loss: 0.3389 - accuracy: 0.8
500
Epoch 150/400
80/80 [==============================] - 0s 876us/step - loss: 0.3409 - accuracy: 0.8
625
Epoch 151/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3398 - accuracy: 0.881
3
Epoch 152/400
80/80 [==============================] - 0s 909us/step - loss: 0.3360 - accuracy: 0.8
500
Epoch 153/400
80/80 [==============================] - 0s 858us/step - loss: 0.3374 - accuracy: 0.8
625
Epoch 154/400
80/80 [==============================] - 0s 873us/step - loss: 0.3437 - accuracy: 0.8
625
Epoch 155/400
80/80 [==============================] - 0s 916us/step - loss: 0.3381 - accuracy: 0.8
625
Epoch 156/400
80/80 [==============================] - 0s 873us/step - loss: 0.3411 - accuracy: 0.8
687
Epoch 157/400
80/80 [==============================] - 0s 896us/step - loss: 0.3392 - accuracy: 0.8
562
Epoch 158/400
80/80 [==============================] - 0s 908us/step - loss: 0.3414 - accuracy: 0.8
438
Epoch 159/400
80/80 [==============================] - 0s 868us/step - loss: 0.3409 - accuracy: 0.8
687
```

```
Epoch 160/400
80/80 [==============================] - 0s 884us/step - loss: 0.3395 - accuracy: 0.8
687
Epoch 161/400
80/80 [==============================] - 0s 920us/step - loss: 0.3413 - accuracy: 0.8
687
Epoch 162/400
80/80 [==============================] - 0s 947us/step - loss: 0.3410 - accuracy: 0.8
625
Epoch 163/400
80/80 [==============================] - 0s 934us/step - loss: 0.3401 - accuracy: 0.8
687
Epoch 164/400
80/80 [==============================] - 0s 947us/step - loss: 0.3436 - accuracy: 0.8
750
Epoch 165/400
80/80 [==============================] - 0s 959us/step - loss: 0.3397 - accuracy: 0.8
687
Epoch 166/400
80/80 [==============================] - 0s 972us/step - loss: 0.3346 - accuracy: 0.8
750
Epoch 167/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3406 - accuracy: 0.875
0
Epoch 168/400
80/80 [==============================] - 0s 942us/step - loss: 0.3395 - accuracy: 0.8
750
Epoch 169/400
80/80 [==============================] - 0s 930us/step - loss: 0.3422 - accuracy: 0.8
687
Epoch 170/400
80/80 [==============================] - 0s 916us/step - loss: 0.3397 - accuracy: 0.8
562
Epoch 171/400
80/80 [==============================] - 0s 921us/step - loss: 0.3417 - accuracy: 0.8
625
Epoch 172/400
80/80 [==============================] - 0s 871us/step - loss: 0.3376 - accuracy: 0.8
750
Epoch 173/400
80/80 [==============================] - 0s 871us/step - loss: 0.3393 - accuracy: 0.8
625
Epoch 174/400
80/80 [==============================] - 0s 871us/step - loss: 0.3346 - accuracy: 0.8
562
Epoch 175/400
80/80 [==============================] - 0s 858us/step - loss: 0.3345 - accuracy: 0.8
750
Epoch 176/400
80/80 [==============================] - 0s 887us/step - loss: 0.3411 - accuracy: 0.8
500
Epoch 177/400
80/80 [==============================] - 0s 882us/step - loss: 0.3442 - accuracy: 0.8
687
Epoch 178/400
80/80 [==============================] - 0s 862us/step - loss: 0.3387 - accuracy: 0.8
625
Epoch 179/400
80/80 [==============================] - 0s 922us/step - loss: 0.3387 - accuracy: 0.8
500
```

```
Epoch 180/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3396 - accuracy: 0.868
7
Epoch 181/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3415 - accuracy: 0.862
5
Epoch 182/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3393 - accuracy: 0.868
7
Epoch 183/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3378 - accuracy: 0.856
2
Epoch 184/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3404 - accuracy: 0.875
0
Epoch 185/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3393 - accuracy: 0.862
5
Epoch 186/400
80/80 [==============================] - 0s 995us/step - loss: 0.3429 - accuracy: 0.8
687
Epoch 187/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3416 - accuracy: 0.868
7
Epoch 188/400
80/80 [==============================] - 0s 947us/step - loss: 0.3347 - accuracy: 0.8
687
Epoch 189/400
80/80 [==============================] - 0s 972us/step - loss: 0.3405 - accuracy: 0.8
687
Epoch 190/400
80/80 [==============================] - 0s 914us/step - loss: 0.3375 - accuracy: 0.8
562
Epoch 191/400
80/80 [==============================] - 0s 962us/step - loss: 0.3401 - accuracy: 0.8
625
Epoch 192/400
80/80 [==============================] - 0s 903us/step - loss: 0.3300 - accuracy: 0.8
625
Epoch 193/400
80/80 [==============================] - 0s 884us/step - loss: 0.3420 - accuracy: 0.8
625
Epoch 194/400
80/80 [==============================] - 0s 871us/step - loss: 0.3390 - accuracy: 0.8
750
Epoch 195/400
80/80 [==============================] - 0s 892us/step - loss: 0.3429 - accuracy: 0.8
625
Epoch 196/400
80/80 [==============================] - 0s 896us/step - loss: 0.3412 - accuracy: 0.8
687
Epoch 197/400
80/80 [==============================] - 0s 915us/step - loss: 0.3375 - accuracy: 0.8
687
Epoch 198/400
80/80 [==============================] - 0s 873us/step - loss: 0.3414 - accuracy: 0.8
750
Epoch 199/400
80/80 [==============================] - 0s 880us/step - loss: 0.3390 - accuracy: 0.8
750
```

```
Epoch 200/400
80/80 [==============================] - 0s 868us/step - loss: 0.3399 - accuracy: 0.8
500
Epoch 201/400
80/80 [==============================] - 0s 868us/step - loss: 0.3404 - accuracy: 0.8
687
Epoch 202/400
80/80 [==============================] - 0s 887us/step - loss: 0.3388 - accuracy: 0.8
625
Epoch 203/400
80/80 [==============================] - 0s 871us/step - loss: 0.3324 - accuracy: 0.8
438
Epoch 204/400
80/80 [==============================] - 0s 892us/step - loss: 0.3363 - accuracy: 0.8
687
Epoch 205/400
80/80 [==============================] - 0s 871us/step - loss: 0.3377 - accuracy: 0.8
500
Epoch 206/400
80/80 [==============================] - 0s 876us/step - loss: 0.3357 - accuracy: 0.8
750
Epoch 207/400
80/80 [==============================] - 0s 884us/step - loss: 0.3391 - accuracy: 0.8
625
Epoch 208/400
80/80 [==============================] - 0s 907us/step - loss: 0.3394 - accuracy: 0.8
625
Epoch 209/400
80/80 [==============================] - 0s 858us/step - loss: 0.3374 - accuracy: 0.8
750
Epoch 210/400
80/80 [==============================] - 0s 886us/step - loss: 0.3396 - accuracy: 0.8
625
Epoch 211/400
80/80 [==============================] - 0s 871us/step - loss: 0.3366 - accuracy: 0.8
625
Epoch 212/400
80/80 [==============================] - 0s 884us/step - loss: 0.3378 - accuracy: 0.8
750
Epoch 213/400
80/80 [==============================] - 0s 917us/step - loss: 0.3393 - accuracy: 0.8
750
Epoch 214/400
80/80 [==============================] - 0s 909us/step - loss: 0.3378 - accuracy: 0.8
687
Epoch 215/400
80/80 [==============================] - 0s 922us/step - loss: 0.3372 - accuracy: 0.8
687
Epoch 216/400
80/80 [==============================] - 0s 906us/step - loss: 0.3381 - accuracy: 0.8
750
Epoch 217/400
80/80 [==============================] - 0s 947us/step - loss: 0.3359 - accuracy: 0.8
625
Epoch 218/400
80/80 [==============================] - 0s 922us/step - loss: 0.3325 - accuracy: 0.8
500
Epoch 219/400
80/80 [==============================] - 0s 948us/step - loss: 0.3404 - accuracy: 0.8
625
```

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Epoch 220/400
80/80 [==============================] - 0s 934us/step - loss: 0.3389 - accuracy: 0.8
687
Epoch 221/400
80/80 [==============================] - 0s 985us/step - loss: 0.3357 - accuracy: 0.8
562
Epoch 222/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3400 - accuracy: 0.868
7
Epoch 223/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3383 - accuracy: 0.856
2
Epoch 224/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3373 - accuracy: 0.856
2
Epoch 225/400
80/80 [==============================] - 0s 983us/step - loss: 0.3398 - accuracy: 0.8
750
Epoch 226/400
80/80 [==============================] - 0s 979us/step - loss: 0.3384 - accuracy: 0.8
562
Epoch 227/400
80/80 [==============================] - 0s 945us/step - loss: 0.3419 - accuracy: 0.8
750
Epoch 228/400
80/80 [==============================] - 0s 934us/step - loss: 0.3409 - accuracy: 0.8
625
Epoch 229/400
80/80 [==============================] - 0s 934us/step - loss: 0.3397 - accuracy: 0.8
687
Epoch 230/400
80/80 [==============================] - 0s 939us/step - loss: 0.3297 - accuracy: 0.8
750
Epoch 231/400
80/80 [==============================] - 0s 997us/step - loss: 0.3405 - accuracy: 0.8
500
Epoch 232/400
80/80 [==============================] - 0s 980us/step - loss: 0.3357 - accuracy: 0.8
750
Epoch 233/400
80/80 [==============================] - 0s 945us/step - loss: 0.3351 - accuracy: 0.8
687
Epoch 234/400
80/80 [==============================] - 0s 947us/step - loss: 0.3332 - accuracy: 0.8
875
Epoch 235/400
80/80 [==============================] - 0s 941us/step - loss: 0.3312 - accuracy: 0.8
625
Epoch 236/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3417 - accuracy: 0.856
2
Epoch 237/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3333 - accuracy: 0.856
2
Epoch 238/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3398 - accuracy: 0.868
7
Epoch 239/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3350 - accuracy: 0.868
7
```

```
Epoch 240/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3354 - accuracy: 0.862
5
Epoch 241/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3388 - accuracy: 0.868
7
Epoch 242/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3377 - accuracy: 0.875
0
Epoch 243/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3390 - accuracy: 0.856
2
Epoch 244/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3369 - accuracy: 0.875
0
Epoch 245/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3382 - accuracy: 0.862
5
Epoch 246/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3376 - accuracy: 0.862
5
Epoch 247/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3418 - accuracy: 0.868
7
Epoch 248/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3351 - accuracy: 0.862
5
Epoch 249/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3302 - accuracy: 0.875
0
Epoch 250/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3407 - accuracy: 0.850
0
Epoch 251/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3374 - accuracy: 0.850
0
Epoch 252/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3417 - accuracy: 0.868
7
Epoch 253/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3387 - accuracy: 0.868
7
Epoch 254/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3370 - accuracy: 0.875
0
Epoch 255/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3371 - accuracy: 0.862
5
Epoch 256/400
80/80 [==============================] - 0s 972us/step - loss: 0.3370 - accuracy: 0.8
687
Epoch 257/400
80/80 [==============================] - 0s 972us/step - loss: 0.3396 - accuracy: 0.8
562
Epoch 258/400
80/80 [==============================] - 0s 925us/step - loss: 0.3385 - accuracy: 0.8
562
Epoch 259/400
80/80 [==============================] - 0s 915us/step - loss: 0.3384 - accuracy: 0.8
813
```

```
Epoch 260/400
80/80 [==============================] - 0s 908us/step - loss: 0.3381 - accuracy: 0.8
687
Epoch 261/400
80/80 [==============================] - 0s 934us/step - loss: 0.3424 - accuracy: 0.8
625
Epoch 262/400
80/80 [==============================] - 0s 884us/step - loss: 0.3366 - accuracy: 0.8
750
Epoch 263/400
80/80 [==============================] - 0s 871us/step - loss: 0.3363 - accuracy: 0.8
562
Epoch 264/400
80/80 [==============================] - 0s 896us/step - loss: 0.3369 - accuracy: 0.8
687
Epoch 265/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3392 - accuracy: 0.875
0
Epoch 266/400
80/80 [==============================] - 0s 909us/step - loss: 0.3387 - accuracy: 0.8
687
Epoch 267/400
80/80 [==============================] - 0s 923us/step - loss: 0.3368 - accuracy: 0.8
687
Epoch 268/400
80/80 [==============================] - 0s 900us/step - loss: 0.3348 - accuracy: 0.8
750
Epoch 269/400
80/80 [==============================] - 0s 871us/step - loss: 0.3382 - accuracy: 0.8
750
Epoch 270/400
80/80 [==============================] - 0s 910us/step - loss: 0.3358 - accuracy: 0.8
750
Epoch 271/400
80/80 [==============================] - 0s 871us/step - loss: 0.3370 - accuracy: 0.8
562
Epoch 272/400
80/80 [==============================] - 0s 884us/step - loss: 0.3343 - accuracy: 0.8
687
Epoch 273/400
80/80 [==============================] - 0s 909us/step - loss: 0.3408 - accuracy: 0.8
562
Epoch 274/400
80/80 [==============================] - 0s 905us/step - loss: 0.3387 - accuracy: 0.8
875
Epoch 275/400
80/80 [==============================] - 0s 884us/step - loss: 0.3347 - accuracy: 0.8
562
Epoch 276/400
80/80 [==============================] - 0s 896us/step - loss: 0.3388 - accuracy: 0.8
562
Epoch 277/400
80/80 [==============================] - 0s 934us/step - loss: 0.3396 - accuracy: 0.8
562
Epoch 278/400
80/80 [==============================] - 0s 934us/step - loss: 0.3407 - accuracy: 0.8
750
Epoch 279/400
80/80 [==============================] - 0s 922us/step - loss: 0.3355 - accuracy: 0.8
813
```

```
Epoch 280/400
80/80 [==============================] - 0s 909us/step - loss: 0.3365 - accuracy: 0.8
625
Epoch 281/400
80/80 [==============================] - 0s 896us/step - loss: 0.3395 - accuracy: 0.8
687
Epoch 282/400
80/80 [==============================] - 0s 871us/step - loss: 0.3355 - accuracy: 0.8
687
Epoch 283/400
80/80 [==============================] - 0s 985us/step - loss: 0.3246 - accuracy: 0.8
562
Epoch 284/400
80/80 [==============================] - 0s 961us/step - loss: 0.3435 - accuracy: 0.8
562
Epoch 285/400
80/80 [==============================] - 0s 918us/step - loss: 0.3352 - accuracy: 0.8
625
Epoch 286/400
80/80 [==============================] - 0s 922us/step - loss: 0.3359 - accuracy: 0.8
813
Epoch 287/400
80/80 [==============================] - 0s 911us/step - loss: 0.3395 - accuracy: 0.8
562
Epoch 288/400
80/80 [==============================] - 0s 929us/step - loss: 0.3382 - accuracy: 0.8
562
Epoch 289/400
80/80 [==============================] - 0s 896us/step - loss: 0.3388 - accuracy: 0.8
750
Epoch 290/400
80/80 [==============================] - 0s 945us/step - loss: 0.3397 - accuracy: 0.8
500
Epoch 291/400
80/80 [==============================] - 0s 920us/step - loss: 0.3371 - accuracy: 0.8
687
Epoch 292/400
80/80 [==============================] - 0s 934us/step - loss: 0.3355 - accuracy: 0.8
687
Epoch 293/400
80/80 [==============================] - 0s 930us/step - loss: 0.3376 - accuracy: 0.8
687
Epoch 294/400
80/80 [==============================] - 0s 935us/step - loss: 0.3380 - accuracy: 0.8
562
Epoch 295/400
80/80 [==============================] - 0s 917us/step - loss: 0.3383 - accuracy: 0.8
687
Epoch 296/400
80/80 [==============================] - 0s 930us/step - loss: 0.3391 - accuracy: 0.8
625
Epoch 297/400
80/80 [==============================] - 0s 922us/step - loss: 0.3327 - accuracy: 0.8
813
Epoch 298/400
80/80 [==============================] - 0s 935us/step - loss: 0.3398 - accuracy: 0.8
562
Epoch 299/400
80/80 [==============================] - 0s 930us/step - loss: 0.3374 - accuracy: 0.8
625
```

```
Epoch 300/400
80/80 [==============================] - 0s 938us/step - loss: 0.3348 - accuracy: 0.8
625
Epoch 301/400
80/80 [==============================] - 0s 909us/step - loss: 0.3339 - accuracy: 0.8
750
Epoch 302/400
80/80 [==============================] - 0s 909us/step - loss: 0.3344 - accuracy: 0.8
500
Epoch 303/400
80/80 [==============================] - 0s 909us/step - loss: 0.3373 - accuracy: 0.8
750
Epoch 304/400
80/80 [==============================] - 0s 896us/step - loss: 0.3347 - accuracy: 0.8
687
Epoch 305/400
80/80 [==============================] - 0s 976us/step - loss: 0.3352 - accuracy: 0.8
562
Epoch 306/400
80/80 [==============================] - 0s 947us/step - loss: 0.3380 - accuracy: 0.8
562
Epoch 307/400
80/80 [==============================] - 0s 912us/step - loss: 0.3407 - accuracy: 0.8
687
Epoch 308/400
80/80 [==============================] - 0s 934us/step - loss: 0.3326 - accuracy: 0.8
562
Epoch 309/400
80/80 [==============================] - 0s 934us/step - loss: 0.3374 - accuracy: 0.8
625
Epoch 310/400
80/80 [==============================] - 0s 959us/step - loss: 0.3375 - accuracy: 0.8
625
Epoch 311/400
80/80 [==============================] - 0s 909us/step - loss: 0.3346 - accuracy: 0.8
687
Epoch 312/400
80/80 [==============================] - 0s 909us/step - loss: 0.3395 - accuracy: 0.8
562
Epoch 313/400
80/80 [==============================] - 0s 871us/step - loss: 0.3370 - accuracy: 0.8
687
Epoch 314/400
80/80 [==============================] - 0s 883us/step - loss: 0.3371 - accuracy: 0.8
625
Epoch 315/400
80/80 [==============================] - 0s 858us/step - loss: 0.3358 - accuracy: 0.8
750
Epoch 316/400
80/80 [==============================] - 0s 858us/step - loss: 0.3401 - accuracy: 0.8
625
Epoch 317/400
80/80 [==============================] - 0s 872us/step - loss: 0.3392 - accuracy: 0.8
750
Epoch 318/400
80/80 [==============================] - 0s 869us/step - loss: 0.3365 - accuracy: 0.8
875
Epoch 319/400
80/80 [==============================] - 0s 850us/step - loss: 0.3338 - accuracy: 0.8
687
```

```
Epoch 320/400
80/80 [==============================] - 0s 887us/step - loss: 0.3384 - accuracy: 0.8
687
Epoch 321/400
80/80 [==============================] - 0s 863us/step - loss: 0.3407 - accuracy: 0.8
687
Epoch 322/400
80/80 [==============================] - 0s 878us/step - loss: 0.3362 - accuracy: 0.8
750
Epoch 323/400
80/80 [==============================] - 0s 889us/step - loss: 0.3322 - accuracy: 0.8
687
Epoch 324/400
80/80 [==============================] - 0s 880us/step - loss: 0.3384 - accuracy: 0.8
687
Epoch 325/400
80/80 [==============================] - 0s 857us/step - loss: 0.3394 - accuracy: 0.8
687
Epoch 326/400
80/80 [==============================] - 0s 880us/step - loss: 0.3379 - accuracy: 0.8
562
Epoch 327/400
80/80 [==============================] - 0s 857us/step - loss: 0.3368 - accuracy: 0.8
625
Epoch 328/400
80/80 [==============================] - 0s 869us/step - loss: 0.3375 - accuracy: 0.8
625
Epoch 329/400
80/80 [==============================] - 0s 853us/step - loss: 0.3361 - accuracy: 0.8
625
Epoch 330/400
80/80 [==============================] - 0s 858us/step - loss: 0.3392 - accuracy: 0.8
500
Epoch 331/400
80/80 [==============================] - 0s 871us/step - loss: 0.3413 - accuracy: 0.8
625
Epoch 332/400
80/80 [==============================] - 0s 871us/step - loss: 0.3361 - accuracy: 0.8
687
Epoch 333/400
80/80 [==============================] - 0s 871us/step - loss: 0.3369 - accuracy: 0.8
625
Epoch 334/400
80/80 [==============================] - 0s 896us/step - loss: 0.3306 - accuracy: 0.8
625
Epoch 335/400
80/80 [==============================] - 0s 865us/step - loss: 0.3381 - accuracy: 0.8
750
Epoch 336/400
80/80 [==============================] - 0s 883us/step - loss: 0.3365 - accuracy: 0.8
625
Epoch 337/400
80/80 [==============================] - 0s 895us/step - loss: 0.3328 - accuracy: 0.8
562
Epoch 338/400
80/80 [==============================] - 0s 871us/step - loss: 0.3398 - accuracy: 0.8
562
Epoch 339/400
80/80 [==============================] - 0s 884us/step - loss: 0.3397 - accuracy: 0.8
687
```

```
Epoch 340/400
80/80 [==============================] - 0s 871us/step - loss: 0.3384 - accuracy: 0.8
750
Epoch 341/400
80/80 [==============================] - 0s 821us/step - loss: 0.3323 - accuracy: 0.8
687
Epoch 342/400
80/80 [==============================] - 0s 821us/step - loss: 0.3351 - accuracy: 0.8
750
Epoch 343/400
80/80 [==============================] - 0s 858us/step - loss: 0.3420 - accuracy: 0.8
562
Epoch 344/400
80/80 [==============================] - 0s 879us/step - loss: 0.3340 - accuracy: 0.8
687
Epoch 345/400
80/80 [==============================] - 0s 866us/step - loss: 0.3363 - accuracy: 0.8
562
Epoch 346/400
80/80 [==============================] - 0s 863us/step - loss: 0.3390 - accuracy: 0.8
750
Epoch 347/400
80/80 [==============================] - 0s 896us/step - loss: 0.3404 - accuracy: 0.8
625
Epoch 348/400
80/80 [==============================] - 0s 877us/step - loss: 0.3368 - accuracy: 0.8
687
Epoch 349/400
80/80 [==============================] - 0s 909us/step - loss: 0.3367 - accuracy: 0.8
750
Epoch 350/400
80/80 [==============================] - 0s 859us/step - loss: 0.3356 - accuracy: 0.8
625
Epoch 351/400
80/80 [==============================] - 0s 881us/step - loss: 0.3370 - accuracy: 0.8
750
Epoch 352/400
80/80 [==============================] - 0s 872us/step - loss: 0.3352 - accuracy: 0.8
625
Epoch 353/400
80/80 [==============================] - 0s 878us/step - loss: 0.3403 - accuracy: 0.8
562
Epoch 354/400
80/80 [==============================] - 0s 871us/step - loss: 0.3366 - accuracy: 0.8
625
Epoch 355/400
80/80 [==============================] - 0s 872us/step - loss: 0.3380 - accuracy: 0.8
687
Epoch 356/400
80/80 [==============================] - 0s 881us/step - loss: 0.3385 - accuracy: 0.8
625
Epoch 357/400
80/80 [==============================] - 0s 871us/step - loss: 0.3328 - accuracy: 0.8
750
Epoch 358/400
80/80 [==============================] - 0s 858us/step - loss: 0.3369 - accuracy: 0.8
562
Epoch 359/400
80/80 [==============================] - 0s 832us/step - loss: 0.3385 - accuracy: 0.8
562
```

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Epoch 360/400
80/80 [==============================] - 0s 833us/step - loss: 0.3352 - accuracy: 0.8
750
Epoch 361/400
80/80 [==============================] - 0s 871us/step - loss: 0.3378 - accuracy: 0.8
750
Epoch 362/400
80/80 [==============================] - 0s 896us/step - loss: 0.3385 - accuracy: 0.8
750
Epoch 363/400
80/80 [==============================] - 0s 856us/step - loss: 0.3345 - accuracy: 0.8
438
Epoch 364/400
80/80 [==============================] - 0s 846us/step - loss: 0.3315 - accuracy: 0.8
750
Epoch 365/400
80/80 [==============================] - 0s 846us/step - loss: 0.3365 - accuracy: 0.8
687
Epoch 366/400
80/80 [==============================] - 0s 833us/step - loss: 0.3383 - accuracy: 0.8
687
Epoch 367/400
80/80 [==============================] - 0s 874us/step - loss: 0.3360 - accuracy: 0.8
687
Epoch 368/400
80/80 [==============================] - 0s 877us/step - loss: 0.3346 - accuracy: 0.8
813
Epoch 369/400
80/80 [==============================] - 0s 879us/step - loss: 0.3361 - accuracy: 0.8
750
Epoch 370/400
80/80 [==============================] - 0s 884us/step - loss: 0.3371 - accuracy: 0.8
687
Epoch 371/400
80/80 [==============================] - 0s 897us/step - loss: 0.3327 - accuracy: 0.8
687
Epoch 372/400
80/80 [==============================] - 0s 871us/step - loss: 0.3348 - accuracy: 0.8
750
Epoch 373/400
80/80 [==============================] - 0s 857us/step - loss: 0.3375 - accuracy: 0.8
500
Epoch 374/400
80/80 [==============================] - 0s 821us/step - loss: 0.3244 - accuracy: 0.8
625
Epoch 375/400
80/80 [==============================] - 0s 858us/step - loss: 0.3434 - accuracy: 0.8
750
Epoch 376/400
80/80 [==============================] - 0s 899us/step - loss: 0.3331 - accuracy: 0.8
687
Epoch 377/400
80/80 [==============================] - 0s 873us/step - loss: 0.3369 - accuracy: 0.8
625
Epoch 378/400
80/80 [==============================] - 0s 867us/step - loss: 0.3358 - accuracy: 0.8
562
Epoch 379/400
80/80 [==============================] - 0s 899us/step - loss: 0.3376 - accuracy: 0.8
687
```

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Epoch 380/400
80/80 [==============================] - 0s 948us/step - loss: 0.3407 - accuracy: 0.8
625
Epoch 381/400
80/80 [==============================] - 0s 911us/step - loss: 0.3398 - accuracy: 0.8
625
Epoch 382/400
80/80 [==============================] - 0s 941us/step - loss: 0.3381 - accuracy: 0.8
750
Epoch 383/400
80/80 [==============================] - 0s 909us/step - loss: 0.3378 - accuracy: 0.8
562
Epoch 384/400
80/80 [==============================] - 0s 940us/step - loss: 0.3350 - accuracy: 0.8
813
Epoch 385/400
80/80 [==============================] - 0s 922us/step - loss: 0.3343 - accuracy: 0.8
687
Epoch 386/400
80/80 [==============================] - 0s 883us/step - loss: 0.3386 - accuracy: 0.8
625
Epoch 387/400
80/80 [==============================] - 0s 861us/step - loss: 0.3351 - accuracy: 0.8
687
Epoch 388/400
80/80 [==============================] - 0s 859us/step - loss: 0.3369 - accuracy: 0.8
687
Epoch 389/400
80/80 [==============================] - 0s 875us/step - loss: 0.3351 - accuracy: 0.8
625
Epoch 390/400
80/80 [==============================] - 0s 887us/step - loss: 0.3331 - accuracy: 0.8
625
Epoch 391/400
80/80 [==============================] - 0s 858us/step - loss: 0.3330 - accuracy: 0.8
500
Epoch 392/400
80/80 [==============================] - 0s 871us/step - loss: 0.3397 - accuracy: 0.8
438
Epoch 393/400
80/80 [==============================] - 0s 858us/step - loss: 0.3362 - accuracy: 0.8
625
Epoch 394/400
80/80 [==============================] - 0s 896us/step - loss: 0.3386 - accuracy: 0.8
687
Epoch 395/400
80/80 [==============================] - 0s 884us/step - loss: 0.3380 - accuracy: 0.8
687
Epoch 396/400
80/80 [==============================] - 0s 858us/step - loss: 0.3405 - accuracy: 0.8
562
Epoch 397/400
80/80 [==============================] - 0s 876us/step - loss: 0.3349 - accuracy: 0.8
750
Epoch 398/400
80/80 [==============================] - 0s 873us/step - loss: 0.3396 - accuracy: 0.8
562
Epoch 399/400
80/80 [==============================] - 0s 858us/step - loss: 0.3357 - accuracy: 0.8
500
```

```
Epoch 400/400
80/80 [==============================] - 0s 821us/step - loss: 0.3360 - accuracy: 0.8
562
5/5 [==============================] - 0s 1ms/step - loss: 0.3256 - accuracy: 0.8750
Epoch 1/400
80/80 [==============================] - 0s 720us/step - loss: 0.6950 - accuracy: 0.4
812
Epoch 2/400
80/80 [==============================] - 0s 720us/step - loss: 0.6947 - accuracy: 0.4
750
Epoch 3/400
80/80 [==============================] - 0s 774us/step - loss: 0.6946 - accuracy: 0.5
250
Epoch 4/400
80/80 [==============================] - 0s 818us/step - loss: 0.6943 - accuracy: 0.5
188
Epoch 5/400
80/80 [==============================] - 0s 787us/step - loss: 0.6942 - accuracy: 0.5
375
Epoch 6/400
80/80 [==============================] - 0s 819us/step - loss: 0.6943 - accuracy: 0.5
437
Epoch 7/400
80/80 [==============================] - 0s 875us/step - loss: 0.6939 - accuracy: 0.5
063
Epoch 8/400
80/80 [==============================] - 0s 795us/step - loss: 0.6940 - accuracy: 0.5
688
Epoch 9/400
80/80 [==============================] - 0s 871us/step - loss: 0.6939 - accuracy: 0.5
188
Epoch 10/400
80/80 [==============================] - 0s 871us/step - loss: 0.6931 - accuracy: 0.3
938
Epoch 11/400
80/80 [==============================] - 0s 871us/step - loss: 0.6936 - accuracy: 0.4
938
Epoch 12/400
80/80 [==============================] - 0s 871us/step - loss: 0.6930 - accuracy: 0.6
250
Epoch 13/400
80/80 [==============================] - 0s 880us/step - loss: 0.6926 - accuracy: 0.6
375
Epoch 14/400
80/80 [==============================] - 0s 884us/step - loss: 0.6926 - accuracy: 0.4
875
Epoch 15/400
80/80 [==============================] - 0s 877us/step - loss: 0.6924 - accuracy: 0.5
125
Epoch 16/400
80/80 [==============================] - 0s 846us/step - loss: 0.6921 - accuracy: 0.5
063
Epoch 17/400
80/80 [==============================] - 0s 821us/step - loss: 0.6922 - accuracy: 0.5
625
Epoch 18/400
80/80 [==============================] - 0s 865us/step - loss: 0.6914 - accuracy: 0.5
500
Epoch 19/400
80/80 [==============================] - 0s 921us/step - loss: 0.6913 - accuracy: 0.5
```

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125
Epoch 20/400
80/80 [==============================] - 0s 921us/step - loss: 0.6911 - accuracy: 0.6
000
Epoch 21/400
80/80 [==============================] - 0s 871us/step - loss: 0.6904 - accuracy: 0.4
750
Epoch 22/400
80/80 [==============================] - 0s 858us/step - loss: 0.6907 - accuracy: 0.6
500
Epoch 23/400
80/80 [==============================] - 0s 959us/step - loss: 0.6900 - accuracy: 0.5
688
Epoch 24/400
80/80 [==============================] - 0s 909us/step - loss: 0.6891 - accuracy: 0.6
687
Epoch 25/400
80/80 [==============================] - 0s 884us/step - loss: 0.6884 - accuracy: 0.4
750
Epoch 26/400
80/80 [==============================] - 0s 909us/step - loss: 0.6878 - accuracy: 0.5
875
Epoch 27/400
80/80 [==============================] - 0s 925us/step - loss: 0.6871 - accuracy: 0.6
562
Epoch 28/400
80/80 [==============================] - 0s 884us/step - loss: 0.6861 - accuracy: 0.6
500
Epoch 29/400
80/80 [==============================] - 0s 871us/step - loss: 0.6852 - accuracy: 0.6
062
Epoch 30/400
80/80 [==============================] - 0s 894us/step - loss: 0.6842 - accuracy: 0.5
375
Epoch 31/400
80/80 [==============================] - 0s 892us/step - loss: 0.6830 - accuracy: 0.6
687
Epoch 32/400
80/80 [==============================] - 0s 884us/step - loss: 0.6817 - accuracy: 0.6
187
Epoch 33/400
80/80 [==============================] - 0s 884us/step - loss: 0.6804 - accuracy: 0.6
562
Epoch 34/400
80/80 [==============================] - 0s 938us/step - loss: 0.6786 - accuracy: 0.6
500
Epoch 35/400
80/80 [==============================] - 0s 912us/step - loss: 0.6769 - accuracy: 0.6
750
Epoch 36/400
80/80 [==============================] - 0s 929us/step - loss: 0.6739 - accuracy: 0.6
625
Epoch 37/400
80/80 [==============================] - 0s 931us/step - loss: 0.6721 - accuracy: 0.6
625
Epoch 38/400
80/80 [==============================] - 0s 985us/step - loss: 0.6689 - accuracy: 0.6
812
Epoch 39/400
80/80 [==============================] - 0s 985us/step - loss: 0.6657 - accuracy: 0.6
```

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562
Epoch 40/400
80/80 [==============================] - 0s 985us/step - loss: 0.6623 - accuracy: 0.6
875
Epoch 41/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6583 - accuracy: 0.650
0
Epoch 42/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6545 - accuracy: 0.662
5
Epoch 43/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6500 - accuracy: 0.687
5
Epoch 44/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6456 - accuracy: 0.681
2
Epoch 45/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6410 - accuracy: 0.668
7
Epoch 46/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6368 - accuracy: 0.681
2
Epoch 47/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6323 - accuracy: 0.681
2
Epoch 48/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6281 - accuracy: 0.687
5
Epoch 49/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6225 - accuracy: 0.687
5
Epoch 50/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6197 - accuracy: 0.687
5
Epoch 51/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6160 - accuracy: 0.681
2
Epoch 52/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6125 - accuracy: 0.687
5
Epoch 53/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6088 - accuracy: 0.687
5
Epoch 54/400
80/80 [==============================] - 0s 945us/step - loss: 0.6063 - accuracy: 0.6
875
Epoch 55/400
80/80 [==============================] - 0s 959us/step - loss: 0.6033 - accuracy: 0.6
875
Epoch 56/400
80/80 [==============================] - 0s 987us/step - loss: 0.6009 - accuracy: 0.6
875
Epoch 57/400
80/80 [==============================] - 0s 922us/step - loss: 0.5985 - accuracy: 0.6
875
Epoch 58/400
80/80 [==============================] - 0s 922us/step - loss: 0.5956 - accuracy: 0.6
875
Epoch 59/400
80/80 [==============================] - 0s 922us/step - loss: 0.5938 - accuracy: 0.6
```

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875
Epoch 60/400
80/80 [==============================] - 0s 909us/step - loss: 0.5915 - accuracy: 0.6
875
Epoch 61/400
80/80 [==============================] - 0s 922us/step - loss: 0.5888 - accuracy: 0.6
750
Epoch 62/400
80/80 [==============================] - 0s 909us/step - loss: 0.5881 - accuracy: 0.6
875
Epoch 63/400
80/80 [==============================] - 0s 909us/step - loss: 0.5855 - accuracy: 0.6
938
Epoch 64/400
80/80 [==============================] - 0s 947us/step - loss: 0.5835 - accuracy: 0.6
938
Epoch 65/400
80/80 [==============================] - 0s 884us/step - loss: 0.5813 - accuracy: 0.6
938
Epoch 66/400
80/80 [==============================] - 0s 884us/step - loss: 0.5789 - accuracy: 0.6
812
Epoch 67/400
80/80 [==============================] - 0s 945us/step - loss: 0.5769 - accuracy: 0.6
875
Epoch 68/400
80/80 [==============================] - 0s 900us/step - loss: 0.5738 - accuracy: 0.6
875
Epoch 69/400
80/80 [==============================] - 0s 928us/step - loss: 0.5711 - accuracy: 0.6
938
Epoch 70/400
80/80 [==============================] - 0s 922us/step - loss: 0.5679 - accuracy: 0.6
938
Epoch 71/400
80/80 [==============================] - 0s 871us/step - loss: 0.5650 - accuracy: 0.6
875
Epoch 72/400
80/80 [==============================] - 0s 896us/step - loss: 0.5615 - accuracy: 0.6
875
Epoch 73/400
80/80 [==============================] - 0s 909us/step - loss: 0.5579 - accuracy: 0.6
938
Epoch 74/400
80/80 [==============================] - 0s 922us/step - loss: 0.5526 - accuracy: 0.6
938
Epoch 75/400
80/80 [==============================] - 0s 928us/step - loss: 0.5498 - accuracy: 0.6
875
Epoch 76/400
80/80 [==============================] - 0s 912us/step - loss: 0.5448 - accuracy: 0.6
938
Epoch 77/400
80/80 [==============================] - 0s 909us/step - loss: 0.5394 - accuracy: 0.7
000
Epoch 78/400
80/80 [==============================] - 0s 871us/step - loss: 0.5343 - accuracy: 0.6
875
Epoch 79/400
80/80 [==============================] - 0s 884us/step - loss: 0.5292 - accuracy: 0.7
```

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000
Epoch 80/400
80/80 [==============================] - 0s 858us/step - loss: 0.5236 - accuracy: 0.7
063
Epoch 81/400
80/80 [==============================] - 0s 909us/step - loss: 0.5187 - accuracy: 0.6
875
Epoch 82/400
80/80 [==============================] - 0s 896us/step - loss: 0.5128 - accuracy: 0.7
000
Epoch 83/400
80/80 [==============================] - 0s 896us/step - loss: 0.5089 - accuracy: 0.6
875
Epoch 84/400
80/80 [==============================] - 0s 884us/step - loss: 0.5032 - accuracy: 0.7
063
Epoch 85/400
80/80 [==============================] - 0s 884us/step - loss: 0.4981 - accuracy: 0.6
938
Epoch 86/400
80/80 [==============================] - 0s 934us/step - loss: 0.4936 - accuracy: 0.7
063
Epoch 87/400
80/80 [==============================] - 0s 884us/step - loss: 0.4901 - accuracy: 0.7
063
Epoch 88/400
80/80 [==============================] - 0s 934us/step - loss: 0.4863 - accuracy: 0.6
875
Epoch 89/400
80/80 [==============================] - 0s 884us/step - loss: 0.4807 - accuracy: 0.6
938
Epoch 90/400
80/80 [==============================] - 0s 858us/step - loss: 0.4788 - accuracy: 0.6
625
Epoch 91/400
80/80 [==============================] - 0s 885us/step - loss: 0.4760 - accuracy: 0.6
687
Epoch 92/400
80/80 [==============================] - 0s 884us/step - loss: 0.4731 - accuracy: 0.6
375
Epoch 93/400
80/80 [==============================] - 0s 905us/step - loss: 0.4686 - accuracy: 0.6
313
Epoch 94/400
80/80 [==============================] - 0s 884us/step - loss: 0.4661 - accuracy: 0.6
687
Epoch 95/400
80/80 [==============================] - 0s 897us/step - loss: 0.4641 - accuracy: 0.6
062
Epoch 96/400
80/80 [==============================] - 0s 858us/step - loss: 0.4613 - accuracy: 0.6
500
Epoch 97/400
80/80 [==============================] - 0s 846us/step - loss: 0.4586 - accuracy: 0.7
063
Epoch 98/400
80/80 [==============================] - 0s 883us/step - loss: 0.4566 - accuracy: 0.6
375
Epoch 99/400
80/80 [==============================] - 0s 986us/step - loss: 0.4553 - accuracy: 0.6
```

```
500
Epoch 100/400
80/80 [==============================] - 0s 950us/step - loss: 0.4529 - accuracy: 0.6
687
Epoch 101/400
80/80 [==============================] - 0s 884us/step - loss: 0.4522 - accuracy: 0.5
625
Epoch 102/400
80/80 [==============================] - 0s 959us/step - loss: 0.4497 - accuracy: 0.6
625
Epoch 103/400
80/80 [==============================] - 0s 896us/step - loss: 0.4483 - accuracy: 0.6
938
Epoch 104/400
80/80 [==============================] - 0s 903us/step - loss: 0.4459 - accuracy: 0.6
187
Epoch 105/400
80/80 [==============================] - 0s 896us/step - loss: 0.4448 - accuracy: 0.6
250
Epoch 106/400
80/80 [==============================] - 0s 942us/step - loss: 0.4430 - accuracy: 0.7
063
Epoch 107/400
80/80 [==============================] - 0s 896us/step - loss: 0.4426 - accuracy: 0.6
375
Epoch 108/400
80/80 [==============================] - 0s 896us/step - loss: 0.4395 - accuracy: 0.6
438
Epoch 109/400
80/80 [==============================] - 0s 878us/step - loss: 0.4404 - accuracy: 0.6
500
Epoch 110/400
80/80 [==============================] - 0s 871us/step - loss: 0.4364 - accuracy: 0.6
438
Epoch 111/400
80/80 [==============================] - 0s 896us/step - loss: 0.4380 - accuracy: 0.6
687
Epoch 112/400
80/80 [==============================] - 0s 871us/step - loss: 0.4366 - accuracy: 0.6
375
Epoch 113/400
80/80 [==============================] - 0s 909us/step - loss: 0.4361 - accuracy: 0.6
875
Epoch 114/400
80/80 [==============================] - 0s 884us/step - loss: 0.4327 - accuracy: 0.6
875
Epoch 115/400
80/80 [==============================] - 0s 922us/step - loss: 0.4322 - accuracy: 0.6
938
Epoch 116/400
80/80 [==============================] - 0s 909us/step - loss: 0.4324 - accuracy: 0.7
063
Epoch 117/400
80/80 [==============================] - 0s 878us/step - loss: 0.4311 - accuracy: 0.6
875
Epoch 118/400
80/80 [==============================] - 0s 904us/step - loss: 0.4315 - accuracy: 0.6
125
Epoch 119/400
80/80 [==============================] - 0s 896us/step - loss: 0.4309 - accuracy: 0.7
```

```
063
Epoch 120/400
80/80 [==============================] - 0s 909us/step - loss: 0.4298 - accuracy: 0.6
250
Epoch 121/400
80/80 [==============================] - 0s 922us/step - loss: 0.4292 - accuracy: 0.6
625
Epoch 122/400
80/80 [==============================] - 0s 860us/step - loss: 0.4267 - accuracy: 0.6
562
Epoch 123/400
80/80 [==============================] - 0s 884us/step - loss: 0.4278 - accuracy: 0.6
313
Epoch 124/400
80/80 [==============================] - 0s 878us/step - loss: 0.4247 - accuracy: 0.6
500
Epoch 125/400
80/80 [==============================] - 0s 871us/step - loss: 0.4253 - accuracy: 0.6
187
Epoch 126/400
80/80 [==============================] - 0s 896us/step - loss: 0.4225 - accuracy: 0.7
188
Epoch 127/400
80/80 [==============================] - 0s 963us/step - loss: 0.4261 - accuracy: 0.7
063
Epoch 128/400
80/80 [==============================] - 0s 915us/step - loss: 0.4227 - accuracy: 0.6
375
Epoch 129/400
80/80 [==============================] - 0s 946us/step - loss: 0.4219 - accuracy: 0.7
125
Epoch 130/400
80/80 [==============================] - 0s 886us/step - loss: 0.4207 - accuracy: 0.6
687
Epoch 131/400
80/80 [==============================] - 0s 902us/step - loss: 0.4205 - accuracy: 0.7
188
Epoch 132/400
80/80 [==============================] - 0s 912us/step - loss: 0.4204 - accuracy: 0.7
312
Epoch 133/400
80/80 [==============================] - 0s 893us/step - loss: 0.4194 - accuracy: 0.7
125
Epoch 134/400
80/80 [==============================] - 0s 921us/step - loss: 0.4167 - accuracy: 0.7
250
Epoch 135/400
80/80 [==============================] - 0s 876us/step - loss: 0.4206 - accuracy: 0.6
875
Epoch 136/400
80/80 [==============================] - 0s 897us/step - loss: 0.4197 - accuracy: 0.7
125
Epoch 137/400
80/80 [==============================] - 0s 884us/step - loss: 0.4174 - accuracy: 0.7
063
Epoch 138/400
80/80 [==============================] - 0s 884us/step - loss: 0.4148 - accuracy: 0.6
375
Epoch 139/400
80/80 [==============================] - 0s 922us/step - loss: 0.4176 - accuracy: 0.6
```

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938
Epoch 140/400
80/80 [==============================] - 0s 896us/step - loss: 0.4156 - accuracy: 0.6
562
Epoch 141/400
80/80 [==============================] - 0s 931us/step - loss: 0.4137 - accuracy: 0.6
375
Epoch 142/400
80/80 [==============================] - 0s 902us/step - loss: 0.4158 - accuracy: 0.6
562
Epoch 143/400
80/80 [==============================] - 0s 874us/step - loss: 0.4132 - accuracy: 0.7
188
Epoch 144/400
80/80 [==============================] - 0s 896us/step - loss: 0.4128 - accuracy: 0.6
313
Epoch 145/400
80/80 [==============================] - 0s 906us/step - loss: 0.4137 - accuracy: 0.6
812
Epoch 146/400
80/80 [==============================] - 0s 846us/step - loss: 0.4090 - accuracy: 0.7
000
Epoch 147/400
80/80 [==============================] - 0s 852us/step - loss: 0.4110 - accuracy: 0.7
250
Epoch 148/400
80/80 [==============================] - 0s 910us/step - loss: 0.4086 - accuracy: 0.6
313
Epoch 149/400
80/80 [==============================] - 0s 892us/step - loss: 0.4065 - accuracy: 0.7
312
Epoch 150/400
80/80 [==============================] - 0s 865us/step - loss: 0.4119 - accuracy: 0.7
125
Epoch 151/400
80/80 [==============================] - 0s 865us/step - loss: 0.4100 - accuracy: 0.7
312
Epoch 152/400
80/80 [==============================] - 0s 858us/step - loss: 0.4067 - accuracy: 0.6
625
Epoch 153/400
80/80 [==============================] - 0s 885us/step - loss: 0.4101 - accuracy: 0.6
938
Epoch 154/400
80/80 [==============================] - 0s 871us/step - loss: 0.4075 - accuracy: 0.7
063
Epoch 155/400
80/80 [==============================] - 0s 846us/step - loss: 0.4037 - accuracy: 0.7
063
Epoch 156/400
80/80 [==============================] - 0s 908us/step - loss: 0.4070 - accuracy: 0.7
188
Epoch 157/400
80/80 [==============================] - 0s 868us/step - loss: 0.4069 - accuracy: 0.6
750
Epoch 158/400
80/80 [==============================] - 0s 895us/step - loss: 0.4054 - accuracy: 0.7
063
Epoch 159/400
80/80 [==============================] - 0s 871us/step - loss: 0.4064 - accuracy: 0.6
```

```
375
Epoch 160/400
80/80 [==============================] - 0s 833us/step - loss: 0.4031 - accuracy: 0.6
687
Epoch 161/400
80/80 [==============================] - 0s 846us/step - loss: 0.4031 - accuracy: 0.6
125
Epoch 162/400
80/80 [==============================] - 0s 871us/step - loss: 0.3997 - accuracy: 0.7
063
Epoch 163/400
80/80 [==============================] - 0s 875us/step - loss: 0.4075 - accuracy: 0.7
125
Epoch 164/400
80/80 [==============================] - 0s 924us/step - loss: 0.4012 - accuracy: 0.6
875
Epoch 165/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4038 - accuracy: 0.718
8
Epoch 166/400
80/80 [==============================] - 0s 996us/step - loss: 0.4008 - accuracy: 0.7
063
Epoch 167/400
80/80 [==============================] - 0s 966us/step - loss: 0.3987 - accuracy: 0.7
188
Epoch 168/400
80/80 [==============================] - 0s 934us/step - loss: 0.4040 - accuracy: 0.6
375
Epoch 169/400
80/80 [==============================] - 0s 929us/step - loss: 0.4005 - accuracy: 0.6
375
Epoch 170/400
80/80 [==============================] - 0s 897us/step - loss: 0.4018 - accuracy: 0.7
000
Epoch 171/400
80/80 [==============================] - 0s 871us/step - loss: 0.4007 - accuracy: 0.6
313
Epoch 172/400
80/80 [==============================] - 0s 896us/step - loss: 0.4001 - accuracy: 0.7
250
Epoch 173/400
80/80 [==============================] - 0s 896us/step - loss: 0.3995 - accuracy: 0.7
188
Epoch 174/400
80/80 [==============================] - 0s 871us/step - loss: 0.3988 - accuracy: 0.6
250
Epoch 175/400
80/80 [==============================] - 0s 878us/step - loss: 0.3992 - accuracy: 0.7
063
Epoch 176/400
80/80 [==============================] - 0s 884us/step - loss: 0.3997 - accuracy: 0.6
812
Epoch 177/400
80/80 [==============================] - 0s 892us/step - loss: 0.3993 - accuracy: 0.6
438
Epoch 178/400
80/80 [==============================] - 0s 871us/step - loss: 0.3976 - accuracy: 0.6
750
Epoch 179/400
80/80 [==============================] - 0s 844us/step - loss: 0.3950 - accuracy: 0.6
```

```
938
Epoch 180/400
80/80 [==============================] - 0s 858us/step - loss: 0.3974 - accuracy: 0.6
938
Epoch 181/400
80/80 [==============================] - 0s 868us/step - loss: 0.4017 - accuracy: 0.6
687
Epoch 182/400
80/80 [==============================] - 0s 846us/step - loss: 0.3968 - accuracy: 0.6
750
Epoch 183/400
80/80 [==============================] - 0s 924us/step - loss: 0.3957 - accuracy: 0.6
750
Epoch 184/400
80/80 [==============================] - 0s 846us/step - loss: 0.3954 - accuracy: 0.6
750
Epoch 185/400
80/80 [==============================] - 0s 847us/step - loss: 0.3965 - accuracy: 0.6
938
Epoch 186/400
80/80 [==============================] - 0s 884us/step - loss: 0.3950 - accuracy: 0.6
938
Epoch 187/400
80/80 [==============================] - 0s 884us/step - loss: 0.3967 - accuracy: 0.7
063
Epoch 188/400
80/80 [==============================] - 0s 871us/step - loss: 0.3925 - accuracy: 0.6
562
Epoch 189/400
80/80 [==============================] - 0s 857us/step - loss: 0.3937 - accuracy: 0.6
625
Epoch 190/400
80/80 [==============================] - 0s 852us/step - loss: 0.3927 - accuracy: 0.6
375
Epoch 191/400
80/80 [==============================] - 0s 871us/step - loss: 0.3961 - accuracy: 0.6
313
Epoch 192/400
80/80 [==============================] - 0s 894us/step - loss: 0.3934 - accuracy: 0.7
000
Epoch 193/400
80/80 [==============================] - 0s 890us/step - loss: 0.3932 - accuracy: 0.6
438
Epoch 194/400
80/80 [==============================] - 0s 884us/step - loss: 0.3892 - accuracy: 0.7
125
Epoch 195/400
80/80 [==============================] - 0s 919us/step - loss: 0.3944 - accuracy: 0.6
500
Epoch 196/400
80/80 [==============================] - 0s 884us/step - loss: 0.3962 - accuracy: 0.7
000
Epoch 197/400
80/80 [==============================] - 0s 909us/step - loss: 0.3923 - accuracy: 0.7
000
Epoch 198/400
80/80 [==============================] - 0s 909us/step - loss: 0.3923 - accuracy: 0.7
188
Epoch 199/400
80/80 [==============================] - 0s 924us/step - loss: 0.3918 - accuracy: 0.7
```

```
063
Epoch 200/400
80/80 [==============================] - 0s 896us/step - loss: 0.3904 - accuracy: 0.6
250
Epoch 201/400
80/80 [==============================] - 0s 856us/step - loss: 0.3931 - accuracy: 0.7
125
Epoch 202/400
80/80 [==============================] - 0s 896us/step - loss: 0.3929 - accuracy: 0.6
562
Epoch 203/400
80/80 [==============================] - 0s 916us/step - loss: 0.3898 - accuracy: 0.7
000
Epoch 204/400
80/80 [==============================] - 0s 896us/step - loss: 0.3909 - accuracy: 0.7
000
Epoch 205/400
80/80 [==============================] - 0s 867us/step - loss: 0.3910 - accuracy: 0.6
562
Epoch 206/400
80/80 [==============================] - 0s 846us/step - loss: 0.3922 - accuracy: 0.6
687
Epoch 207/400
80/80 [==============================] - 0s 878us/step - loss: 0.3894 - accuracy: 0.7
063
Epoch 208/400
80/80 [==============================] - 0s 903us/step - loss: 0.3908 - accuracy: 0.6
562
Epoch 209/400
80/80 [==============================] - 0s 922us/step - loss: 0.3910 - accuracy: 0.6
938
Epoch 210/400
80/80 [==============================] - 0s 858us/step - loss: 0.3885 - accuracy: 0.7
250
Epoch 211/400
80/80 [==============================] - 0s 907us/step - loss: 0.3932 - accuracy: 0.6
812
Epoch 212/400
80/80 [==============================] - 0s 909us/step - loss: 0.3885 - accuracy: 0.7
000
Epoch 213/400
80/80 [==============================] - 0s 914us/step - loss: 0.3862 - accuracy: 0.6
875
Epoch 214/400
80/80 [==============================] - 0s 871us/step - loss: 0.3887 - accuracy: 0.6
812
Epoch 215/400
80/80 [==============================] - 0s 890us/step - loss: 0.3877 - accuracy: 0.6
687
Epoch 216/400
80/80 [==============================] - 0s 885us/step - loss: 0.3898 - accuracy: 0.6
313
Epoch 217/400
80/80 [==============================] - 0s 897us/step - loss: 0.3876 - accuracy: 0.7
250
Epoch 218/400
80/80 [==============================] - 0s 968us/step - loss: 0.3915 - accuracy: 0.6
500
Epoch 219/400
80/80 [==============================] - 0s 909us/step - loss: 0.3864 - accuracy: 0.7
```

```
063
Epoch 220/400
80/80 [==============================] - 0s 898us/step - loss: 0.3862 - accuracy: 0.6
500
Epoch 221/400
80/80 [==============================] - 0s 884us/step - loss: 0.3865 - accuracy: 0.7
188
Epoch 222/400
80/80 [==============================] - 0s 871us/step - loss: 0.3884 - accuracy: 0.6
750
Epoch 223/400
80/80 [==============================] - 0s 859us/step - loss: 0.3883 - accuracy: 0.6
625
Epoch 224/400
80/80 [==============================] - 0s 858us/step - loss: 0.3879 - accuracy: 0.7
063
Epoch 225/400
80/80 [==============================] - 0s 896us/step - loss: 0.3877 - accuracy: 0.6
750
Epoch 226/400
80/80 [==============================] - 0s 884us/step - loss: 0.3919 - accuracy: 0.6
438
Epoch 227/400
80/80 [==============================] - 0s 896us/step - loss: 0.3890 - accuracy: 0.6
562
Epoch 228/400
80/80 [==============================] - 0s 878us/step - loss: 0.3856 - accuracy: 0.6
875
Epoch 229/400
80/80 [==============================] - 0s 909us/step - loss: 0.3850 - accuracy: 0.7
063
Epoch 230/400
80/80 [==============================] - 0s 871us/step - loss: 0.3943 - accuracy: 0.6
875
Epoch 231/400
80/80 [==============================] - 0s 851us/step - loss: 0.3861 - accuracy: 0.6
500
Epoch 232/400
80/80 [==============================] - 0s 855us/step - loss: 0.3868 - accuracy: 0.6
625
Epoch 233/400
80/80 [==============================] - 0s 837us/step - loss: 0.3867 - accuracy: 0.6
500
Epoch 234/400
80/80 [==============================] - 0s 874us/step - loss: 0.3851 - accuracy: 0.7
312
Epoch 235/400
80/80 [==============================] - 0s 853us/step - loss: 0.3844 - accuracy: 0.6
812
Epoch 236/400
80/80 [==============================] - 0s 884us/step - loss: 0.3833 - accuracy: 0.7
188
Epoch 237/400
80/80 [==============================] - 0s 871us/step - loss: 0.3845 - accuracy: 0.6
938
Epoch 238/400
80/80 [==============================] - 0s 846us/step - loss: 0.3840 - accuracy: 0.6
438
Epoch 239/400
80/80 [==============================] - 0s 882us/step - loss: 0.3900 - accuracy: 0.6
```

```
687
Epoch 240/400
80/80 [==============================] - 0s 884us/step - loss: 0.3828 - accuracy: 0.6
250
Epoch 241/400
80/80 [==============================] - 0s 846us/step - loss: 0.3851 - accuracy: 0.6
875
Epoch 242/400
80/80 [==============================] - 0s 885us/step - loss: 0.3849 - accuracy: 0.7
000
Epoch 243/400
80/80 [==============================] - 0s 858us/step - loss: 0.3911 - accuracy: 0.6
500
Epoch 244/400
80/80 [==============================] - 0s 934us/step - loss: 0.3835 - accuracy: 0.6
812
Epoch 245/400
80/80 [==============================] - 0s 884us/step - loss: 0.3836 - accuracy: 0.6
187
Epoch 246/400
80/80 [==============================] - 0s 881us/step - loss: 0.3901 - accuracy: 0.6
375
Epoch 247/400
80/80 [==============================] - 0s 896us/step - loss: 0.3844 - accuracy: 0.7
125
Epoch 248/400
80/80 [==============================] - 0s 960us/step - loss: 0.3885 - accuracy: 0.6
875
Epoch 249/400
80/80 [==============================] - 0s 911us/step - loss: 0.3828 - accuracy: 0.6
875
Epoch 250/400
80/80 [==============================] - 0s 896us/step - loss: 0.3831 - accuracy: 0.6
875
Epoch 251/400
80/80 [==============================] - 0s 947us/step - loss: 0.3820 - accuracy: 0.6
750
Epoch 252/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3925 - accuracy: 0.656
2
Epoch 253/400
80/80 [==============================] - 0s 985us/step - loss: 0.3818 - accuracy: 0.6
625
Epoch 254/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3814 - accuracy: 0.681
2
Epoch 255/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3844 - accuracy: 0.693
8
Epoch 256/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3891 - accuracy: 0.637
5
Epoch 257/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3807 - accuracy: 0.706
3
Epoch 258/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3904 - accuracy: 0.650
0
Epoch 259/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3867 - accuracy: 0.693
```

```
8
Epoch 260/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3872 - accuracy: 0.650
0
Epoch 261/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3868 - accuracy: 0.650
0
Epoch 262/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3842 - accuracy: 0.693
8
Epoch 263/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3813 - accuracy: 0.668
7
Epoch 264/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3852 - accuracy: 0.693
8
Epoch 265/400
80/80 [==============================] - 0s 992us/step - loss: 0.3841 - accuracy: 0.6
562
Epoch 266/400
80/80 [==============================] - 0s 980us/step - loss: 0.3817 - accuracy: 0.6
875
Epoch 267/400
80/80 [==============================] - 0s 919us/step - loss: 0.3816 - accuracy: 0.6
625
Epoch 268/400
80/80 [==============================] - 0s 915us/step - loss: 0.3831 - accuracy: 0.6
938
Epoch 269/400
80/80 [==============================] - 0s 944us/step - loss: 0.3836 - accuracy: 0.7
188
Epoch 270/400
80/80 [==============================] - 0s 922us/step - loss: 0.3808 - accuracy: 0.6
438
Epoch 271/400
80/80 [==============================] - 0s 916us/step - loss: 0.3820 - accuracy: 0.6
500
Epoch 272/400
80/80 [==============================] - 0s 935us/step - loss: 0.3822 - accuracy: 0.7
125
Epoch 273/400
80/80 [==============================] - 0s 913us/step - loss: 0.3864 - accuracy: 0.6
812
Epoch 274/400
80/80 [==============================] - 0s 884us/step - loss: 0.3828 - accuracy: 0.6
687
Epoch 275/400
80/80 [==============================] - 0s 930us/step - loss: 0.3893 - accuracy: 0.6
500
Epoch 276/400
80/80 [==============================] - 0s 907us/step - loss: 0.3798 - accuracy: 0.6
938
Epoch 277/400
80/80 [==============================] - 0s 947us/step - loss: 0.3860 - accuracy: 0.7
312
Epoch 278/400
80/80 [==============================] - 0s 934us/step - loss: 0.3842 - accuracy: 0.6
812
Epoch 279/400
80/80 [==============================] - 0s 915us/step - loss: 0.3801 - accuracy: 0.7
```

```
063
Epoch 280/400
80/80 [==============================] - 0s 884us/step - loss: 0.3800 - accuracy: 0.7
125
Epoch 281/400
80/80 [==============================] - 0s 884us/step - loss: 0.3825 - accuracy: 0.7
000
Epoch 282/400
80/80 [==============================] - 0s 863us/step - loss: 0.3827 - accuracy: 0.6
812
Epoch 283/400
80/80 [==============================] - 0s 884us/step - loss: 0.3834 - accuracy: 0.6
187
Epoch 284/400
80/80 [==============================] - 0s 858us/step - loss: 0.3798 - accuracy: 0.6
750
Epoch 285/400
80/80 [==============================] - 0s 896us/step - loss: 0.3791 - accuracy: 0.6
812
Epoch 286/400
80/80 [==============================] - 0s 909us/step - loss: 0.3803 - accuracy: 0.7
000
Epoch 287/400
80/80 [==============================] - 0s 922us/step - loss: 0.3899 - accuracy: 0.6
812
Epoch 288/400
80/80 [==============================] - 0s 918us/step - loss: 0.3800 - accuracy: 0.7
250
Epoch 289/400
80/80 [==============================] - 0s 877us/step - loss: 0.3790 - accuracy: 0.6
500
Epoch 290/400
80/80 [==============================] - 0s 934us/step - loss: 0.3780 - accuracy: 0.7
125
Epoch 291/400
80/80 [==============================] - 0s 916us/step - loss: 0.3796 - accuracy: 0.6
750
Epoch 292/400
80/80 [==============================] - 0s 904us/step - loss: 0.3881 - accuracy: 0.6
687
Epoch 293/400
80/80 [==============================] - 0s 896us/step - loss: 0.3796 - accuracy: 0.6
687
Epoch 294/400
80/80 [==============================] - 0s 871us/step - loss: 0.3876 - accuracy: 0.6
562
Epoch 295/400
80/80 [==============================] - 0s 884us/step - loss: 0.3842 - accuracy: 0.6
875
Epoch 296/400
80/80 [==============================] - 0s 969us/step - loss: 0.3866 - accuracy: 0.6
750
Epoch 297/400
80/80 [==============================] - 0s 923us/step - loss: 0.3841 - accuracy: 0.6
812
Epoch 298/400
80/80 [==============================] - 0s 972us/step - loss: 0.3789 - accuracy: 0.7
312
Epoch 299/400
80/80 [==============================] - 0s 992us/step - loss: 0.3770 - accuracy: 0.6
```

```
875
Epoch 300/400
80/80 [==============================] - 0s 929us/step - loss: 0.3823 - accuracy: 0.6
812
Epoch 301/400
80/80 [==============================] - 0s 984us/step - loss: 0.3865 - accuracy: 0.6
562
Epoch 302/400
80/80 [==============================] - 0s 922us/step - loss: 0.3790 - accuracy: 0.6
750
Epoch 303/400
80/80 [==============================] - 0s 962us/step - loss: 0.3778 - accuracy: 0.6
812
Epoch 304/400
80/80 [==============================] - 0s 951us/step - loss: 0.3755 - accuracy: 0.7
250
Epoch 305/400
80/80 [==============================] - 0s 893us/step - loss: 0.3852 - accuracy: 0.6
687
Epoch 306/400
80/80 [==============================] - 0s 909us/step - loss: 0.3901 - accuracy: 0.7
000
Epoch 307/400
80/80 [==============================] - 0s 896us/step - loss: 0.3804 - accuracy: 0.6
812
Epoch 308/400
80/80 [==============================] - 0s 896us/step - loss: 0.3806 - accuracy: 0.6
625
Epoch 309/400
80/80 [==============================] - 0s 884us/step - loss: 0.3848 - accuracy: 0.6
438
Epoch 310/400
80/80 [==============================] - 0s 909us/step - loss: 0.3876 - accuracy: 0.6
812
Epoch 311/400
80/80 [==============================] - 0s 884us/step - loss: 0.3778 - accuracy: 0.6
750
Epoch 312/400
80/80 [==============================] - 0s 896us/step - loss: 0.3787 - accuracy: 0.6
938
Epoch 313/400
80/80 [==============================] - 0s 896us/step - loss: 0.3800 - accuracy: 0.7
312
Epoch 314/400
80/80 [==============================] - 0s 896us/step - loss: 0.3776 - accuracy: 0.6
938
Epoch 315/400
80/80 [==============================] - 0s 896us/step - loss: 0.3771 - accuracy: 0.7
312
Epoch 316/400
80/80 [==============================] - 0s 846us/step - loss: 0.3774 - accuracy: 0.7
375
Epoch 317/400
80/80 [==============================] - 0s 896us/step - loss: 0.3780 - accuracy: 0.6
687
Epoch 318/400
80/80 [==============================] - 0s 909us/step - loss: 0.3751 - accuracy: 0.6
500
Epoch 319/400
80/80 [==============================] - 0s 909us/step - loss: 0.3760 - accuracy: 0.7
```

```
063
Epoch 320/400
80/80 [==============================] - 0s 871us/step - loss: 0.3785 - accuracy: 0.7
188
Epoch 321/400
80/80 [==============================] - 0s 884us/step - loss: 0.3766 - accuracy: 0.7
312
Epoch 322/400
80/80 [==============================] - 0s 884us/step - loss: 0.3765 - accuracy: 0.7
000
Epoch 323/400
80/80 [==============================] - 0s 872us/step - loss: 0.3743 - accuracy: 0.6
938
Epoch 324/400
80/80 [==============================] - 0s 896us/step - loss: 0.3849 - accuracy: 0.6
750
Epoch 325/400
80/80 [==============================] - 0s 884us/step - loss: 0.3780 - accuracy: 0.7
188
Epoch 326/400
80/80 [==============================] - 0s 884us/step - loss: 0.3771 - accuracy: 0.6
687
Epoch 327/400
80/80 [==============================] - 0s 896us/step - loss: 0.3759 - accuracy: 0.7
063
Epoch 328/400
80/80 [==============================] - 0s 934us/step - loss: 0.3738 - accuracy: 0.6
625
Epoch 329/400
80/80 [==============================] - 0s 884us/step - loss: 0.3788 - accuracy: 0.6
625
Epoch 330/400
80/80 [==============================] - 0s 884us/step - loss: 0.3796 - accuracy: 0.6
812
Epoch 331/400
80/80 [==============================] - 0s 884us/step - loss: 0.3768 - accuracy: 0.7
250
Epoch 332/400
80/80 [==============================] - 0s 871us/step - loss: 0.3768 - accuracy: 0.6
750
Epoch 333/400
80/80 [==============================] - 0s 896us/step - loss: 0.3756 - accuracy: 0.6
750
Epoch 334/400
80/80 [==============================] - 0s 912us/step - loss: 0.3741 - accuracy: 0.7
063
Epoch 335/400
80/80 [==============================] - 0s 884us/step - loss: 0.3755 - accuracy: 0.6
562
Epoch 336/400
80/80 [==============================] - 0s 896us/step - loss: 0.3796 - accuracy: 0.6
375
Epoch 337/400
80/80 [==============================] - 0s 963us/step - loss: 0.3842 - accuracy: 0.7
063
Epoch 338/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3784 - accuracy: 0.693
8
Epoch 339/400
80/80 [==============================] - 0s 934us/step - loss: 0.3766 - accuracy: 0.7
```

```
375
Epoch 340/400
80/80 [==============================] - 0s 900us/step - loss: 0.3875 - accuracy: 0.6
875
Epoch 341/400
80/80 [==============================] - 0s 893us/step - loss: 0.3720 - accuracy: 0.7
125
Epoch 342/400
80/80 [==============================] - 0s 913us/step - loss: 0.3803 - accuracy: 0.6
625
Epoch 343/400
80/80 [==============================] - 0s 913us/step - loss: 0.3802 - accuracy: 0.7
000
Epoch 344/400
80/80 [==============================] - 0s 922us/step - loss: 0.3743 - accuracy: 0.7
312
Epoch 345/400
80/80 [==============================] - 0s 922us/step - loss: 0.3733 - accuracy: 0.7
000
Epoch 346/400
80/80 [==============================] - 0s 936us/step - loss: 0.3789 - accuracy: 0.7
125
Epoch 347/400
80/80 [==============================] - 0s 896us/step - loss: 0.3712 - accuracy: 0.7
375
Epoch 348/400
80/80 [==============================] - 0s 895us/step - loss: 0.3832 - accuracy: 0.7
437
Epoch 349/400
80/80 [==============================] - 0s 891us/step - loss: 0.3752 - accuracy: 0.7
063
Epoch 350/400
80/80 [==============================] - 0s 909us/step - loss: 0.3747 - accuracy: 0.6
875
Epoch 351/400
80/80 [==============================] - 0s 914us/step - loss: 0.3715 - accuracy: 0.6
938
Epoch 352/400
80/80 [==============================] - 0s 871us/step - loss: 0.3712 - accuracy: 0.6
562
Epoch 353/400
80/80 [==============================] - 0s 863us/step - loss: 0.3791 - accuracy: 0.7
188
Epoch 354/400
80/80 [==============================] - 0s 866us/step - loss: 0.3742 - accuracy: 0.6
562
Epoch 355/400
80/80 [==============================] - 0s 858us/step - loss: 0.3722 - accuracy: 0.6
812
Epoch 356/400
80/80 [==============================] - 0s 833us/step - loss: 0.3743 - accuracy: 0.7
125
Epoch 357/400
80/80 [==============================] - 0s 909us/step - loss: 0.3717 - accuracy: 0.6
750
Epoch 358/400
80/80 [==============================] - 0s 926us/step - loss: 0.3726 - accuracy: 0.6
812
Epoch 359/400
80/80 [==============================] - 0s 928us/step - loss: 0.3719 - accuracy: 0.7
```

```
000
Epoch 360/400
80/80 [==============================] - 0s 858us/step - loss: 0.3714 - accuracy: 0.6
812
Epoch 361/400
80/80 [==============================] - 0s 892us/step - loss: 0.3720 - accuracy: 0.7
125
Epoch 362/400
80/80 [==============================] - 0s 877us/step - loss: 0.3710 - accuracy: 0.6
500
Epoch 363/400
80/80 [==============================] - 0s 909us/step - loss: 0.3713 - accuracy: 0.7
000
Epoch 364/400
80/80 [==============================] - 0s 904us/step - loss: 0.3720 - accuracy: 0.6
500
Epoch 365/400
80/80 [==============================] - 0s 871us/step - loss: 0.3731 - accuracy: 0.7
125
Epoch 366/400
80/80 [==============================] - 0s 858us/step - loss: 0.3703 - accuracy: 0.7
063
Epoch 367/400
80/80 [==============================] - 0s 884us/step - loss: 0.3698 - accuracy: 0.7
188
Epoch 368/400
80/80 [==============================] - 0s 873us/step - loss: 0.3790 - accuracy: 0.7
000
Epoch 369/400
80/80 [==============================] - 0s 891us/step - loss: 0.3872 - accuracy: 0.7
125
Epoch 370/400
80/80 [==============================] - 0s 895us/step - loss: 0.3748 - accuracy: 0.7
188
Epoch 371/400
80/80 [==============================] - 0s 896us/step - loss: 0.3722 - accuracy: 0.7
437
Epoch 372/400
80/80 [==============================] - 0s 854us/step - loss: 0.3723 - accuracy: 0.7
312
Epoch 373/400
80/80 [==============================] - 0s 856us/step - loss: 0.3707 - accuracy: 0.6
938
Epoch 374/400
80/80 [==============================] - 0s 905us/step - loss: 0.3730 - accuracy: 0.6
875
Epoch 375/400
80/80 [==============================] - 0s 896us/step - loss: 0.3720 - accuracy: 0.6
938
Epoch 376/400
80/80 [==============================] - 0s 918us/step - loss: 0.3697 - accuracy: 0.6
438
Epoch 377/400
80/80 [==============================] - 0s 916us/step - loss: 0.3699 - accuracy: 0.6
938
Epoch 378/400
80/80 [==============================] - 0s 875us/step - loss: 0.3691 - accuracy: 0.6
812
Epoch 379/400
80/80 [==============================] - 0s 909us/step - loss: 0.3733 - accuracy: 0.7
```

```
125
Epoch 380/400
80/80 [==============================] - 0s 884us/step - loss: 0.3711 - accuracy: 0.7
188
Epoch 381/400
80/80 [==============================] - 0s 858us/step - loss: 0.3698 - accuracy: 0.6
812
Epoch 382/400
80/80 [==============================] - 0s 884us/step - loss: 0.3692 - accuracy: 0.6
562
Epoch 383/400
80/80 [==============================] - 0s 909us/step - loss: 0.3685 - accuracy: 0.7
312
Epoch 384/400
80/80 [==============================] - 0s 876us/step - loss: 0.3726 - accuracy: 0.7
375
Epoch 385/400
80/80 [==============================] - 0s 917us/step - loss: 0.3680 - accuracy: 0.7
125
Epoch 386/400
80/80 [==============================] - 0s 873us/step - loss: 0.3728 - accuracy: 0.6
562
Epoch 387/400
80/80 [==============================] - 0s 889us/step - loss: 0.3708 - accuracy: 0.7
312
Epoch 388/400
80/80 [==============================] - 0s 884us/step - loss: 0.3693 - accuracy: 0.7
250
Epoch 389/400
80/80 [==============================] - 0s 846us/step - loss: 0.3694 - accuracy: 0.7
188
Epoch 390/400
80/80 [==============================] - 0s 855us/step - loss: 0.3709 - accuracy: 0.7
000
Epoch 391/400
80/80 [==============================] - 0s 896us/step - loss: 0.3691 - accuracy: 0.7
000
Epoch 392/400
80/80 [==============================] - 0s 910us/step - loss: 0.3681 - accuracy: 0.7
125
Epoch 393/400
80/80 [==============================] - 0s 871us/step - loss: 0.3728 - accuracy: 0.6
938
Epoch 394/400
80/80 [==============================] - 0s 871us/step - loss: 0.3713 - accuracy: 0.6
750
Epoch 395/400
80/80 [==============================] - 0s 858us/step - loss: 0.3687 - accuracy: 0.7
000
Epoch 396/400
80/80 [==============================] - 0s 870us/step - loss: 0.3702 - accuracy: 0.7
188
Epoch 397/400
80/80 [==============================] - 0s 896us/step - loss: 0.3687 - accuracy: 0.7
125
Epoch 398/400
80/80 [==============================] - 0s 868us/step - loss: 0.3692 - accuracy: 0.6
938
Epoch 399/400
80/80 [==============================] - 0s 884us/step - loss: 0.3693 - accuracy: 0.6
```

```
938
Epoch 400/400
80/80 [==============================] - 0s 932us/step - loss: 0.3694 - accuracy: 0.7
188
5/5 [==============================] - 0s 1ms/step - loss: 0.3651 - accuracy: 0.7250
Epoch 1/400
80/80 [==============================] - 0s 767us/step - loss: 0.6963 - accuracy: 0.5
625
Epoch 2/400
80/80 [==============================] - 0s 795us/step - loss: 0.6845 - accuracy: 0.6
125
Epoch 3/400
80/80 [==============================] - 0s 784us/step - loss: 0.6759 - accuracy: 0.6
250
Epoch 4/400
80/80 [==============================] - 0s 807us/step - loss: 0.6681 - accuracy: 0.6
375
Epoch 5/400
80/80 [==============================] - 0s 821us/step - loss: 0.6607 - accuracy: 0.6
750
Epoch 6/400
80/80 [==============================] - 0s 909us/step - loss: 0.6554 - accuracy: 0.6
687
Epoch 7/400
80/80 [==============================] - 0s 872us/step - loss: 0.6488 - accuracy: 0.6
750
Epoch 8/400
80/80 [==============================] - 0s 860us/step - loss: 0.6430 - accuracy: 0.6
750
Epoch 9/400
80/80 [==============================] - 0s 901us/step - loss: 0.6373 - accuracy: 0.6
875
Epoch 10/400
80/80 [==============================] - 0s 884us/step - loss: 0.6317 - accuracy: 0.6
812
Epoch 11/400
80/80 [==============================] - 0s 846us/step - loss: 0.6270 - accuracy: 0.6
875
Epoch 12/400
80/80 [==============================] - 0s 857us/step - loss: 0.6234 - accuracy: 0.6
875
Epoch 13/400
80/80 [==============================] - 0s 893us/step - loss: 0.6193 - accuracy: 0.6
875
Epoch 14/400
80/80 [==============================] - 0s 914us/step - loss: 0.6157 - accuracy: 0.6
812
Epoch 15/400
80/80 [==============================] - 0s 909us/step - loss: 0.6126 - accuracy: 0.6
875
Epoch 16/400
80/80 [==============================] - 0s 909us/step - loss: 0.6097 - accuracy: 0.6
812
Epoch 17/400
80/80 [==============================] - 0s 884us/step - loss: 0.6074 - accuracy: 0.6
812
Epoch 18/400
80/80 [==============================] - 0s 917us/step - loss: 0.6054 - accuracy: 0.6
875
Epoch 19/400
```

```
80/80 [==============================] - 0s 947us/step - loss: 0.6042 - accuracy: 0.6
750
Epoch 20/400
80/80 [==============================] - 0s 909us/step - loss: 0.6022 - accuracy: 0.6
750
Epoch 21/400
80/80 [==============================] - 0s 880us/step - loss: 0.6004 - accuracy: 0.6
875
Epoch 22/400
80/80 [==============================] - 0s 913us/step - loss: 0.5980 - accuracy: 0.6
625
Epoch 23/400
80/80 [==============================] - 0s 922us/step - loss: 0.5972 - accuracy: 0.6
875
Epoch 24/400
80/80 [==============================] - 0s 922us/step - loss: 0.5963 - accuracy: 0.6
750
Epoch 25/400
80/80 [==============================] - 0s 877us/step - loss: 0.5957 - accuracy: 0.6
812
Epoch 26/400
80/80 [==============================] - 0s 896us/step - loss: 0.5947 - accuracy: 0.6
750
Epoch 27/400
80/80 [==============================] - 0s 871us/step - loss: 0.5944 - accuracy: 0.6
750
Epoch 28/400
80/80 [==============================] - 0s 885us/step - loss: 0.5929 - accuracy: 0.6
687
Epoch 29/400
80/80 [==============================] - 0s 881us/step - loss: 0.5929 - accuracy: 0.6
750
Epoch 30/400
80/80 [==============================] - 0s 871us/step - loss: 0.5915 - accuracy: 0.6
812
Epoch 31/400
80/80 [==============================] - 0s 910us/step - loss: 0.5921 - accuracy: 0.6
750
Epoch 32/400
80/80 [==============================] - 0s 934us/step - loss: 0.5907 - accuracy: 0.6
812
Epoch 33/400
80/80 [==============================] - 0s 960us/step - loss: 0.5913 - accuracy: 0.6
812
Epoch 34/400
80/80 [==============================] - 0s 997us/step - loss: 0.5911 - accuracy: 0.6
812
Epoch 35/400
80/80 [==============================] - 0s 932us/step - loss: 0.5902 - accuracy: 0.6
750
Epoch 36/400
80/80 [==============================] - 0s 915us/step - loss: 0.5899 - accuracy: 0.6
750
Epoch 37/400
80/80 [==============================] - 0s 894us/step - loss: 0.5890 - accuracy: 0.6
812
Epoch 38/400
80/80 [==============================] - 0s 891us/step - loss: 0.5888 - accuracy: 0.6
812
Epoch 39/400
```

```
80/80 [==============================] - 0s 858us/step - loss: 0.5891 - accuracy: 0.6
750
Epoch 40/400
80/80 [==============================] - 0s 913us/step - loss: 0.5888 - accuracy: 0.6
750
Epoch 41/400
80/80 [==============================] - 0s 899us/step - loss: 0.5884 - accuracy: 0.6
750
Epoch 42/400
80/80 [==============================] - 0s 895us/step - loss: 0.5886 - accuracy: 0.6
938
Epoch 43/400
80/80 [==============================] - 0s 896us/step - loss: 0.5888 - accuracy: 0.6
625
Epoch 44/400
80/80 [==============================] - 0s 881us/step - loss: 0.5879 - accuracy: 0.6
812
Epoch 45/400
80/80 [==============================] - 0s 904us/step - loss: 0.5872 - accuracy: 0.6
687
Epoch 46/400
80/80 [==============================] - 0s 985us/step - loss: 0.5876 - accuracy: 0.6
812
Epoch 47/400
80/80 [==============================] - 0s 934us/step - loss: 0.5878 - accuracy: 0.6
812
Epoch 48/400
80/80 [==============================] - 0s 909us/step - loss: 0.5870 - accuracy: 0.6
750
Epoch 49/400
80/80 [==============================] - 0s 922us/step - loss: 0.5856 - accuracy: 0.6
812
Epoch 50/400
80/80 [==============================] - 0s 911us/step - loss: 0.5864 - accuracy: 0.6
687
Epoch 51/400
80/80 [==============================] - 0s 884us/step - loss: 0.5865 - accuracy: 0.6
687
Epoch 52/400
80/80 [==============================] - 0s 865us/step - loss: 0.5870 - accuracy: 0.6
750
Epoch 53/400
80/80 [==============================] - 0s 882us/step - loss: 0.5861 - accuracy: 0.6
687
Epoch 54/400
80/80 [==============================] - 0s 915us/step - loss: 0.5862 - accuracy: 0.6
750
Epoch 55/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5867 - accuracy: 0.668
7
Epoch 56/400
80/80 [==============================] - 0s 972us/step - loss: 0.5857 - accuracy: 0.6
625
Epoch 57/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5848 - accuracy: 0.675
0
Epoch 58/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5842 - accuracy: 0.662
5
Epoch 59/400
```

```
80/80 [==============================] - 0s 1ms/step - loss: 0.5853 - accuracy: 0.675
0
Epoch 60/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5856 - accuracy: 0.668
7
Epoch 61/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5846 - accuracy: 0.675
0
Epoch 62/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5855 - accuracy: 0.668
7
Epoch 63/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5843 - accuracy: 0.675
0
Epoch 64/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5841 - accuracy: 0.662
5
Epoch 65/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5857 - accuracy: 0.662
5
Epoch 66/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5848 - accuracy: 0.675
0
Epoch 67/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5845 - accuracy: 0.668
7
Epoch 68/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5842 - accuracy: 0.662
5
Epoch 69/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5848 - accuracy: 0.668
7
Epoch 70/400
80/80 [==============================] - 0s 985us/step - loss: 0.5849 - accuracy: 0.6
750
Epoch 71/400
80/80 [==============================] - 0s 979us/step - loss: 0.5840 - accuracy: 0.6
562
Epoch 72/400
80/80 [==============================] - 0s 947us/step - loss: 0.5845 - accuracy: 0.6
750
Epoch 73/400
80/80 [==============================] - 0s 933us/step - loss: 0.5849 - accuracy: 0.6
625
Epoch 74/400
80/80 [==============================] - 0s 947us/step - loss: 0.5827 - accuracy: 0.6
687
Epoch 75/400
80/80 [==============================] - 0s 972us/step - loss: 0.5844 - accuracy: 0.6
687
Epoch 76/400
80/80 [==============================] - 0s 957us/step - loss: 0.5829 - accuracy: 0.6
687
Epoch 77/400
80/80 [==============================] - 0s 973us/step - loss: 0.5836 - accuracy: 0.6
562
Epoch 78/400
80/80 [==============================] - 0s 947us/step - loss: 0.5838 - accuracy: 0.6
750
Epoch 79/400
```

```
80/80 [==============================] - 0s 922us/step - loss: 0.5835 - accuracy: 0.6
625
Epoch 80/400
80/80 [==============================] - 0s 953us/step - loss: 0.5829 - accuracy: 0.6
625
Epoch 81/400
80/80 [==============================] - 0s 921us/step - loss: 0.5838 - accuracy: 0.6
750
Epoch 82/400
80/80 [==============================] - 0s 926us/step - loss: 0.5828 - accuracy: 0.6
812
Epoch 83/400
80/80 [==============================] - 0s 960us/step - loss: 0.5812 - accuracy: 0.6
687
Epoch 84/400
80/80 [==============================] - 0s 961us/step - loss: 0.5842 - accuracy: 0.6
875
Epoch 85/400
80/80 [==============================] - 0s 886us/step - loss: 0.5829 - accuracy: 0.6
687
Epoch 86/400
80/80 [==============================] - 0s 888us/step - loss: 0.5838 - accuracy: 0.6
562
Epoch 87/400
80/80 [==============================] - 0s 922us/step - loss: 0.5833 - accuracy: 0.6
750
Epoch 88/400
80/80 [==============================] - 0s 934us/step - loss: 0.5831 - accuracy: 0.6
687
Epoch 89/400
80/80 [==============================] - 0s 916us/step - loss: 0.5811 - accuracy: 0.6
875
Epoch 90/400
80/80 [==============================] - 0s 922us/step - loss: 0.5816 - accuracy: 0.6
625
Epoch 91/400
80/80 [==============================] - 0s 909us/step - loss: 0.5831 - accuracy: 0.6
687
Epoch 92/400
80/80 [==============================] - 0s 908us/step - loss: 0.5823 - accuracy: 0.6
625
Epoch 93/400
80/80 [==============================] - 0s 909us/step - loss: 0.5834 - accuracy: 0.6
750
Epoch 94/400
80/80 [==============================] - 0s 871us/step - loss: 0.5823 - accuracy: 0.6
625
Epoch 95/400
80/80 [==============================] - 0s 896us/step - loss: 0.5825 - accuracy: 0.6
687
Epoch 96/400
80/80 [==============================] - 0s 931us/step - loss: 0.5826 - accuracy: 0.6
625
Epoch 97/400
80/80 [==============================] - 0s 896us/step - loss: 0.5831 - accuracy: 0.6
625
Epoch 98/400
80/80 [==============================] - 0s 909us/step - loss: 0.5837 - accuracy: 0.6
812
Epoch 99/400
```

```
80/80 [==============================] - 0s 910us/step - loss: 0.5837 - accuracy: 0.6
687
Epoch 100/400
80/80 [==============================] - 0s 916us/step - loss: 0.5824 - accuracy: 0.6
625
Epoch 101/400
80/80 [==============================] - 0s 909us/step - loss: 0.5825 - accuracy: 0.6
750
Epoch 102/400
80/80 [==============================] - 0s 928us/step - loss: 0.5813 - accuracy: 0.6
687
Epoch 103/400
80/80 [==============================] - 0s 928us/step - loss: 0.5835 - accuracy: 0.6
625
Epoch 104/400
80/80 [==============================] - 0s 905us/step - loss: 0.5808 - accuracy: 0.6
687
Epoch 105/400
80/80 [==============================] - 0s 871us/step - loss: 0.5829 - accuracy: 0.6
625
Epoch 106/400
80/80 [==============================] - 0s 896us/step - loss: 0.5830 - accuracy: 0.6
750
Epoch 107/400
80/80 [==============================] - 0s 919us/step - loss: 0.5801 - accuracy: 0.6
687
Epoch 108/400
80/80 [==============================] - 0s 959us/step - loss: 0.5824 - accuracy: 0.6
625
Epoch 109/400
80/80 [==============================] - 0s 952us/step - loss: 0.5831 - accuracy: 0.6
750
Epoch 110/400
80/80 [==============================] - 0s 914us/step - loss: 0.5822 - accuracy: 0.6
562
Epoch 111/400
80/80 [==============================] - 0s 934us/step - loss: 0.5821 - accuracy: 0.6
562
Epoch 112/400
80/80 [==============================] - 0s 910us/step - loss: 0.5823 - accuracy: 0.6
562
Epoch 113/400
80/80 [==============================] - 0s 896us/step - loss: 0.5832 - accuracy: 0.6
687
Epoch 114/400
80/80 [==============================] - 0s 871us/step - loss: 0.5807 - accuracy: 0.6
625
Epoch 115/400
80/80 [==============================] - 0s 925us/step - loss: 0.5833 - accuracy: 0.6
875
Epoch 116/400
80/80 [==============================] - 0s 914us/step - loss: 0.5824 - accuracy: 0.6
687
Epoch 117/400
80/80 [==============================] - 0s 934us/step - loss: 0.5819 - accuracy: 0.6
625
Epoch 118/400
80/80 [==============================] - 0s 922us/step - loss: 0.5822 - accuracy: 0.6
687
Epoch 119/400
```

```
80/80 [==============================] - 0s 953us/step - loss: 0.5822 - accuracy: 0.6
625
Epoch 120/400
80/80 [==============================] - 0s 902us/step - loss: 0.5834 - accuracy: 0.6
625
Epoch 121/400
80/80 [==============================] - 0s 935us/step - loss: 0.5822 - accuracy: 0.6
625
Epoch 122/400
80/80 [==============================] - 0s 914us/step - loss: 0.5814 - accuracy: 0.6
562
Epoch 123/400
80/80 [==============================] - 0s 922us/step - loss: 0.5824 - accuracy: 0.6
625
Epoch 124/400
80/80 [==============================] - 0s 919us/step - loss: 0.5821 - accuracy: 0.6
687
Epoch 125/400
80/80 [==============================] - 0s 922us/step - loss: 0.5812 - accuracy: 0.6
687
Epoch 126/400
80/80 [==============================] - 0s 922us/step - loss: 0.5825 - accuracy: 0.6
625
Epoch 127/400
80/80 [==============================] - 0s 896us/step - loss: 0.5818 - accuracy: 0.6
625
Epoch 128/400
80/80 [==============================] - 0s 916us/step - loss: 0.5824 - accuracy: 0.6
625
Epoch 129/400
80/80 [==============================] - 0s 909us/step - loss: 0.5813 - accuracy: 0.6
625
Epoch 130/400
80/80 [==============================] - 0s 936us/step - loss: 0.5824 - accuracy: 0.6
687
Epoch 131/400
80/80 [==============================] - 0s 896us/step - loss: 0.5811 - accuracy: 0.6
687
Epoch 132/400
80/80 [==============================] - 0s 900us/step - loss: 0.5822 - accuracy: 0.6
625
Epoch 133/400
80/80 [==============================] - 0s 916us/step - loss: 0.5807 - accuracy: 0.6
687
Epoch 134/400
80/80 [==============================] - 0s 934us/step - loss: 0.5829 - accuracy: 0.6
625
Epoch 135/400
80/80 [==============================] - 0s 920us/step - loss: 0.5809 - accuracy: 0.6
812
Epoch 136/400
80/80 [==============================] - 0s 926us/step - loss: 0.5816 - accuracy: 0.6
562
Epoch 137/400
80/80 [==============================] - 0s 947us/step - loss: 0.5810 - accuracy: 0.6
625
Epoch 138/400
80/80 [==============================] - 0s 930us/step - loss: 0.5825 - accuracy: 0.6
687
Epoch 139/400
```

```
80/80 [==============================] - 0s 896us/step - loss: 0.5815 - accuracy: 0.6
625
Epoch 140/400
80/80 [==============================] - 0s 910us/step - loss: 0.5816 - accuracy: 0.6
687
Epoch 141/400
80/80 [==============================] - 0s 896us/step - loss: 0.5821 - accuracy: 0.6
562
Epoch 142/400
80/80 [==============================] - 0s 910us/step - loss: 0.5821 - accuracy: 0.6
687
Epoch 143/400
80/80 [==============================] - 0s 921us/step - loss: 0.5828 - accuracy: 0.6
687
Epoch 144/400
80/80 [==============================] - 0s 908us/step - loss: 0.5818 - accuracy: 0.6
687
Epoch 145/400
80/80 [==============================] - 0s 934us/step - loss: 0.5813 - accuracy: 0.6
625
Epoch 146/400
80/80 [==============================] - 0s 925us/step - loss: 0.5824 - accuracy: 0.6
562
Epoch 147/400
80/80 [==============================] - 0s 900us/step - loss: 0.5813 - accuracy: 0.6
687
Epoch 148/400
80/80 [==============================] - 0s 866us/step - loss: 0.5816 - accuracy: 0.6
562
Epoch 149/400
80/80 [==============================] - 0s 881us/step - loss: 0.5814 - accuracy: 0.6
812
Epoch 150/400
80/80 [==============================] - 0s 951us/step - loss: 0.5810 - accuracy: 0.6
625
Epoch 151/400
80/80 [==============================] - 0s 953us/step - loss: 0.5818 - accuracy: 0.6
625
Epoch 152/400
80/80 [==============================] - 0s 907us/step - loss: 0.5803 - accuracy: 0.6
750
Epoch 153/400
80/80 [==============================] - 0s 940us/step - loss: 0.5811 - accuracy: 0.6
625
Epoch 154/400
80/80 [==============================] - 0s 934us/step - loss: 0.5812 - accuracy: 0.6
687
Epoch 155/400
80/80 [==============================] - 0s 941us/step - loss: 0.5816 - accuracy: 0.6
687
Epoch 156/400
80/80 [==============================] - 0s 966us/step - loss: 0.5822 - accuracy: 0.6
625
Epoch 157/400
80/80 [==============================] - 0s 885us/step - loss: 0.5808 - accuracy: 0.6
687
Epoch 158/400
80/80 [==============================] - 0s 858us/step - loss: 0.5817 - accuracy: 0.6
625
Epoch 159/400
```

```
80/80 [==============================] - 0s 878us/step - loss: 0.5816 - accuracy: 0.6
625
Epoch 160/400
80/80 [==============================] - 0s 898us/step - loss: 0.5816 - accuracy: 0.6
625
Epoch 161/400
80/80 [==============================] - 0s 896us/step - loss: 0.5819 - accuracy: 0.6
750
Epoch 162/400
80/80 [==============================] - 0s 926us/step - loss: 0.5807 - accuracy: 0.6
625
Epoch 163/400
80/80 [==============================] - 0s 950us/step - loss: 0.5827 - accuracy: 0.6
687
Epoch 164/400
80/80 [==============================] - 0s 896us/step - loss: 0.5814 - accuracy: 0.6
625
Epoch 165/400
80/80 [==============================] - 0s 909us/step - loss: 0.5821 - accuracy: 0.6
687
Epoch 166/400
80/80 [==============================] - 0s 911us/step - loss: 0.5809 - accuracy: 0.6
625
Epoch 167/400
80/80 [==============================] - 0s 918us/step - loss: 0.5811 - accuracy: 0.6
562
Epoch 168/400
80/80 [==============================] - 0s 915us/step - loss: 0.5821 - accuracy: 0.6
625
Epoch 169/400
80/80 [==============================] - 0s 912us/step - loss: 0.5806 - accuracy: 0.6
625
Epoch 170/400
80/80 [==============================] - 0s 933us/step - loss: 0.5815 - accuracy: 0.6
625
Epoch 171/400
80/80 [==============================] - 0s 909us/step - loss: 0.5814 - accuracy: 0.6
625
Epoch 172/400
80/80 [==============================] - 0s 896us/step - loss: 0.5813 - accuracy: 0.6
625
Epoch 173/400
80/80 [==============================] - 0s 993us/step - loss: 0.5811 - accuracy: 0.6
625
Epoch 174/400
80/80 [==============================] - 0s 947us/step - loss: 0.5837 - accuracy: 0.6
625
Epoch 175/400
80/80 [==============================] - 0s 919us/step - loss: 0.5809 - accuracy: 0.6
625
Epoch 176/400
80/80 [==============================] - 0s 909us/step - loss: 0.5825 - accuracy: 0.6
625
Epoch 177/400
80/80 [==============================] - 0s 905us/step - loss: 0.5809 - accuracy: 0.6
562
Epoch 178/400
80/80 [==============================] - 0s 922us/step - loss: 0.5829 - accuracy: 0.6
625
Epoch 179/400
```

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80/80 [==============================] - 0s 896us/step - loss: 0.5832 - accuracy: 0.6
750
Epoch 180/400
80/80 [==============================] - 0s 920us/step - loss: 0.5818 - accuracy: 0.6
625
Epoch 181/400
80/80 [==============================] - 0s 891us/step - loss: 0.5797 - accuracy: 0.6
625
Epoch 182/400
80/80 [==============================] - 0s 909us/step - loss: 0.5826 - accuracy: 0.6
812
Epoch 183/400
80/80 [==============================] - 0s 909us/step - loss: 0.5814 - accuracy: 0.6
812
Epoch 184/400
80/80 [==============================] - 0s 922us/step - loss: 0.5789 - accuracy: 0.6
875
Epoch 185/400
80/80 [==============================] - 0s 944us/step - loss: 0.5821 - accuracy: 0.6
625
Epoch 186/400
80/80 [==============================] - 0s 900us/step - loss: 0.5828 - accuracy: 0.6
625
Epoch 187/400
80/80 [==============================] - 0s 909us/step - loss: 0.5812 - accuracy: 0.6
625
Epoch 188/400
80/80 [==============================] - 0s 909us/step - loss: 0.5803 - accuracy: 0.6
625
Epoch 189/400
80/80 [==============================] - 0s 909us/step - loss: 0.5819 - accuracy: 0.6
625
Epoch 190/400
80/80 [==============================] - 0s 896us/step - loss: 0.5791 - accuracy: 0.6
687
Epoch 191/400
80/80 [==============================] - 0s 947us/step - loss: 0.5838 - accuracy: 0.6
687
Epoch 192/400
80/80 [==============================] - 0s 898us/step - loss: 0.5821 - accuracy: 0.6
687
Epoch 193/400
80/80 [==============================] - 0s 896us/step - loss: 0.5803 - accuracy: 0.6
750
Epoch 194/400
80/80 [==============================] - 0s 929us/step - loss: 0.5816 - accuracy: 0.6
687
Epoch 195/400
80/80 [==============================] - 0s 917us/step - loss: 0.5820 - accuracy: 0.6
625
Epoch 196/400
80/80 [==============================] - 0s 896us/step - loss: 0.5810 - accuracy: 0.6
625
Epoch 197/400
80/80 [==============================] - 0s 896us/step - loss: 0.5794 - accuracy: 0.6
625
Epoch 198/400
80/80 [==============================] - 0s 910us/step - loss: 0.5805 - accuracy: 0.6
687
Epoch 199/400
```

```
80/80 [==============================] - 0s 896us/step - loss: 0.5817 - accuracy: 0.6
750
Epoch 200/400
80/80 [==============================] - 0s 901us/step - loss: 0.5818 - accuracy: 0.6
625
Epoch 201/400
80/80 [==============================] - 0s 922us/step - loss: 0.5813 - accuracy: 0.6
687
Epoch 202/400
80/80 [==============================] - 0s 909us/step - loss: 0.5813 - accuracy: 0.6
625
Epoch 203/400
80/80 [==============================] - 0s 946us/step - loss: 0.5812 - accuracy: 0.6
687
Epoch 204/400
80/80 [==============================] - 0s 937us/step - loss: 0.5816 - accuracy: 0.6
562
Epoch 205/400
80/80 [==============================] - 0s 896us/step - loss: 0.5810 - accuracy: 0.6
687
Epoch 206/400
80/80 [==============================] - 0s 947us/step - loss: 0.5803 - accuracy: 0.6
562
Epoch 207/400
80/80 [==============================] - 0s 901us/step - loss: 0.5810 - accuracy: 0.6
687
Epoch 208/400
80/80 [==============================] - 0s 905us/step - loss: 0.5815 - accuracy: 0.6
625
Epoch 209/400
80/80 [==============================] - 0s 919us/step - loss: 0.5801 - accuracy: 0.6
625
Epoch 210/400
80/80 [==============================] - 0s 896us/step - loss: 0.5821 - accuracy: 0.6
687
Epoch 211/400
80/80 [==============================] - 0s 909us/step - loss: 0.5815 - accuracy: 0.6
750
Epoch 212/400
80/80 [==============================] - 0s 938us/step - loss: 0.5818 - accuracy: 0.6
562
Epoch 213/400
80/80 [==============================] - 0s 909us/step - loss: 0.5799 - accuracy: 0.6
687
Epoch 214/400
80/80 [==============================] - 0s 924us/step - loss: 0.5813 - accuracy: 0.6
812
Epoch 215/400
80/80 [==============================] - 0s 909us/step - loss: 0.5804 - accuracy: 0.6
625
Epoch 216/400
80/80 [==============================] - 0s 938us/step - loss: 0.5799 - accuracy: 0.6
625
Epoch 217/400
80/80 [==============================] - 0s 911us/step - loss: 0.5803 - accuracy: 0.6
625
Epoch 218/400
80/80 [==============================] - 0s 924us/step - loss: 0.5799 - accuracy: 0.6
687
Epoch 219/400
```

```
80/80 [==============================] - 0s 934us/step - loss: 0.5794 - accuracy: 0.6
625
Epoch 220/400
80/80 [==============================] - 0s 908us/step - loss: 0.5815 - accuracy: 0.6
687
Epoch 221/400
80/80 [==============================] - 0s 947us/step - loss: 0.5815 - accuracy: 0.6
687
Epoch 222/400
80/80 [==============================] - 0s 934us/step - loss: 0.5822 - accuracy: 0.6
625
Epoch 223/400
80/80 [==============================] - 0s 922us/step - loss: 0.5802 - accuracy: 0.6
687
Epoch 224/400
80/80 [==============================] - 0s 904us/step - loss: 0.5824 - accuracy: 0.6
687
Epoch 225/400
80/80 [==============================] - 0s 922us/step - loss: 0.5800 - accuracy: 0.6
625
Epoch 226/400
80/80 [==============================] - 0s 947us/step - loss: 0.5809 - accuracy: 0.6
687
Epoch 227/400
80/80 [==============================] - 0s 966us/step - loss: 0.5799 - accuracy: 0.6
562
Epoch 228/400
80/80 [==============================] - 0s 896us/step - loss: 0.5794 - accuracy: 0.6
625
Epoch 229/400
80/80 [==============================] - 0s 896us/step - loss: 0.5818 - accuracy: 0.6
750
Epoch 230/400
80/80 [==============================] - 0s 924us/step - loss: 0.5803 - accuracy: 0.6
687
Epoch 231/400
80/80 [==============================] - 0s 938us/step - loss: 0.5798 - accuracy: 0.6
625
Epoch 232/400
80/80 [==============================] - 0s 893us/step - loss: 0.5816 - accuracy: 0.6
687
Epoch 233/400
80/80 [==============================] - 0s 938us/step - loss: 0.5811 - accuracy: 0.6
625
Epoch 234/400
80/80 [==============================] - 0s 909us/step - loss: 0.5818 - accuracy: 0.6
625
Epoch 235/400
80/80 [==============================] - 0s 917us/step - loss: 0.5790 - accuracy: 0.6
875
Epoch 236/400
80/80 [==============================] - 0s 896us/step - loss: 0.5817 - accuracy: 0.6
687
Epoch 237/400
80/80 [==============================] - 0s 909us/step - loss: 0.5803 - accuracy: 0.6
625
Epoch 238/400
80/80 [==============================] - 0s 912us/step - loss: 0.5807 - accuracy: 0.6
562
Epoch 239/400
```

```
80/80 [==============================] - 0s 917us/step - loss: 0.5788 - accuracy: 0.6
625
Epoch 240/400
80/80 [==============================] - 0s 896us/step - loss: 0.5818 - accuracy: 0.6
687
Epoch 241/400
80/80 [==============================] - 0s 858us/step - loss: 0.5813 - accuracy: 0.6
625
Epoch 242/400
80/80 [==============================] - 0s 922us/step - loss: 0.5802 - accuracy: 0.6
625
Epoch 243/400
80/80 [==============================] - 0s 904us/step - loss: 0.5807 - accuracy: 0.6
562
Epoch 244/400
80/80 [==============================] - 0s 903us/step - loss: 0.5813 - accuracy: 0.6
687
Epoch 245/400
80/80 [==============================] - 0s 910us/step - loss: 0.5811 - accuracy: 0.6
687
Epoch 246/400
80/80 [==============================] - 0s 861us/step - loss: 0.5796 - accuracy: 0.6
687
Epoch 247/400
80/80 [==============================] - 0s 896us/step - loss: 0.5807 - accuracy: 0.6
687
Epoch 248/400
80/80 [==============================] - 0s 911us/step - loss: 0.5794 - accuracy: 0.6
625
Epoch 249/400
80/80 [==============================] - 0s 909us/step - loss: 0.5807 - accuracy: 0.6
750
Epoch 250/400
80/80 [==============================] - 0s 909us/step - loss: 0.5798 - accuracy: 0.6
812
Epoch 251/400
80/80 [==============================] - 0s 950us/step - loss: 0.5809 - accuracy: 0.6
687
Epoch 252/400
80/80 [==============================] - 0s 871us/step - loss: 0.5793 - accuracy: 0.6
625
Epoch 253/400
80/80 [==============================] - 0s 885us/step - loss: 0.5801 - accuracy: 0.6
625
Epoch 254/400
80/80 [==============================] - 0s 896us/step - loss: 0.5800 - accuracy: 0.6
750
Epoch 255/400
80/80 [==============================] - 0s 896us/step - loss: 0.5801 - accuracy: 0.6
625
Epoch 256/400
80/80 [==============================] - 0s 922us/step - loss: 0.5797 - accuracy: 0.6
812
Epoch 257/400
80/80 [==============================] - 0s 926us/step - loss: 0.5807 - accuracy: 0.6
625
Epoch 258/400
80/80 [==============================] - 0s 928us/step - loss: 0.5792 - accuracy: 0.6
687
Epoch 259/400
```

```
80/80 [==============================] - 0s 934us/step - loss: 0.5800 - accuracy: 0.6
750
Epoch 260/400
80/80 [==============================] - 0s 927us/step - loss: 0.5802 - accuracy: 0.6
625
Epoch 261/400
80/80 [==============================] - 0s 877us/step - loss: 0.5815 - accuracy: 0.6
625
Epoch 262/400
80/80 [==============================] - 0s 920us/step - loss: 0.5801 - accuracy: 0.6
687
Epoch 263/400
80/80 [==============================] - 0s 922us/step - loss: 0.5811 - accuracy: 0.6
750
Epoch 264/400
80/80 [==============================] - 0s 922us/step - loss: 0.5803 - accuracy: 0.6
687
Epoch 265/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5793 - accuracy: 0.675
0
Epoch 266/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5791 - accuracy: 0.668
7
Epoch 267/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5785 - accuracy: 0.675
0
Epoch 268/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5779 - accuracy: 0.656
2
Epoch 269/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5783 - accuracy: 0.662
5
Epoch 270/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5798 - accuracy: 0.675
0
Epoch 271/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5820 - accuracy: 0.675
0
Epoch 272/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5803 - accuracy: 0.675
0
Epoch 273/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5797 - accuracy: 0.668
7
Epoch 274/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5785 - accuracy: 0.668
7
Epoch 275/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5806 - accuracy: 0.675
0
Epoch 276/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5781 - accuracy: 0.668
7
Epoch 277/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5794 - accuracy: 0.656
2
Epoch 278/400
80/80 [==============================] - 0s 997us/step - loss: 0.5796 - accuracy: 0.6
687
Epoch 279/400
```

```
80/80 [==============================] - 0s 972us/step - loss: 0.5782 - accuracy: 0.6
750
Epoch 280/400
80/80 [==============================] - 0s 953us/step - loss: 0.5780 - accuracy: 0.6
750
Epoch 281/400
80/80 [==============================] - 0s 972us/step - loss: 0.5769 - accuracy: 0.6
750
Epoch 282/400
80/80 [==============================] - 0s 959us/step - loss: 0.5790 - accuracy: 0.6
875
Epoch 283/400
80/80 [==============================] - 0s 909us/step - loss: 0.5771 - accuracy: 0.6
750
Epoch 284/400
80/80 [==============================] - 0s 908us/step - loss: 0.5789 - accuracy: 0.6
687
Epoch 285/400
80/80 [==============================] - 0s 916us/step - loss: 0.5780 - accuracy: 0.6
625
Epoch 286/400
80/80 [==============================] - 0s 959us/step - loss: 0.5768 - accuracy: 0.6
687
Epoch 287/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5753 - accuracy: 0.662
5
Epoch 288/400
80/80 [==============================] - 0s 985us/step - loss: 0.5777 - accuracy: 0.6
625
Epoch 289/400
80/80 [==============================] - 0s 978us/step - loss: 0.5765 - accuracy: 0.6
750
Epoch 290/400
80/80 [==============================] - 0s 896us/step - loss: 0.5743 - accuracy: 0.6
625
Epoch 291/400
80/80 [==============================] - 0s 922us/step - loss: 0.5758 - accuracy: 0.6
875
Epoch 292/400
80/80 [==============================] - 0s 896us/step - loss: 0.5751 - accuracy: 0.6
625
Epoch 293/400
80/80 [==============================] - 0s 922us/step - loss: 0.5735 - accuracy: 0.6
687
Epoch 294/400
80/80 [==============================] - 0s 945us/step - loss: 0.5734 - accuracy: 0.6
687
Epoch 295/400
80/80 [==============================] - 0s 884us/step - loss: 0.5710 - accuracy: 0.6
750
Epoch 296/400
80/80 [==============================] - 0s 897us/step - loss: 0.5690 - accuracy: 0.6
687
Epoch 297/400
80/80 [==============================] - 0s 909us/step - loss: 0.5667 - accuracy: 0.6
812
Epoch 298/400
80/80 [==============================] - 0s 936us/step - loss: 0.5645 - accuracy: 0.6
812
Epoch 299/400
```

```
80/80 [==============================] - 0s 959us/step - loss: 0.5583 - accuracy: 0.6
750
Epoch 300/400
80/80 [==============================] - 0s 972us/step - loss: 0.5537 - accuracy: 0.6
875
Epoch 301/400
80/80 [==============================] - 0s 884us/step - loss: 0.5462 - accuracy: 0.7
063
Epoch 302/400
80/80 [==============================] - 0s 922us/step - loss: 0.5281 - accuracy: 0.7
312
Epoch 303/400
80/80 [==============================] - 0s 909us/step - loss: 0.5192 - accuracy: 0.7
500
Epoch 304/400
80/80 [==============================] - 0s 884us/step - loss: 0.4992 - accuracy: 0.8
250
Epoch 305/400
80/80 [==============================] - 0s 909us/step - loss: 0.4734 - accuracy: 0.8
438
Epoch 306/400
80/80 [==============================] - 0s 896us/step - loss: 0.4456 - accuracy: 0.8
313
Epoch 307/400
80/80 [==============================] - 0s 932us/step - loss: 0.4277 - accuracy: 0.8
500
Epoch 308/400
80/80 [==============================] - 0s 909us/step - loss: 0.3998 - accuracy: 0.8
438
Epoch 309/400
80/80 [==============================] - 0s 925us/step - loss: 0.3842 - accuracy: 0.8
562
Epoch 310/400
80/80 [==============================] - 0s 922us/step - loss: 0.3684 - accuracy: 0.8
750
Epoch 311/400
80/80 [==============================] - 0s 909us/step - loss: 0.3704 - accuracy: 0.8
500
Epoch 312/400
80/80 [==============================] - 0s 907us/step - loss: 0.3609 - accuracy: 0.8
438
Epoch 313/400
80/80 [==============================] - 0s 909us/step - loss: 0.3576 - accuracy: 0.8
625
Epoch 314/400
80/80 [==============================] - 0s 911us/step - loss: 0.3607 - accuracy: 0.8
562
Epoch 315/400
80/80 [==============================] - 0s 896us/step - loss: 0.3490 - accuracy: 0.8
438
Epoch 316/400
80/80 [==============================] - 0s 907us/step - loss: 0.3465 - accuracy: 0.8
625
Epoch 317/400
80/80 [==============================] - 0s 897us/step - loss: 0.3504 - accuracy: 0.8
687
Epoch 318/400
80/80 [==============================] - 0s 911us/step - loss: 0.3500 - accuracy: 0.8
687
Epoch 319/400
```

```
80/80 [==============================] - 0s 922us/step - loss: 0.3531 - accuracy: 0.8
625
Epoch 320/400
80/80 [==============================] - 0s 927us/step - loss: 0.3544 - accuracy: 0.8
500
Epoch 321/400
80/80 [==============================] - 0s 912us/step - loss: 0.3505 - accuracy: 0.8
562
Epoch 322/400
80/80 [==============================] - 0s 922us/step - loss: 0.3514 - accuracy: 0.8
500
Epoch 323/400
80/80 [==============================] - 0s 922us/step - loss: 0.3437 - accuracy: 0.8
625
Epoch 324/400
80/80 [==============================] - 0s 934us/step - loss: 0.3584 - accuracy: 0.8
438
Epoch 325/400
80/80 [==============================] - 0s 921us/step - loss: 0.3537 - accuracy: 0.8
687
Epoch 326/400
80/80 [==============================] - 0s 909us/step - loss: 0.3560 - accuracy: 0.8
625
Epoch 327/400
80/80 [==============================] - 0s 884us/step - loss: 0.3571 - accuracy: 0.8
687
Epoch 328/400
80/80 [==============================] - 0s 909us/step - loss: 0.3454 - accuracy: 0.8
750
Epoch 329/400
80/80 [==============================] - 0s 905us/step - loss: 0.3474 - accuracy: 0.8
750
Epoch 330/400
80/80 [==============================] - 0s 871us/step - loss: 0.3546 - accuracy: 0.8
750
Epoch 331/400
80/80 [==============================] - 0s 871us/step - loss: 0.3558 - accuracy: 0.8
625
Epoch 332/400
80/80 [==============================] - 0s 884us/step - loss: 0.3575 - accuracy: 0.8
687
Epoch 333/400
80/80 [==============================] - 0s 947us/step - loss: 0.3504 - accuracy: 0.8
438
Epoch 334/400
80/80 [==============================] - 0s 936us/step - loss: 0.3591 - accuracy: 0.8
625
Epoch 335/400
80/80 [==============================] - 0s 896us/step - loss: 0.3481 - accuracy: 0.8
562
Epoch 336/400
80/80 [==============================] - 0s 944us/step - loss: 0.3444 - accuracy: 0.8
750
Epoch 337/400
80/80 [==============================] - 0s 896us/step - loss: 0.3527 - accuracy: 0.8
625
Epoch 338/400
80/80 [==============================] - 0s 911us/step - loss: 0.3538 - accuracy: 0.8
687
Epoch 339/400
```

```
80/80 [==============================] - 0s 884us/step - loss: 0.3596 - accuracy: 0.8
375
Epoch 340/400
80/80 [==============================] - 0s 896us/step - loss: 0.3477 - accuracy: 0.8
687
Epoch 341/400
80/80 [==============================] - 0s 871us/step - loss: 0.3592 - accuracy: 0.8
562
Epoch 342/400
80/80 [==============================] - 0s 891us/step - loss: 0.3619 - accuracy: 0.8
562
Epoch 343/400
80/80 [==============================] - 0s 934us/step - loss: 0.3573 - accuracy: 0.8
500
Epoch 344/400
80/80 [==============================] - 0s 902us/step - loss: 0.3567 - accuracy: 0.8
500
Epoch 345/400
80/80 [==============================] - 0s 909us/step - loss: 0.3499 - accuracy: 0.8
687
Epoch 346/400
80/80 [==============================] - 0s 934us/step - loss: 0.3606 - accuracy: 0.8
500
Epoch 347/400
80/80 [==============================] - 0s 884us/step - loss: 0.3473 - accuracy: 0.8
813
Epoch 348/400
80/80 [==============================] - 0s 858us/step - loss: 0.3520 - accuracy: 0.8
438
Epoch 349/400
80/80 [==============================] - 0s 909us/step - loss: 0.3501 - accuracy: 0.8
562
Epoch 350/400
80/80 [==============================] - 0s 913us/step - loss: 0.3564 - accuracy: 0.8
625
Epoch 351/400
80/80 [==============================] - 0s 922us/step - loss: 0.3554 - accuracy: 0.8
562
Epoch 352/400
80/80 [==============================] - 0s 902us/step - loss: 0.3520 - accuracy: 0.8
625
Epoch 353/400
80/80 [==============================] - 0s 914us/step - loss: 0.3522 - accuracy: 0.8
562
Epoch 354/400
80/80 [==============================] - 0s 934us/step - loss: 0.3512 - accuracy: 0.8
438
Epoch 355/400
80/80 [==============================] - 0s 923us/step - loss: 0.3553 - accuracy: 0.8
438
Epoch 356/400
80/80 [==============================] - 0s 947us/step - loss: 0.3644 - accuracy: 0.8
438
Epoch 357/400
80/80 [==============================] - 0s 931us/step - loss: 0.3395 - accuracy: 0.8
500
Epoch 358/400
80/80 [==============================] - 0s 934us/step - loss: 0.3678 - accuracy: 0.8
625
Epoch 359/400
```

```
80/80 [==============================] - 0s 922us/step - loss: 0.3523 - accuracy: 0.8
625
Epoch 360/400
80/80 [==============================] - 0s 896us/step - loss: 0.3526 - accuracy: 0.8
687
Epoch 361/400
80/80 [==============================] - 0s 934us/step - loss: 0.3541 - accuracy: 0.8
500
Epoch 362/400
80/80 [==============================] - 0s 890us/step - loss: 0.3496 - accuracy: 0.8
562
Epoch 363/400
80/80 [==============================] - 0s 926us/step - loss: 0.3498 - accuracy: 0.8
375
Epoch 364/400
80/80 [==============================] - 0s 934us/step - loss: 0.3581 - accuracy: 0.8
375
Epoch 365/400
80/80 [==============================] - 0s 919us/step - loss: 0.3593 - accuracy: 0.8
500
Epoch 366/400
80/80 [==============================] - 0s 934us/step - loss: 0.3468 - accuracy: 0.8
500
Epoch 367/400
80/80 [==============================] - 0s 896us/step - loss: 0.3536 - accuracy: 0.8
625
Epoch 368/400
80/80 [==============================] - 0s 957us/step - loss: 0.3495 - accuracy: 0.8
500
Epoch 369/400
80/80 [==============================] - 0s 913us/step - loss: 0.3466 - accuracy: 0.8
687
Epoch 370/400
80/80 [==============================] - 0s 902us/step - loss: 0.3519 - accuracy: 0.8
500
Epoch 371/400
80/80 [==============================] - 0s 922us/step - loss: 0.3525 - accuracy: 0.8
687
Epoch 372/400
80/80 [==============================] - 0s 925us/step - loss: 0.3624 - accuracy: 0.8
438
Epoch 373/400
80/80 [==============================] - 0s 922us/step - loss: 0.3562 - accuracy: 0.8
562
Epoch 374/400
80/80 [==============================] - 0s 947us/step - loss: 0.3481 - accuracy: 0.8
562
Epoch 375/400
80/80 [==============================] - 0s 972us/step - loss: 0.3458 - accuracy: 0.8
625
Epoch 376/400
80/80 [==============================] - 0s 954us/step - loss: 0.3442 - accuracy: 0.8
875
Epoch 377/400
80/80 [==============================] - 0s 997us/step - loss: 0.3427 - accuracy: 0.8
562
Epoch 378/400
80/80 [==============================] - 0s 922us/step - loss: 0.3574 - accuracy: 0.8
562
Epoch 379/400
```

```
80/80 [==============================] - 0s 922us/step - loss: 0.3470 - accuracy: 0.8
562
Epoch 380/400
80/80 [==============================] - 0s 922us/step - loss: 0.3565 - accuracy: 0.8
438
Epoch 381/400
80/80 [==============================] - 0s 896us/step - loss: 0.3483 - accuracy: 0.8
813
Epoch 382/400
80/80 [==============================] - 0s 997us/step - loss: 0.3531 - accuracy: 0.8
562
Epoch 383/400
80/80 [==============================] - 0s 997us/step - loss: 0.3566 - accuracy: 0.8
625
Epoch 384/400
80/80 [==============================] - 0s 922us/step - loss: 0.3421 - accuracy: 0.8
687
Epoch 385/400
80/80 [==============================] - 0s 947us/step - loss: 0.3551 - accuracy: 0.8
625
Epoch 386/400
80/80 [==============================] - 0s 908us/step - loss: 0.3545 - accuracy: 0.8
438
Epoch 387/400
80/80 [==============================] - 0s 906us/step - loss: 0.3542 - accuracy: 0.8
687
Epoch 388/400
80/80 [==============================] - 0s 897us/step - loss: 0.3373 - accuracy: 0.8
750
Epoch 389/400
80/80 [==============================] - 0s 909us/step - loss: 0.3493 - accuracy: 0.8
500
Epoch 390/400
80/80 [==============================] - 0s 891us/step - loss: 0.3610 - accuracy: 0.8
562
Epoch 391/400
80/80 [==============================] - 0s 904us/step - loss: 0.3515 - accuracy: 0.8
562
Epoch 392/400
80/80 [==============================] - 0s 902us/step - loss: 0.3563 - accuracy: 0.8
375
Epoch 393/400
80/80 [==============================] - 0s 896us/step - loss: 0.3532 - accuracy: 0.8
687
Epoch 394/400
80/80 [==============================] - 0s 898us/step - loss: 0.3554 - accuracy: 0.8
687
Epoch 395/400
80/80 [==============================] - 0s 922us/step - loss: 0.3132 - accuracy: 0.8
687
Epoch 396/400
80/80 [==============================] - 0s 899us/step - loss: 0.3667 - accuracy: 0.8
562
Epoch 397/400
80/80 [==============================] - 0s 947us/step - loss: 0.3546 - accuracy: 0.8
500
Epoch 398/400
80/80 [==============================] - 0s 934us/step - loss: 0.3552 - accuracy: 0.8
562
Epoch 399/400
```

```
80/80 [==============================] - 0s 937us/step - loss: 0.3582 - accuracy: 0.8
500
Epoch 400/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3482 - accuracy: 0.868
7
5/5 [==============================] - 0s 1ms/step - loss: 0.3346 - accuracy: 0.8750
```

In [90]:
```python
columns = list(zip(*scores))
loss = columns[0]

plt.scatter(num_layers, loss, c = "purple")
plt.title('Loss by # of Hidden Layers (1-5)')
plt.xlabel("# of Hidden Layers")
plt.ylabel('Loss')
```

Out[90]:   Text(0, 0.5, 'Loss')
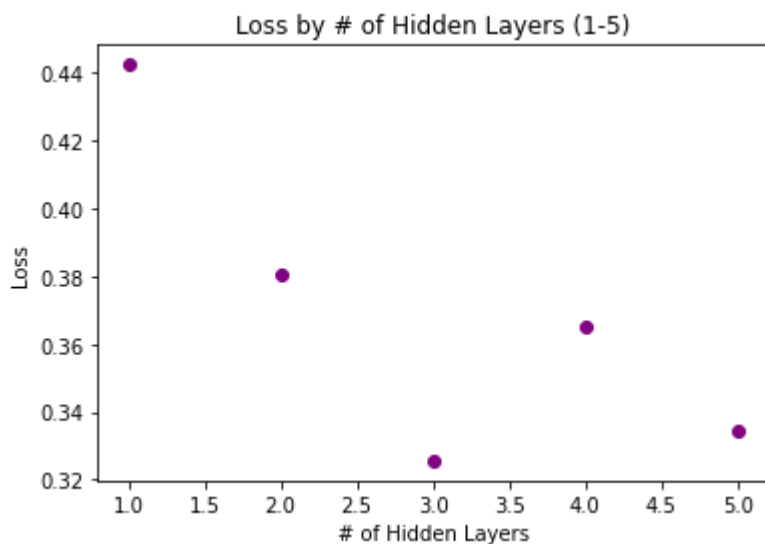
In [91]:
```python
accuracy = columns[1]

plt.scatter(num_layers, accuracy, c = "gold")
plt.title('Accuracy by # of Hidden Layers (1-5)')
plt.xlabel("# of Hidden Layers")
plt.ylabel('Accuracy')
```

Out[91]:   Text(0, 0.5, 'Accuracy')
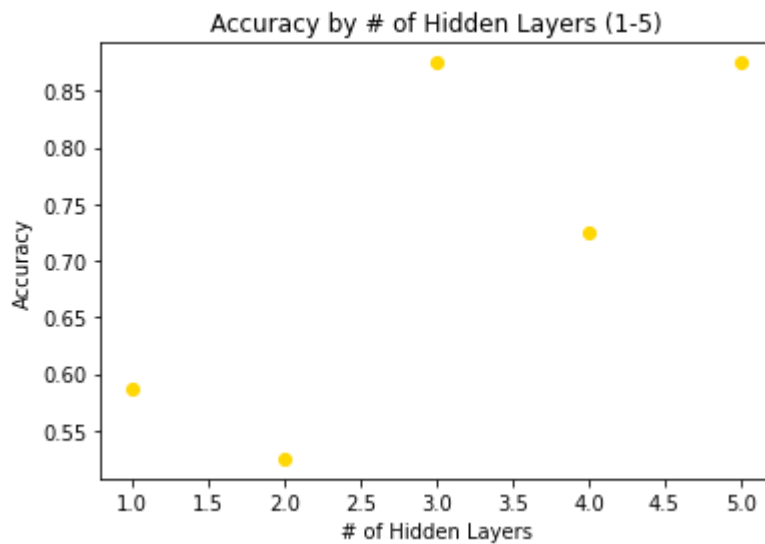
In both loss and accuracy, 3 hidden layers with 2 neurons is the optimal fit.

Optimizers

Using the most optimal configuraion (n-layers, k-neurons per layer), compare how tanh, sigmoid,softplus and relu effect the loss after 400 epochs.

In [96]:
```python
# Tanh
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'tanh'))
model.add(Dense(2, activation = 'tanh'))
model.add(Dense(2, activation = 'tanh'))
model.add(Dense(1, activation='tanh'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accuracy'])
model.fit(X, y, batch_size = 2, epochs = 400)
tanh = model.evaluate(X, y)
```

```
Epoch 1/400
80/80 [==============================] - 0s 783us/step - loss: 4.1051 - accuracy: 0.6
375
Epoch 2/400
80/80 [==============================] - 0s 682us/step - loss: 4.0577 - accuracy: 0.6
687
Epoch 3/400
80/80 [==============================] - 0s 694us/step - loss: 4.0398 - accuracy: 0.6
812
Epoch 4/400
80/80 [==============================] - 0s 694us/step - loss: 3.6905 - accuracy: 0.6
625
Epoch 5/400
80/80 [==============================] - 0s 745us/step - loss: 0.9658 - accuracy: 0.4
875
Epoch 6/400
80/80 [==============================] - 0s 757us/step - loss: 0.7289 - accuracy: 0.4
812
Epoch 7/400
80/80 [==============================] - 0s 770us/step - loss: 0.7110 - accuracy: 0.4
938
Epoch 8/400
80/80 [==============================] - 0s 678us/step - loss: 0.7035 - accuracy: 0.4
563
Epoch 9/400
80/80 [==============================] - 0s 707us/step - loss: 0.6968 - accuracy: 0.5
813
Epoch 10/400
80/80 [==============================] - 0s 721us/step - loss: 0.6856 - accuracy: 0.5
375
Epoch 11/400
80/80 [==============================] - 0s 726us/step - loss: 0.6846 - accuracy: 0.5
375
Epoch 12/400
80/80 [==============================] - 0s 757us/step - loss: 0.6792 - accuracy: 0.5
312
Epoch 13/400
80/80 [==============================] - 0s 707us/step - loss: 0.6687 - accuracy: 0.5
188
Epoch 14/400
80/80 [==============================] - 0s 682us/step - loss: 0.6558 - accuracy: 0.5
813
Epoch 15/400
80/80 [==============================] - 0s 732us/step - loss: 0.6469 - accuracy: 0.6
438
Epoch 16/400
80/80 [==============================] - 0s 783us/step - loss: 0.6331 - accuracy: 0.6
125
Epoch 17/400
80/80 [==============================] - 0s 694us/step - loss: 0.6303 - accuracy: 0.6
250
Epoch 18/400
80/80 [==============================] - 0s 768us/step - loss: 0.6144 - accuracy: 0.6
313
Epoch 19/400
80/80 [==============================] - 0s 708us/step - loss: 0.6076 - accuracy: 0.6
687
Epoch 20/400
80/80 [==============================] - 0s 707us/step - loss: 0.6132 - accuracy: 0.6
313
```

```
Epoch 21/400
80/80 [==============================] - 0s 745us/step - loss: 0.6031 - accuracy: 0.6
187
Epoch 22/400
80/80 [==============================] - 0s 673us/step - loss: 0.6098 - accuracy: 0.6
500
Epoch 23/400
80/80 [==============================] - 0s 776us/step - loss: 0.6052 - accuracy: 0.6
500
Epoch 24/400
80/80 [==============================] - 0s 786us/step - loss: 0.5887 - accuracy: 0.6
625
Epoch 25/400
80/80 [==============================] - 0s 720us/step - loss: 0.6003 - accuracy: 0.6
625
Epoch 26/400
80/80 [==============================] - 0s 676us/step - loss: 0.5999 - accuracy: 0.6
625
Epoch 27/400
80/80 [==============================] - 0s 707us/step - loss: 0.6159 - accuracy: 0.6
625
Epoch 28/400
80/80 [==============================] - 0s 701us/step - loss: 0.5979 - accuracy: 0.6
687
Epoch 29/400
80/80 [==============================] - 0s 707us/step - loss: 0.5903 - accuracy: 0.6
750
Epoch 30/400
80/80 [==============================] - 0s 720us/step - loss: 0.5949 - accuracy: 0.6
812
Epoch 31/400
80/80 [==============================] - 0s 720us/step - loss: 0.5929 - accuracy: 0.6
687
Epoch 32/400
80/80 [==============================] - 0s 719us/step - loss: 0.5888 - accuracy: 0.6
750
Epoch 33/400
80/80 [==============================] - 0s 714us/step - loss: 0.5871 - accuracy: 0.6
250
Epoch 34/400
80/80 [==============================] - 0s 770us/step - loss: 0.5845 - accuracy: 0.6
687
Epoch 35/400
80/80 [==============================] - 0s 695us/step - loss: 0.6134 - accuracy: 0.6
687
Epoch 36/400
80/80 [==============================] - 0s 732us/step - loss: 0.5837 - accuracy: 0.5
875
Epoch 37/400
80/80 [==============================] - 0s 846us/step - loss: 0.5890 - accuracy: 0.6
625
Epoch 38/400
80/80 [==============================] - 0s 795us/step - loss: 0.5854 - accuracy: 0.6
875
Epoch 39/400
80/80 [==============================] - 0s 720us/step - loss: 0.5872 - accuracy: 0.6
750
Epoch 40/400
80/80 [==============================] - 0s 757us/step - loss: 0.5917 - accuracy: 0.6
875
```

```
Epoch 41/400
80/80 [==============================] - 0s 745us/step - loss: 0.5823 - accuracy: 0.6
687
Epoch 42/400
80/80 [==============================] - 0s 739us/step - loss: 0.5837 - accuracy: 0.6
875
Epoch 43/400
80/80 [==============================] - 0s 707us/step - loss: 0.5731 - accuracy: 0.6
438
Epoch 44/400
80/80 [==============================] - 0s 739us/step - loss: 0.7424 - accuracy: 0.6
625
Epoch 45/400
80/80 [==============================] - 0s 694us/step - loss: 0.8097 - accuracy: 0.6
812
Epoch 46/400
80/80 [==============================] - 0s 745us/step - loss: 1.0999 - accuracy: 0.5
000
Epoch 47/400
80/80 [==============================] - 0s 770us/step - loss: 0.7125 - accuracy: 0.4
125
Epoch 48/400
80/80 [==============================] - 0s 732us/step - loss: 0.6984 - accuracy: 0.5
063
Epoch 49/400
80/80 [==============================] - 0s 694us/step - loss: 0.6912 - accuracy: 0.5
312
Epoch 50/400
80/80 [==============================] - 0s 821us/step - loss: 0.6971 - accuracy: 0.5
063
Epoch 51/400
80/80 [==============================] - 0s 709us/step - loss: 0.6892 - accuracy: 0.5
437
Epoch 52/400
80/80 [==============================] - 0s 739us/step - loss: 0.6801 - accuracy: 0.5
688
Epoch 53/400
80/80 [==============================] - 0s 720us/step - loss: 0.6793 - accuracy: 0.5
250
Epoch 54/400
80/80 [==============================] - 0s 676us/step - loss: 0.6756 - accuracy: 0.5
938
Epoch 55/400
80/80 [==============================] - 0s 656us/step - loss: 0.6674 - accuracy: 0.5
500
Epoch 56/400
80/80 [==============================] - 0s 701us/step - loss: 0.6599 - accuracy: 0.5
875
Epoch 57/400
80/80 [==============================] - 0s 720us/step - loss: 0.6516 - accuracy: 0.6
375
Epoch 58/400
80/80 [==============================] - 0s 682us/step - loss: 0.6582 - accuracy: 0.5
875
Epoch 59/400
80/80 [==============================] - 0s 720us/step - loss: 0.6322 - accuracy: 0.6
687
Epoch 60/400
80/80 [==============================] - 0s 720us/step - loss: 0.6453 - accuracy: 0.5
938
```

```
Epoch 61/400
80/80 [==============================] - 0s 669us/step - loss: 0.6297 - accuracy: 0.5
813
Epoch 62/400
80/80 [==============================] - 0s 707us/step - loss: 0.6305 - accuracy: 0.6
062
Epoch 63/400
80/80 [==============================] - 0s 694us/step - loss: 0.6223 - accuracy: 0.6
313
Epoch 64/400
80/80 [==============================] - 0s 682us/step - loss: 0.6207 - accuracy: 0.6
750
Epoch 65/400
80/80 [==============================] - 0s 732us/step - loss: 0.6166 - accuracy: 0.6
125
Epoch 66/400
80/80 [==============================] - 0s 694us/step - loss: 0.6216 - accuracy: 0.6
625
Epoch 67/400
80/80 [==============================] - 0s 757us/step - loss: 0.6107 - accuracy: 0.6
313
Epoch 68/400
80/80 [==============================] - 0s 770us/step - loss: 0.6113 - accuracy: 0.5
938
Epoch 69/400
80/80 [==============================] - 0s 757us/step - loss: 0.6071 - accuracy: 0.6
438
Epoch 70/400
80/80 [==============================] - 0s 770us/step - loss: 0.6068 - accuracy: 0.6
750
Epoch 71/400
80/80 [==============================] - 0s 858us/step - loss: 0.6023 - accuracy: 0.6
562
Epoch 72/400
80/80 [==============================] - 0s 829us/step - loss: 0.6015 - accuracy: 0.6
687
Epoch 73/400
80/80 [==============================] - 0s 833us/step - loss: 0.6044 - accuracy: 0.6
750
Epoch 74/400
80/80 [==============================] - 0s 874us/step - loss: 0.6073 - accuracy: 0.6
687
Epoch 75/400
80/80 [==============================] - 0s 795us/step - loss: 0.6022 - accuracy: 0.6
812
Epoch 76/400
80/80 [==============================] - 0s 795us/step - loss: 0.6022 - accuracy: 0.6
500
Epoch 77/400
80/80 [==============================] - 0s 808us/step - loss: 0.5950 - accuracy: 0.6
562
Epoch 78/400
80/80 [==============================] - 0s 766us/step - loss: 0.6015 - accuracy: 0.6
687
Epoch 79/400
80/80 [==============================] - 0s 745us/step - loss: 0.5971 - accuracy: 0.6
625
Epoch 80/400
80/80 [==============================] - 0s 652us/step - loss: 0.5941 - accuracy: 0.6
438
```

```
Epoch 81/400
80/80 [==============================] - 0s 682us/step - loss: 0.5985 - accuracy: 0.6
500
Epoch 82/400
80/80 [==============================] - 0s 720us/step - loss: 0.5943 - accuracy: 0.6
687
Epoch 83/400
80/80 [==============================] - 0s 686us/step - loss: 0.5960 - accuracy: 0.6
687
Epoch 84/400
80/80 [==============================] - 0s 745us/step - loss: 0.6004 - accuracy: 0.6
500
Epoch 85/400
80/80 [==============================] - 0s 656us/step - loss: 0.6029 - accuracy: 0.6
625
Epoch 86/400
80/80 [==============================] - 0s 694us/step - loss: 0.5889 - accuracy: 0.6
625
Epoch 87/400
80/80 [==============================] - 0s 644us/step - loss: 0.5989 - accuracy: 0.6
562
Epoch 88/400
80/80 [==============================] - 0s 732us/step - loss: 0.5953 - accuracy: 0.6
687
Epoch 89/400
80/80 [==============================] - 0s 682us/step - loss: 0.5953 - accuracy: 0.6
875
Epoch 90/400
80/80 [==============================] - 0s 720us/step - loss: 0.5924 - accuracy: 0.6
750
Epoch 91/400
80/80 [==============================] - 0s 720us/step - loss: 0.5918 - accuracy: 0.6
750
Epoch 92/400
80/80 [==============================] - 0s 770us/step - loss: 0.5952 - accuracy: 0.6
750
Epoch 93/400
80/80 [==============================] - 0s 694us/step - loss: 0.5871 - accuracy: 0.6
687
Epoch 94/400
80/80 [==============================] - 0s 669us/step - loss: 0.5939 - accuracy: 0.6
750
Epoch 95/400
80/80 [==============================] - 0s 745us/step - loss: 0.5940 - accuracy: 0.6
750
Epoch 96/400
80/80 [==============================] - 0s 757us/step - loss: 0.5945 - accuracy: 0.6
750
Epoch 97/400
80/80 [==============================] - 0s 732us/step - loss: 0.5908 - accuracy: 0.6
500
Epoch 98/400
80/80 [==============================] - 0s 732us/step - loss: 0.5946 - accuracy: 0.6
812
Epoch 99/400
80/80 [==============================] - 0s 745us/step - loss: 0.5931 - accuracy: 0.6
625
Epoch 100/400
80/80 [==============================] - 0s 728us/step - loss: 0.5955 - accuracy: 0.6
687
```

```
Epoch 101/400
80/80 [==============================] - 0s 669us/step - loss: 0.5891 - accuracy: 0.6
687
Epoch 102/400
80/80 [==============================] - 0s 717us/step - loss: 0.5945 - accuracy: 0.6
750
Epoch 103/400
80/80 [==============================] - 0s 833us/step - loss: 0.5848 - accuracy: 0.6
562
Epoch 104/400
80/80 [==============================] - 0s 884us/step - loss: 0.5898 - accuracy: 0.6
750
Epoch 105/400
80/80 [==============================] - 0s 860us/step - loss: 0.5825 - accuracy: 0.6
562
Epoch 106/400
80/80 [==============================] - 0s 918us/step - loss: 0.5934 - accuracy: 0.6
438
Epoch 107/400
80/80 [==============================] - 0s 985us/step - loss: 0.5901 - accuracy: 0.6
562
Epoch 108/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5943 - accuracy: 0.656
2
Epoch 109/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5934 - accuracy: 0.687
5
Epoch 110/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5954 - accuracy: 0.662
5
Epoch 111/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5905 - accuracy: 0.662
5
Epoch 112/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5910 - accuracy: 0.662
5
Epoch 113/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5944 - accuracy: 0.681
2
Epoch 114/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5882 - accuracy: 0.668
7
Epoch 115/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5906 - accuracy: 0.693
8
Epoch 116/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5933 - accuracy: 0.675
0
Epoch 117/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5880 - accuracy: 0.668
7
Epoch 118/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5856 - accuracy: 0.625
0
Epoch 119/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5856 - accuracy: 0.675
0
Epoch 120/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5940 - accuracy: 0.637
5
```

```
Epoch 121/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5971 - accuracy: 0.675
0
Epoch 122/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5891 - accuracy: 0.681
2
Epoch 123/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5830 - accuracy: 0.662
5
Epoch 124/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5928 - accuracy: 0.662
5
Epoch 125/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5867 - accuracy: 0.675
0
Epoch 126/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5899 - accuracy: 0.687
5
Epoch 127/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5847 - accuracy: 0.681
2
Epoch 128/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5892 - accuracy: 0.656
2
Epoch 129/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5850 - accuracy: 0.656
2
Epoch 130/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5872 - accuracy: 0.625
0
Epoch 131/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5890 - accuracy: 0.662
5
Epoch 132/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5886 - accuracy: 0.668
7
Epoch 133/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5922 - accuracy: 0.662
5
Epoch 134/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5931 - accuracy: 0.662
5
Epoch 135/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5860 - accuracy: 0.656
2
Epoch 136/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5849 - accuracy: 0.681
2
Epoch 137/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5899 - accuracy: 0.687
5
Epoch 138/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5931 - accuracy: 0.668
7
Epoch 139/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5772 - accuracy: 0.650
0
Epoch 140/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5823 - accuracy: 0.656
2
```

```
Epoch 141/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5854 - accuracy: 0.668
7
Epoch 142/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5907 - accuracy: 0.687
5
Epoch 143/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5898 - accuracy: 0.662
5
Epoch 144/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5933 - accuracy: 0.675
0
Epoch 145/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5934 - accuracy: 0.675
0
Epoch 146/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5817 - accuracy: 0.643
8
Epoch 147/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5836 - accuracy: 0.656
2
Epoch 148/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5958 - accuracy: 0.681
2
Epoch 149/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5904 - accuracy: 0.681
2
Epoch 150/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5916 - accuracy: 0.650
0
Epoch 151/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5871 - accuracy: 0.687
5
Epoch 152/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5914 - accuracy: 0.675
0
Epoch 153/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5933 - accuracy: 0.675
0
Epoch 154/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5920 - accuracy: 0.675
0
Epoch 155/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5881 - accuracy: 0.687
5
Epoch 156/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5917 - accuracy: 0.675
0
Epoch 157/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5865 - accuracy: 0.662
5
Epoch 158/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5813 - accuracy: 0.662
5
Epoch 159/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5883 - accuracy: 0.675
0
Epoch 160/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5941 - accuracy: 0.656
2
```

```
Epoch 161/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5838 - accuracy: 0.668
7
Epoch 162/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5917 - accuracy: 0.656
2
Epoch 163/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5880 - accuracy: 0.668
7
Epoch 164/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5926 - accuracy: 0.656
2
Epoch 165/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5911 - accuracy: 0.643
8
Epoch 166/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5911 - accuracy: 0.675
0
Epoch 167/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5873 - accuracy: 0.675
0
Epoch 168/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5927 - accuracy: 0.668
7
Epoch 169/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5930 - accuracy: 0.662
5
Epoch 170/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5965 - accuracy: 0.681
2
Epoch 171/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5879 - accuracy: 0.656
2
Epoch 172/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5788 - accuracy: 0.668
7
Epoch 173/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5956 - accuracy: 0.675
0
Epoch 174/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5826 - accuracy: 0.662
5
Epoch 175/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5875 - accuracy: 0.643
8
Epoch 176/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5942 - accuracy: 0.675
0
Epoch 177/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5892 - accuracy: 0.681
2
Epoch 178/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5915 - accuracy: 0.681
2
Epoch 179/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5971 - accuracy: 0.681
2
Epoch 180/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5929 - accuracy: 0.668
7
```

```
Epoch 181/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5740 - accuracy: 0.681
2
Epoch 182/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5905 - accuracy: 0.668
7
Epoch 183/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5888 - accuracy: 0.662
5
Epoch 184/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5877 - accuracy: 0.675
0
Epoch 185/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5892 - accuracy: 0.681
2
Epoch 186/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5929 - accuracy: 0.681
2
Epoch 187/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5921 - accuracy: 0.650
0
Epoch 188/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5870 - accuracy: 0.650
0
Epoch 189/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5930 - accuracy: 0.656
2
Epoch 190/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5836 - accuracy: 0.656
2
Epoch 191/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5870 - accuracy: 0.668
7
Epoch 192/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5872 - accuracy: 0.675
0
Epoch 193/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5972 - accuracy: 0.656
2
Epoch 194/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5904 - accuracy: 0.656
2
Epoch 195/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5895 - accuracy: 0.668
7
Epoch 196/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5856 - accuracy: 0.625
0
Epoch 197/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5838 - accuracy: 0.656
2
Epoch 198/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5919 - accuracy: 0.637
5
Epoch 199/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5862 - accuracy: 0.650
0
Epoch 200/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5959 - accuracy: 0.668
7
```

```
Epoch 201/400
80/80 [==============================] - 0s 5ms/step - loss: 0.5909 - accuracy: 0.650
0
Epoch 202/400
80/80 [==============================] - 0s 5ms/step - loss: 0.5896 - accuracy: 0.668
7
Epoch 203/400
80/80 [==============================] - 1s 6ms/step - loss: 0.5912 - accuracy: 0.650
0
Epoch 204/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5882 - accuracy: 0.668
7
Epoch 205/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5891 - accuracy: 0.650
0
Epoch 206/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5941 - accuracy: 0.662
5
Epoch 207/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5901 - accuracy: 0.675
0
Epoch 208/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5870 - accuracy: 0.668
7
Epoch 209/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5865 - accuracy: 0.650
0
Epoch 210/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5908 - accuracy: 0.675
0
Epoch 211/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5914 - accuracy: 0.650
0
Epoch 212/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5871 - accuracy: 0.656
2
Epoch 213/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5921 - accuracy: 0.675
0
Epoch 214/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5891 - accuracy: 0.637
5
Epoch 215/400
80/80 [==============================] - 0s 4ms/step - loss: 0.5878 - accuracy: 0.662
5
Epoch 216/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5802 - accuracy: 0.662
5
Epoch 217/400
80/80 [==============================] - 0s 4ms/step - loss: 0.5980 - accuracy: 0.650
0
Epoch 218/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5878 - accuracy: 0.675
0
Epoch 219/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5898 - accuracy: 0.656
2
Epoch 220/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5837 - accuracy: 0.637
5
```

```
Epoch 221/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5907 - accuracy: 0.656
2
Epoch 222/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5914 - accuracy: 0.668
7
Epoch 223/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5903 - accuracy: 0.631
3
Epoch 224/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5942 - accuracy: 0.656
2
Epoch 225/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5935 - accuracy: 0.681
2
Epoch 226/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5785 - accuracy: 0.656
2
Epoch 227/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5918 - accuracy: 0.662
5
Epoch 228/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5936 - accuracy: 0.681
2
Epoch 229/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5890 - accuracy: 0.675
0
Epoch 230/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5900 - accuracy: 0.668
7
Epoch 231/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5918 - accuracy: 0.662
5
Epoch 232/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5907 - accuracy: 0.662
5
Epoch 233/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5891 - accuracy: 0.675
0
Epoch 234/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5815 - accuracy: 0.668
7
Epoch 235/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5879 - accuracy: 0.637
5
Epoch 236/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5904 - accuracy: 0.643
8
Epoch 237/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5952 - accuracy: 0.668
7
Epoch 238/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5905 - accuracy: 0.662
5
Epoch 239/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5878 - accuracy: 0.675
0
Epoch 240/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5740 - accuracy: 0.650
0
```

```
Epoch 241/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5903 - accuracy: 0.675
0
Epoch 242/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5935 - accuracy: 0.675
0
Epoch 243/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5861 - accuracy: 0.656
2
Epoch 244/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5876 - accuracy: 0.631
3
Epoch 245/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5900 - accuracy: 0.675
0
Epoch 246/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5910 - accuracy: 0.656
2
Epoch 247/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5856 - accuracy: 0.656
2
Epoch 248/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5933 - accuracy: 0.681
2
Epoch 249/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5883 - accuracy: 0.650
0
Epoch 250/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5954 - accuracy: 0.668
7
Epoch 251/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5908 - accuracy: 0.650
0
Epoch 252/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5894 - accuracy: 0.668
7
Epoch 253/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5859 - accuracy: 0.656
2
Epoch 254/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5861 - accuracy: 0.662
5
Epoch 255/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5870 - accuracy: 0.631
3
Epoch 256/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5970 - accuracy: 0.675
0
Epoch 257/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5885 - accuracy: 0.631
3
Epoch 258/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5897 - accuracy: 0.668
7
Epoch 259/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5909 - accuracy: 0.662
5
Epoch 260/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5773 - accuracy: 0.668
7
```

```
Epoch 261/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5945 - accuracy: 0.643
8
Epoch 262/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5911 - accuracy: 0.656
2
Epoch 263/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5805 - accuracy: 0.656
2
Epoch 264/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5874 - accuracy: 0.637
5
Epoch 265/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5870 - accuracy: 0.637
5
Epoch 266/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5865 - accuracy: 0.681
2
Epoch 267/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5840 - accuracy: 0.662
5
Epoch 268/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5915 - accuracy: 0.681
2
Epoch 269/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5944 - accuracy: 0.656
2
Epoch 270/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5883 - accuracy: 0.656
2
Epoch 271/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5912 - accuracy: 0.662
5
Epoch 272/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5911 - accuracy: 0.675
0
Epoch 273/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5857 - accuracy: 0.650
0
Epoch 274/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5854 - accuracy: 0.656
2
Epoch 275/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5915 - accuracy: 0.675
0
Epoch 276/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5917 - accuracy: 0.656
2
Epoch 277/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5842 - accuracy: 0.675
0
Epoch 278/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5882 - accuracy: 0.637
5
Epoch 279/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5822 - accuracy: 0.643
8
Epoch 280/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5871 - accuracy: 0.625
0
```

```
Epoch 281/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5900 - accuracy: 0.650
0
Epoch 282/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5853 - accuracy: 0.656
2
Epoch 283/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5866 - accuracy: 0.662
5
Epoch 284/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5880 - accuracy: 0.656
2
Epoch 285/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5852 - accuracy: 0.656
2
Epoch 286/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5782 - accuracy: 0.650
0
Epoch 287/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5944 - accuracy: 0.656
2
Epoch 288/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5878 - accuracy: 0.650
0
Epoch 289/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5909 - accuracy: 0.656
2
Epoch 290/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5916 - accuracy: 0.662
5
Epoch 291/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5914 - accuracy: 0.675
0
Epoch 292/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5841 - accuracy: 0.631
3
Epoch 293/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5833 - accuracy: 0.631
3
Epoch 294/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5886 - accuracy: 0.668
7
Epoch 295/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5905 - accuracy: 0.668
7
Epoch 296/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5755 - accuracy: 0.662
5
Epoch 297/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5941 - accuracy: 0.643
8
Epoch 298/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5870 - accuracy: 0.656
2
Epoch 299/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5856 - accuracy: 0.662
5
Epoch 300/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5919 - accuracy: 0.668
7
```

```
Epoch 301/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5908 - accuracy: 0.687
5
Epoch 302/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5892 - accuracy: 0.650
0
Epoch 303/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5881 - accuracy: 0.650
0
Epoch 304/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5897 - accuracy: 0.675
0
Epoch 305/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5921 - accuracy: 0.643
8
Epoch 306/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5946 - accuracy: 0.675
0
Epoch 307/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5843 - accuracy: 0.643
8
Epoch 308/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5918 - accuracy: 0.650
0
Epoch 309/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5888 - accuracy: 0.662
5
Epoch 310/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5859 - accuracy: 0.662
5
Epoch 311/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5923 - accuracy: 0.662
5
Epoch 312/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5953 - accuracy: 0.675
0
Epoch 313/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5940 - accuracy: 0.662
5
Epoch 314/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5866 - accuracy: 0.650
0
Epoch 315/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5920 - accuracy: 0.656
2
Epoch 316/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5882 - accuracy: 0.643
8
Epoch 317/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5897 - accuracy: 0.643
8
Epoch 318/400
80/80 [==============================] - 0s 3ms/step - loss: 0.5860 - accuracy: 0.675
0
Epoch 319/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5880 - accuracy: 0.637
5
Epoch 320/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5788 - accuracy: 0.656
2
```

```
Epoch 321/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5910 - accuracy: 0.668
7
Epoch 322/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5841 - accuracy: 0.662
5
Epoch 323/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5923 - accuracy: 0.656
2
Epoch 324/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5884 - accuracy: 0.662
5
Epoch 325/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5884 - accuracy: 0.668
7
Epoch 326/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5891 - accuracy: 0.662
5
Epoch 327/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5814 - accuracy: 0.662
5
Epoch 328/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5880 - accuracy: 0.650
0
Epoch 329/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5753 - accuracy: 0.625
0
Epoch 330/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5917 - accuracy: 0.693
8
Epoch 331/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5925 - accuracy: 0.675
0
Epoch 332/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5781 - accuracy: 0.675
0
Epoch 333/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5901 - accuracy: 0.662
5
Epoch 334/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5933 - accuracy: 0.668
7
Epoch 335/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5763 - accuracy: 0.668
7
Epoch 336/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5876 - accuracy: 0.681
2
Epoch 337/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5900 - accuracy: 0.656
2
Epoch 338/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5890 - accuracy: 0.662
5
Epoch 339/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5857 - accuracy: 0.662
5
Epoch 340/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5900 - accuracy: 0.656
2
```

```
Epoch 341/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5868 - accuracy: 0.662
5
Epoch 342/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5941 - accuracy: 0.687
5
Epoch 343/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5929 - accuracy: 0.650
0
Epoch 344/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5869 - accuracy: 0.668
7
Epoch 345/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5936 - accuracy: 0.675
0
Epoch 346/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5874 - accuracy: 0.675
0
Epoch 347/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5810 - accuracy: 0.675
0
Epoch 348/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5884 - accuracy: 0.668
7
Epoch 349/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5896 - accuracy: 0.668
7
Epoch 350/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5864 - accuracy: 0.656
2
Epoch 351/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5890 - accuracy: 0.662
5
Epoch 352/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5859 - accuracy: 0.656
2
Epoch 353/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5902 - accuracy: 0.681
2
Epoch 354/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5869 - accuracy: 0.662
5
Epoch 355/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5861 - accuracy: 0.668
7
Epoch 356/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5860 - accuracy: 0.650
0
Epoch 357/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5895 - accuracy: 0.643
8
Epoch 358/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5903 - accuracy: 0.668
7
Epoch 359/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5857 - accuracy: 0.662
5
Epoch 360/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5884 - accuracy: 0.681
2
```

```
Epoch 361/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5895 - accuracy: 0.662
5
Epoch 362/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5894 - accuracy: 0.687
5
Epoch 363/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5833 - accuracy: 0.675
0
Epoch 364/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5899 - accuracy: 0.656
2
Epoch 365/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5888 - accuracy: 0.668
7
Epoch 366/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5925 - accuracy: 0.656
2
Epoch 367/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5852 - accuracy: 0.668
7
Epoch 368/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5892 - accuracy: 0.668
7
Epoch 369/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5694 - accuracy: 0.662
5
Epoch 370/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5943 - accuracy: 0.656
2
Epoch 371/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5732 - accuracy: 0.668
7
Epoch 372/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5886 - accuracy: 0.606
2
Epoch 373/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5872 - accuracy: 0.662
5
Epoch 374/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5968 - accuracy: 0.668
7
Epoch 375/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5930 - accuracy: 0.668
7
Epoch 376/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5967 - accuracy: 0.675
0
Epoch 377/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5896 - accuracy: 0.675
0
Epoch 378/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5935 - accuracy: 0.675
0
Epoch 379/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5884 - accuracy: 0.643
8
Epoch 380/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5947 - accuracy: 0.662
5
```

```
Epoch 381/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5844 - accuracy: 0.656
2
Epoch 382/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5880 - accuracy: 0.656
2
Epoch 383/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5908 - accuracy: 0.662
5
Epoch 384/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5928 - accuracy: 0.650
0
Epoch 385/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5864 - accuracy: 0.637
5
Epoch 386/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5879 - accuracy: 0.681
2
Epoch 387/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5883 - accuracy: 0.668
7
Epoch 388/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5940 - accuracy: 0.687
5
Epoch 389/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5961 - accuracy: 0.656
2
Epoch 390/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5919 - accuracy: 0.662
5
Epoch 391/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5813 - accuracy: 0.656
2
Epoch 392/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5892 - accuracy: 0.668
7
Epoch 393/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5942 - accuracy: 0.656
2
Epoch 394/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5902 - accuracy: 0.662
5
Epoch 395/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5826 - accuracy: 0.675
0
Epoch 396/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5860 - accuracy: 0.650
0
Epoch 397/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5851 - accuracy: 0.637
5
Epoch 398/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5932 - accuracy: 0.668
7
Epoch 399/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5941 - accuracy: 0.662
5
Epoch 400/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5877 - accuracy: 0.675
```

```
0
5/5 [==============================] - 0s 2ms/step - loss: 0.5786 - accuracy: 0.6750
```

In [97]:
```python
# Sigmoid
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'sigmoid'))
model.add(Dense(2, activation = 'sigmoid'))
model.add(Dense(2, activation = 'sigmoid'))
model.add(Dense(1, activation='sigmoid'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accuracy'])
model.fit(X, y, batch_size = 2, epochs = 400)
sigmoid = model.evaluate(X, y)
```

```
Epoch 1/400
80/80 [==============================] - 1s 2ms/step - loss: 0.7245 - accuracy: 0.500
0
Epoch 2/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7089 - accuracy: 0.500
0
Epoch 3/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7014 - accuracy: 0.500
0
Epoch 4/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6976 - accuracy: 0.500
0
Epoch 5/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6959 - accuracy: 0.500
0
Epoch 6/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6952 - accuracy: 0.500
0
Epoch 7/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6949 - accuracy: 0.500
0
Epoch 8/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6947 - accuracy: 0.500
0
Epoch 9/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.493
8
Epoch 10/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.487
5
Epoch 11/400
80/80 [==============================] - 0s 3ms/step - loss: 0.6942 - accuracy: 0.456
3
Epoch 12/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 13/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.450
0
Epoch 14/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.425
0
Epoch 15/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.425
0
Epoch 16/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.468
8
Epoch 17/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.487
5
Epoch 18/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.487
5
Epoch 19/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 20/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.431
3
```

```
Epoch 21/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6940 - accuracy: 0.500
0
Epoch 22/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 23/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.443
7
Epoch 24/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.412
5
Epoch 25/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 26/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6939 - accuracy: 0.506
3
Epoch 27/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.481
2
Epoch 28/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 29/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.437
5
Epoch 30/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.493
8
Epoch 31/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6945 - accuracy: 0.443
7
Epoch 32/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 33/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6945 - accuracy: 0.443
7
Epoch 34/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.456
3
Epoch 35/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 36/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6944 - accuracy: 0.443
7
Epoch 37/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6944 - accuracy: 0.418
7
Epoch 38/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 39/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 40/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.450
0
```

```
Epoch 41/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 42/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.425
0
Epoch 43/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.437
5
Epoch 44/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6940 - accuracy: 0.468
8
Epoch 45/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.456
3
Epoch 46/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 47/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6944 - accuracy: 0.450
0
Epoch 48/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.506
3
Epoch 49/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6944 - accuracy: 0.475
0
Epoch 50/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.493
8
Epoch 51/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6940 - accuracy: 0.487
5
Epoch 52/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.487
5
Epoch 53/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.437
5
Epoch 54/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 55/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.487
5
Epoch 56/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.487
5
Epoch 57/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 58/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.468
8
Epoch 59/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.468
8
Epoch 60/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.468
8
```

```
Epoch 61/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6940 - accuracy: 0.443
7
Epoch 62/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6941 - accuracy: 0.487
5
Epoch 63/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 64/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.425
0
Epoch 65/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.500
0
Epoch 66/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.481
2
Epoch 67/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 68/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.437
5
Epoch 69/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.393
8
Epoch 70/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.443
7
Epoch 71/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6947 - accuracy: 0.400
0
Epoch 72/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 73/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.493
8
Epoch 74/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.462
5
Epoch 75/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 76/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.468
8
Epoch 77/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.437
5
Epoch 78/400
80/80 [==============================] - 0s 619us/step - loss: 0.6942 - accuracy: 0.4
750
Epoch 79/400
80/80 [==============================] - 0s 606us/step - loss: 0.6941 - accuracy: 0.5
000
Epoch 80/400
80/80 [==============================] - 0s 607us/step - loss: 0.6943 - accuracy: 0.4
625
```

```
Epoch 81/400
80/80 [==============================] - 0s 593us/step - loss: 0.6943 - accuracy: 0.4
500
Epoch 82/400
80/80 [==============================] - 0s 603us/step - loss: 0.6942 - accuracy: 0.4
812
Epoch 83/400
80/80 [==============================] - 0s 631us/step - loss: 0.6940 - accuracy: 0.4
938
Epoch 84/400
80/80 [==============================] - 0s 608us/step - loss: 0.6941 - accuracy: 0.4
938
Epoch 85/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.4
750
Epoch 86/400
80/80 [==============================] - 0s 593us/step - loss: 0.6942 - accuracy: 0.4
625
Epoch 87/400
80/80 [==============================] - 0s 593us/step - loss: 0.6943 - accuracy: 0.4
750
Epoch 88/400
80/80 [==============================] - 0s 593us/step - loss: 0.6943 - accuracy: 0.4
500
Epoch 89/400
80/80 [==============================] - 0s 606us/step - loss: 0.6941 - accuracy: 0.4
000
Epoch 90/400
80/80 [==============================] - 0s 593us/step - loss: 0.6942 - accuracy: 0.4
500
Epoch 91/400
80/80 [==============================] - 0s 619us/step - loss: 0.6944 - accuracy: 0.4
250
Epoch 92/400
80/80 [==============================] - 0s 606us/step - loss: 0.6943 - accuracy: 0.4
750
Epoch 93/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.4
625
Epoch 94/400
80/80 [==============================] - 0s 593us/step - loss: 0.6942 - accuracy: 0.5
000
Epoch 95/400
80/80 [==============================] - 0s 606us/step - loss: 0.6944 - accuracy: 0.4
875
Epoch 96/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.4
062
Epoch 97/400
80/80 [==============================] - 0s 606us/step - loss: 0.6943 - accuracy: 0.4
125
Epoch 98/400
80/80 [==============================] - 0s 593us/step - loss: 0.6945 - accuracy: 0.4
563
Epoch 99/400
80/80 [==============================] - 0s 606us/step - loss: 0.6940 - accuracy: 0.3
938
Epoch 100/400
80/80 [==============================] - 0s 631us/step - loss: 0.6944 - accuracy: 0.4
500
```

```
Epoch 101/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.4
812
Epoch 102/400
80/80 [==============================] - 0s 593us/step - loss: 0.6941 - accuracy: 0.4
812
Epoch 103/400
80/80 [==============================] - 0s 606us/step - loss: 0.6941 - accuracy: 0.4
938
Epoch 104/400
80/80 [==============================] - 0s 605us/step - loss: 0.6940 - accuracy: 0.4
563
Epoch 105/400
80/80 [==============================] - 0s 581us/step - loss: 0.6943 - accuracy: 0.4
625
Epoch 106/400
80/80 [==============================] - 0s 619us/step - loss: 0.6942 - accuracy: 0.4
625
Epoch 107/400
80/80 [==============================] - 0s 581us/step - loss: 0.6944 - accuracy: 0.4
250
Epoch 108/400
80/80 [==============================] - 0s 605us/step - loss: 0.6941 - accuracy: 0.4
625
Epoch 109/400
80/80 [==============================] - 0s 593us/step - loss: 0.6944 - accuracy: 0.4
625
Epoch 110/400
80/80 [==============================] - 0s 626us/step - loss: 0.6944 - accuracy: 0.4
250
Epoch 111/400
80/80 [==============================] - 0s 606us/step - loss: 0.6941 - accuracy: 0.4
938
Epoch 112/400
80/80 [==============================] - 0s 656us/step - loss: 0.6941 - accuracy: 0.5
000
Epoch 113/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.4
750
Epoch 114/400
80/80 [==============================] - 0s 606us/step - loss: 0.6944 - accuracy: 0.4
375
Epoch 115/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.5
000
Epoch 116/400
80/80 [==============================] - 0s 631us/step - loss: 0.6945 - accuracy: 0.4
125
Epoch 117/400
80/80 [==============================] - 0s 644us/step - loss: 0.6941 - accuracy: 0.4
437
Epoch 118/400
80/80 [==============================] - 0s 619us/step - loss: 0.6944 - accuracy: 0.4
625
Epoch 119/400
80/80 [==============================] - 0s 619us/step - loss: 0.6941 - accuracy: 0.4
500
Epoch 120/400
80/80 [==============================] - 0s 619us/step - loss: 0.6943 - accuracy: 0.4
750
```

```
Epoch 121/400
80/80 [==============================] - 0s 619us/step - loss: 0.6941 - accuracy: 0.4
812
Epoch 122/400
80/80 [==============================] - 0s 707us/step - loss: 0.6940 - accuracy: 0.4
750
Epoch 123/400
80/80 [==============================] - 0s 694us/step - loss: 0.6941 - accuracy: 0.4
250
Epoch 124/400
80/80 [==============================] - 0s 694us/step - loss: 0.6943 - accuracy: 0.3
875
Epoch 125/400
80/80 [==============================] - 0s 707us/step - loss: 0.6945 - accuracy: 0.4
750
Epoch 126/400
80/80 [==============================] - 0s 707us/step - loss: 0.6944 - accuracy: 0.4
750
Epoch 127/400
80/80 [==============================] - 0s 720us/step - loss: 0.6942 - accuracy: 0.4
500
Epoch 128/400
80/80 [==============================] - 0s 644us/step - loss: 0.6943 - accuracy: 0.4
625
Epoch 129/400
80/80 [==============================] - 0s 694us/step - loss: 0.6942 - accuracy: 0.4
625
Epoch 130/400
80/80 [==============================] - 0s 676us/step - loss: 0.6942 - accuracy: 0.4
250
Epoch 131/400
80/80 [==============================] - 0s 707us/step - loss: 0.6943 - accuracy: 0.4
500
Epoch 132/400
80/80 [==============================] - 0s 714us/step - loss: 0.6944 - accuracy: 0.4
500
Epoch 133/400
80/80 [==============================] - 0s 694us/step - loss: 0.6940 - accuracy: 0.5
000
Epoch 134/400
80/80 [==============================] - 0s 656us/step - loss: 0.6941 - accuracy: 0.4
938
Epoch 135/400
80/80 [==============================] - 0s 669us/step - loss: 0.6942 - accuracy: 0.4
750
Epoch 136/400
80/80 [==============================] - 0s 619us/step - loss: 0.6943 - accuracy: 0.4
313
Epoch 137/400
80/80 [==============================] - 0s 631us/step - loss: 0.6942 - accuracy: 0.4
750
Epoch 138/400
80/80 [==============================] - 0s 669us/step - loss: 0.6942 - accuracy: 0.3
875
Epoch 139/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.5
125
Epoch 140/400
80/80 [==============================] - 0s 593us/step - loss: 0.6941 - accuracy: 0.4
750
```

```
Epoch 141/400
80/80 [==============================] - 0s 656us/step - loss: 0.6943 - accuracy: 0.4
375
Epoch 142/400
80/80 [==============================] - 0s 606us/step - loss: 0.6944 - accuracy: 0.4
437
Epoch 143/400
80/80 [==============================] - 0s 606us/step - loss: 0.6942 - accuracy: 0.4
375
Epoch 144/400
80/80 [==============================] - 0s 593us/step - loss: 0.6942 - accuracy: 0.4
500
Epoch 145/400
80/80 [==============================] - 0s 631us/step - loss: 0.6943 - accuracy: 0.4
875
Epoch 146/400
80/80 [==============================] - 0s 619us/step - loss: 0.6944 - accuracy: 0.4
625
Epoch 147/400
80/80 [==============================] - 0s 606us/step - loss: 0.6941 - accuracy: 0.4
812
Epoch 148/400
80/80 [==============================] - 0s 631us/step - loss: 0.6942 - accuracy: 0.5
000
Epoch 149/400
80/80 [==============================] - 0s 606us/step - loss: 0.6943 - accuracy: 0.4
437
Epoch 150/400
80/80 [==============================] - 0s 631us/step - loss: 0.6944 - accuracy: 0.4
375
Epoch 151/400
80/80 [==============================] - 0s 618us/step - loss: 0.6942 - accuracy: 0.4
125
Epoch 152/400
80/80 [==============================] - 0s 606us/step - loss: 0.6945 - accuracy: 0.4
500
Epoch 153/400
80/80 [==============================] - 0s 631us/step - loss: 0.6943 - accuracy: 0.4
625
Epoch 154/400
80/80 [==============================] - 0s 682us/step - loss: 0.6941 - accuracy: 0.4
563
Epoch 155/400
80/80 [==============================] - 0s 757us/step - loss: 0.6942 - accuracy: 0.4
875
Epoch 156/400
80/80 [==============================] - 0s 858us/step - loss: 0.6940 - accuracy: 0.5
000
Epoch 157/400
80/80 [==============================] - 0s 928us/step - loss: 0.6941 - accuracy: 0.4
812
Epoch 158/400
80/80 [==============================] - 0s 988us/step - loss: 0.6943 - accuracy: 0.4
000
Epoch 159/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 160/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.475
0
```

```
Epoch 161/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6939 - accuracy: 0.500
0
Epoch 162/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6939 - accuracy: 0.493
8
Epoch 163/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.481
2
Epoch 164/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.450
0
Epoch 165/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.443
7
Epoch 166/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.456
3
Epoch 167/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.412
5
Epoch 168/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.468
8
Epoch 169/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 170/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.412
5
Epoch 171/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.450
0
Epoch 172/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.443
7
Epoch 173/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.431
3
Epoch 174/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.468
8
Epoch 175/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 176/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 177/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.450
0
Epoch 178/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.443
7
Epoch 179/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.500
0
Epoch 180/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.487
5
```

```
Epoch 181/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.506
3
Epoch 182/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 183/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.500
0
Epoch 184/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.400
0
Epoch 185/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.425
0
Epoch 186/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 187/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.462
5
Epoch 188/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.431
3
Epoch 189/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 190/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.425
0
Epoch 191/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 192/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.425
0
Epoch 193/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 194/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.437
5
Epoch 195/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 196/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 197/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 198/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.406
2
Epoch 199/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.500
0
Epoch 200/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.481
2
```

```
Epoch 201/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 202/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.462
5
Epoch 203/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 204/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 205/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.443
7
Epoch 206/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.475
0
Epoch 207/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.468
8
Epoch 208/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.500
0
Epoch 209/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.418
7
Epoch 210/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.450
0
Epoch 211/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.431
3
Epoch 212/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.487
5
Epoch 213/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.412
5
Epoch 214/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.462
5
Epoch 215/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.412
5
Epoch 216/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 217/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.456
3
Epoch 218/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.400
0
Epoch 219/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 220/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.462
5
```

```
Epoch 221/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.481
2
Epoch 222/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.356
2
Epoch 223/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 224/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.400
0
Epoch 225/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.418
7
Epoch 226/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.481
2
Epoch 227/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.493
8
Epoch 228/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.406
2
Epoch 229/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 230/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 231/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.481
2
Epoch 232/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 233/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.456
3
Epoch 234/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.412
5
Epoch 235/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.437
5
Epoch 236/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.487
5
Epoch 237/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.450
0
Epoch 238/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.431
3
Epoch 239/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.450
0
Epoch 240/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.468
8
```

```
Epoch 241/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.443
7
Epoch 242/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.500
0
Epoch 243/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.443
7
Epoch 244/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.450
0
Epoch 245/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.468
8
Epoch 246/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.468
8
Epoch 247/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 248/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.487
5
Epoch 249/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.481
2
Epoch 250/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.487
5
Epoch 251/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6938 - accuracy: 0.475
0
Epoch 252/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.456
3
Epoch 253/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.450
0
Epoch 254/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6939 - accuracy: 0.456
3
Epoch 255/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.493
8
Epoch 256/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 257/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 258/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 259/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.481
2
Epoch 260/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.450
0
```

```
Epoch 261/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.437
5
Epoch 262/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 263/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.468
8
Epoch 264/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6946 - accuracy: 0.456
3
Epoch 265/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 266/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.500
0
Epoch 267/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.381
2
Epoch 268/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.381
2
Epoch 269/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.450
0
Epoch 270/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 271/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.468
8
Epoch 272/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 273/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 274/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.481
2
Epoch 275/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.468
8
Epoch 276/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.443
7
Epoch 277/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.493
8
Epoch 278/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 279/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.487
5
Epoch 280/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.412
5
```

```
Epoch 281/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 282/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.481
2
Epoch 283/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.393
8
Epoch 284/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.475
0
Epoch 285/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.506
3
Epoch 286/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.500
0
Epoch 287/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.481
2
Epoch 288/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.443
7
Epoch 289/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.481
2
Epoch 290/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.381
2
Epoch 291/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.418
7
Epoch 292/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 293/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.462
5
Epoch 294/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.431
3
Epoch 295/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.487
5
Epoch 296/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 297/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.418
7
Epoch 298/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.493
8
Epoch 299/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.406
2
Epoch 300/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.468
8
```

```
Epoch 301/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.525
0
Epoch 302/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.468
8
Epoch 303/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 304/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.487
5
Epoch 305/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6947 - accuracy: 0.400
0
Epoch 306/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.450
0
Epoch 307/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 308/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 309/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.468
8
Epoch 310/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.450
0
Epoch 311/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.475
0
Epoch 312/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.475
0
Epoch 313/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 314/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 315/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6940 - accuracy: 0.487
5
Epoch 316/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.418
7
Epoch 317/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 318/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6942 - accuracy: 0.437
5
Epoch 319/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.412
5
Epoch 320/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
```

```
Epoch 321/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.481
2
Epoch 322/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.425
0
Epoch 323/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.425
0
Epoch 324/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.387
5
Epoch 325/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.450
0
Epoch 326/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.493
8
Epoch 327/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.462
5
Epoch 328/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.481
2
Epoch 329/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.456
3
Epoch 330/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.481
2
Epoch 331/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.500
0
Epoch 332/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.475
0
Epoch 333/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.468
8
Epoch 334/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.450
0
Epoch 335/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.412
5
Epoch 336/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.462
5
Epoch 337/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.425
0
Epoch 338/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.450
0
Epoch 339/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.450
0
Epoch 340/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.468
8
```

```
Epoch 341/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.500
0
Epoch 342/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.443
7
Epoch 343/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.437
5
Epoch 344/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.437
5
Epoch 345/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.443
7
Epoch 346/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.350
0
Epoch 347/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.431
3
Epoch 348/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.450
0
Epoch 349/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.443
7
Epoch 350/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.493
8
Epoch 351/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.362
5
Epoch 352/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.456
3
Epoch 353/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.443
7
Epoch 354/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.462
5
Epoch 355/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.418
7
Epoch 356/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.493
8
Epoch 357/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.481
2
Epoch 358/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 359/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.481
2
Epoch 360/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.475
0
```

```
Epoch 361/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.456
3
Epoch 362/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.500
0
Epoch 363/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.493
8
Epoch 364/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.481
2
Epoch 365/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 366/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.487
5
Epoch 367/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 368/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 369/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.506
3
Epoch 370/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.468
8
Epoch 371/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.475
0
Epoch 372/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.437
5
Epoch 373/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.437
5
Epoch 374/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.450
0
Epoch 375/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 376/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.437
5
Epoch 377/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6945 - accuracy: 0.387
5
Epoch 378/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.437
5
Epoch 379/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.487
5
Epoch 380/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.437
5
```

```
Epoch 381/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 382/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.487
5
Epoch 383/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.431
3
Epoch 384/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 385/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.468
8
Epoch 386/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.475
0
Epoch 387/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 388/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.500
0
Epoch 389/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.487
5
Epoch 390/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6943 - accuracy: 0.450
0
Epoch 391/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 392/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.406
2
Epoch 393/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6939 - accuracy: 0.475
0
Epoch 394/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.487
5
Epoch 395/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.500
0
Epoch 396/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6941 - accuracy: 0.462
5
Epoch 397/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.475
0
Epoch 398/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6940 - accuracy: 0.500
0
Epoch 399/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.437
5
Epoch 400/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.443
```

```
7
5/5 [==============================] - 0s 1ms/step - loss: 0.6932 - accuracy: 0.5000
```

In [112…
```python
# Softplus
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(1, activation='softplus'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accuracy'])
model.fit(X, y, batch_size = 2, epochs = 400)
softplus = model.evaluate(X, y)
```

```
Epoch 1/400
80/80 [==============================] - 0s 625us/step - loss: 1.3032 - accuracy: 0.5
000
Epoch 2/400
80/80 [==============================] - 0s 593us/step - loss: 0.7051 - accuracy: 0.6
125
Epoch 3/400
80/80 [==============================] - 0s 568us/step - loss: 0.7005 - accuracy: 0.5
875
Epoch 4/400
80/80 [==============================] - 0s 581us/step - loss: 0.6986 - accuracy: 0.6
187
Epoch 5/400
80/80 [==============================] - 0s 652us/step - loss: 0.6982 - accuracy: 0.5
250
Epoch 6/400
80/80 [==============================] - 0s 606us/step - loss: 0.6974 - accuracy: 0.5
688
Epoch 7/400
80/80 [==============================] - 0s 581us/step - loss: 0.6977 - accuracy: 0.4
437
Epoch 8/400
80/80 [==============================] - 0s 568us/step - loss: 0.6973 - accuracy: 0.5
000
Epoch 9/400
80/80 [==============================] - 0s 628us/step - loss: 0.6974 - accuracy: 0.4
625
Epoch 10/400
80/80 [==============================] - 0s 619us/step - loss: 0.6973 - accuracy: 0.4
125
Epoch 11/400
80/80 [==============================] - 0s 589us/step - loss: 0.6971 - accuracy: 0.4
375
Epoch 12/400
80/80 [==============================] - 0s 619us/step - loss: 0.6969 - accuracy: 0.5
063
Epoch 13/400
80/80 [==============================] - 0s 583us/step - loss: 0.6963 - accuracy: 0.5
688
Epoch 14/400
80/80 [==============================] - 0s 581us/step - loss: 0.6962 - accuracy: 0.3
750
Epoch 15/400
80/80 [==============================] - 0s 631us/step - loss: 0.6966 - accuracy: 0.5
375
Epoch 16/400
80/80 [==============================] - 0s 631us/step - loss: 0.6970 - accuracy: 0.3
812
Epoch 17/400
80/80 [==============================] - 0s 581us/step - loss: 0.6966 - accuracy: 0.5
312
Epoch 18/400
80/80 [==============================] - 0s 581us/step - loss: 0.6967 - accuracy: 0.4
187
Epoch 19/400
80/80 [==============================] - 0s 581us/step - loss: 0.6965 - accuracy: 0.5
063
Epoch 20/400
80/80 [==============================] - 0s 691us/step - loss: 0.6961 - accuracy: 0.4
500
```

```
Epoch 21/400
80/80 [==============================] - 0s 606us/step - loss: 0.6960 - accuracy: 0.4
437
Epoch 22/400
80/80 [==============================] - 0s 581us/step - loss: 0.6959 - accuracy: 0.3
688
Epoch 23/400
80/80 [==============================] - 0s 578us/step - loss: 0.6959 - accuracy: 0.4
688
Epoch 24/400
80/80 [==============================] - 0s 593us/step - loss: 0.6960 - accuracy: 0.4
875
Epoch 25/400
80/80 [==============================] - 0s 581us/step - loss: 0.6955 - accuracy: 0.5
437
Epoch 26/400
80/80 [==============================] - 0s 619us/step - loss: 0.6957 - accuracy: 0.4
875
Epoch 27/400
80/80 [==============================] - 0s 606us/step - loss: 0.6959 - accuracy: 0.4
375
Epoch 28/400
80/80 [==============================] - 0s 568us/step - loss: 0.6955 - accuracy: 0.4
437
Epoch 29/400
80/80 [==============================] - 0s 619us/step - loss: 0.6958 - accuracy: 0.4
812
Epoch 30/400
80/80 [==============================] - 0s 606us/step - loss: 0.6957 - accuracy: 0.5
125
Epoch 31/400
80/80 [==============================] - 0s 633us/step - loss: 0.6956 - accuracy: 0.4
625
Epoch 32/400
80/80 [==============================] - 0s 606us/step - loss: 0.6953 - accuracy: 0.4
000
Epoch 33/400
80/80 [==============================] - 0s 568us/step - loss: 0.6956 - accuracy: 0.5
500
Epoch 34/400
80/80 [==============================] - 0s 619us/step - loss: 0.6954 - accuracy: 0.4
875
Epoch 35/400
80/80 [==============================] - 0s 619us/step - loss: 0.6954 - accuracy: 0.3
938
Epoch 36/400
80/80 [==============================] - 0s 581us/step - loss: 0.6949 - accuracy: 0.4
688
Epoch 37/400
80/80 [==============================] - 0s 629us/step - loss: 0.6949 - accuracy: 0.4
375
Epoch 38/400
80/80 [==============================] - 0s 606us/step - loss: 0.6956 - accuracy: 0.5
312
Epoch 39/400
80/80 [==============================] - 0s 581us/step - loss: 0.6952 - accuracy: 0.5
188
Epoch 40/400
80/80 [==============================] - 0s 644us/step - loss: 0.6953 - accuracy: 0.5
500
```

```
Epoch 41/400
80/80 [==============================] - 0s 631us/step - loss: 0.6950 - accuracy: 0.4
062
Epoch 42/400
80/80 [==============================] - 0s 581us/step - loss: 0.6950 - accuracy: 0.5
562
Epoch 43/400
80/80 [==============================] - 0s 592us/step - loss: 0.6953 - accuracy: 0.5
188
Epoch 44/400
80/80 [==============================] - 0s 593us/step - loss: 0.6953 - accuracy: 0.4
500
Epoch 45/400
80/80 [==============================] - 0s 631us/step - loss: 0.6946 - accuracy: 0.5
000
Epoch 46/400
80/80 [==============================] - 0s 606us/step - loss: 0.6952 - accuracy: 0.4
187
Epoch 47/400
80/80 [==============================] - 0s 581us/step - loss: 0.6949 - accuracy: 0.5
375
Epoch 48/400
80/80 [==============================] - 0s 593us/step - loss: 0.6951 - accuracy: 0.4
563
Epoch 49/400
80/80 [==============================] - 0s 644us/step - loss: 0.6951 - accuracy: 0.4
250
Epoch 50/400
80/80 [==============================] - 0s 606us/step - loss: 0.6949 - accuracy: 0.5
500
Epoch 51/400
80/80 [==============================] - 0s 593us/step - loss: 0.6947 - accuracy: 0.4
812
Epoch 52/400
80/80 [==============================] - 0s 581us/step - loss: 0.6947 - accuracy: 0.5
250
Epoch 53/400
80/80 [==============================] - 0s 593us/step - loss: 0.6944 - accuracy: 0.4
437
Epoch 54/400
80/80 [==============================] - 0s 593us/step - loss: 0.6944 - accuracy: 0.4
000
Epoch 55/400
80/80 [==============================] - 0s 593us/step - loss: 0.6945 - accuracy: 0.4
437
Epoch 56/400
80/80 [==============================] - 0s 581us/step - loss: 0.6946 - accuracy: 0.4
688
Epoch 57/400
80/80 [==============================] - 0s 619us/step - loss: 0.6947 - accuracy: 0.5
750
Epoch 58/400
80/80 [==============================] - 0s 606us/step - loss: 0.6945 - accuracy: 0.4
625
Epoch 59/400
80/80 [==============================] - 0s 581us/step - loss: 0.6943 - accuracy: 0.5
375
Epoch 60/400
80/80 [==============================] - 0s 593us/step - loss: 0.6942 - accuracy: 0.4
125
```

```
Epoch 61/400
80/80 [==============================] - 0s 625us/step - loss: 0.6946 - accuracy: 0.5
312
Epoch 62/400
80/80 [==============================] - 0s 581us/step - loss: 0.6933 - accuracy: 0.4
563
Epoch 63/400
80/80 [==============================] - 0s 581us/step - loss: 0.6944 - accuracy: 0.5
125
Epoch 64/400
80/80 [==============================] - 0s 606us/step - loss: 0.6944 - accuracy: 0.4
875
Epoch 65/400
80/80 [==============================] - 0s 581us/step - loss: 0.6941 - accuracy: 0.4
625
Epoch 66/400
80/80 [==============================] - 0s 610us/step - loss: 0.6940 - accuracy: 0.5
750
Epoch 67/400
80/80 [==============================] - 0s 568us/step - loss: 0.6943 - accuracy: 0.5
562
Epoch 68/400
80/80 [==============================] - 0s 581us/step - loss: 0.6941 - accuracy: 0.4
375
Epoch 69/400
80/80 [==============================] - 0s 581us/step - loss: 0.6943 - accuracy: 0.4
250
Epoch 70/400
80/80 [==============================] - 0s 582us/step - loss: 0.6945 - accuracy: 0.4
875
Epoch 71/400
80/80 [==============================] - 0s 593us/step - loss: 0.6941 - accuracy: 0.5
562
Epoch 72/400
80/80 [==============================] - 0s 606us/step - loss: 0.6943 - accuracy: 0.4
563
Epoch 73/400
80/80 [==============================] - 0s 593us/step - loss: 0.6943 - accuracy: 0.5
312
Epoch 74/400
80/80 [==============================] - 0s 594us/step - loss: 0.6937 - accuracy: 0.5
500
Epoch 75/400
80/80 [==============================] - 0s 681us/step - loss: 0.6944 - accuracy: 0.4
000
Epoch 76/400
80/80 [==============================] - 0s 701us/step - loss: 0.6938 - accuracy: 0.3
500
Epoch 77/400
80/80 [==============================] - 0s 732us/step - loss: 0.6945 - accuracy: 0.5
938
Epoch 78/400
80/80 [==============================] - 0s 804us/step - loss: 0.6937 - accuracy: 0.4
500
Epoch 79/400
80/80 [==============================] - 0s 858us/step - loss: 0.6937 - accuracy: 0.6
125
Epoch 80/400
80/80 [==============================] - 0s 882us/step - loss: 0.6940 - accuracy: 0.5
125
```

```
Epoch 81/400
80/80 [==============================] - 0s 906us/step - loss: 0.6935 - accuracy: 0.5
500
Epoch 82/400
80/80 [==============================] - 0s 909us/step - loss: 0.6940 - accuracy: 0.4
563
Epoch 83/400
80/80 [==============================] - 0s 903us/step - loss: 0.6931 - accuracy: 0.4
187
Epoch 84/400
80/80 [==============================] - 0s 922us/step - loss: 0.6936 - accuracy: 0.5
250
Epoch 85/400
80/80 [==============================] - 0s 909us/step - loss: 0.6937 - accuracy: 0.5
063
Epoch 86/400
80/80 [==============================] - 0s 910us/step - loss: 0.6940 - accuracy: 0.4
625
Epoch 87/400
80/80 [==============================] - 0s 909us/step - loss: 0.6942 - accuracy: 0.5
000
Epoch 88/400
80/80 [==============================] - 0s 922us/step - loss: 0.6933 - accuracy: 0.5
312
Epoch 89/400
80/80 [==============================] - 0s 939us/step - loss: 0.6935 - accuracy: 0.5
063
Epoch 90/400
80/80 [==============================] - 0s 959us/step - loss: 0.6938 - accuracy: 0.4
375
Epoch 91/400
80/80 [==============================] - 0s 959us/step - loss: 0.6937 - accuracy: 0.6
187
Epoch 92/400
80/80 [==============================] - 0s 947us/step - loss: 0.6935 - accuracy: 0.4
625
Epoch 93/400
80/80 [==============================] - 0s 917us/step - loss: 0.6932 - accuracy: 0.6
062
Epoch 94/400
80/80 [==============================] - 0s 933us/step - loss: 0.6936 - accuracy: 0.3
812
Epoch 95/400
80/80 [==============================] - 0s 934us/step - loss: 0.6934 - accuracy: 0.5
125
Epoch 96/400
80/80 [==============================] - 0s 947us/step - loss: 0.6937 - accuracy: 0.5
625
Epoch 97/400
80/80 [==============================] - 0s 962us/step - loss: 0.6934 - accuracy: 0.5
125
Epoch 98/400
80/80 [==============================] - 0s 939us/step - loss: 0.6936 - accuracy: 0.3
812
Epoch 99/400
80/80 [==============================] - 0s 954us/step - loss: 0.6935 - accuracy: 0.5
500
Epoch 100/400
80/80 [==============================] - 0s 985us/step - loss: 0.6937 - accuracy: 0.4
688
```

```
Epoch 101/400
80/80 [==============================] - 0s 941us/step - loss: 0.6934 - accuracy: 0.5
000
Epoch 102/400
80/80 [==============================] - 0s 921us/step - loss: 0.6933 - accuracy: 0.4
688
Epoch 103/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6924 - accuracy: 0.587
5
Epoch 104/400
80/80 [==============================] - 0s 922us/step - loss: 0.6932 - accuracy: 0.5
188
Epoch 105/400
80/80 [==============================] - 0s 917us/step - loss: 0.6937 - accuracy: 0.4
625
Epoch 106/400
80/80 [==============================] - 0s 934us/step - loss: 0.6933 - accuracy: 0.4
187
Epoch 107/400
80/80 [==============================] - 0s 922us/step - loss: 0.6935 - accuracy: 0.4
375
Epoch 108/400
80/80 [==============================] - 0s 909us/step - loss: 0.6929 - accuracy: 0.5
188
Epoch 109/400
80/80 [==============================] - 0s 947us/step - loss: 0.6930 - accuracy: 0.5
750
Epoch 110/400
80/80 [==============================] - 0s 934us/step - loss: 0.6928 - accuracy: 0.3
562
Epoch 111/400
80/80 [==============================] - 0s 934us/step - loss: 0.6934 - accuracy: 0.5
813
Epoch 112/400
80/80 [==============================] - 0s 947us/step - loss: 0.6934 - accuracy: 0.5
125
Epoch 113/400
80/80 [==============================] - 0s 922us/step - loss: 0.6930 - accuracy: 0.4
750
Epoch 114/400
80/80 [==============================] - 0s 922us/step - loss: 0.6929 - accuracy: 0.4
187
Epoch 115/400
80/80 [==============================] - 0s 922us/step - loss: 0.6930 - accuracy: 0.4
313
Epoch 116/400
80/80 [==============================] - 0s 871us/step - loss: 0.6934 - accuracy: 0.5
312
Epoch 117/400
80/80 [==============================] - 0s 884us/step - loss: 0.6925 - accuracy: 0.4
375
Epoch 118/400
80/80 [==============================] - 0s 871us/step - loss: 0.6928 - accuracy: 0.6
187
Epoch 119/400
80/80 [==============================] - 0s 894us/step - loss: 0.6927 - accuracy: 0.5
312
Epoch 120/400
80/80 [==============================] - 0s 922us/step - loss: 0.6933 - accuracy: 0.4
000
```

```
Epoch 121/400
80/80 [==============================] - 0s 930us/step - loss: 0.6927 - accuracy: 0.5
000
Epoch 122/400
80/80 [==============================] - 0s 896us/step - loss: 0.6923 - accuracy: 0.6
250
Epoch 123/400
80/80 [==============================] - 0s 871us/step - loss: 0.6930 - accuracy: 0.3
938
Epoch 124/400
80/80 [==============================] - 0s 884us/step - loss: 0.6928 - accuracy: 0.5
437
Epoch 125/400
80/80 [==============================] - 0s 871us/step - loss: 0.6928 - accuracy: 0.4
313
Epoch 126/400
80/80 [==============================] - 0s 897us/step - loss: 0.6919 - accuracy: 0.6
375
Epoch 127/400
80/80 [==============================] - 0s 920us/step - loss: 0.6929 - accuracy: 0.4
500
Epoch 128/400
80/80 [==============================] - 0s 909us/step - loss: 0.6931 - accuracy: 0.3
812
Epoch 129/400
80/80 [==============================] - 0s 930us/step - loss: 0.6927 - accuracy: 0.5
500
Epoch 130/400
80/80 [==============================] - 0s 924us/step - loss: 0.6928 - accuracy: 0.5
188
Epoch 131/400
80/80 [==============================] - 0s 896us/step - loss: 0.6926 - accuracy: 0.5
875
Epoch 132/400
80/80 [==============================] - 0s 884us/step - loss: 0.6925 - accuracy: 0.5
500
Epoch 133/400
80/80 [==============================] - 0s 884us/step - loss: 0.6927 - accuracy: 0.4
875
Epoch 134/400
80/80 [==============================] - 0s 884us/step - loss: 0.6924 - accuracy: 0.5
437
Epoch 135/400
80/80 [==============================] - 0s 896us/step - loss: 0.6921 - accuracy: 0.3
812
Epoch 136/400
80/80 [==============================] - 0s 922us/step - loss: 0.6920 - accuracy: 0.4
688
Epoch 137/400
80/80 [==============================] - 0s 909us/step - loss: 0.6929 - accuracy: 0.5
312
Epoch 138/400
80/80 [==============================] - 0s 871us/step - loss: 0.6929 - accuracy: 0.6
062
Epoch 139/400
80/80 [==============================] - 0s 884us/step - loss: 0.6922 - accuracy: 0.5
437
Epoch 140/400
80/80 [==============================] - 0s 924us/step - loss: 0.6920 - accuracy: 0.4
187
```

```
Epoch 141/400
80/80 [==============================] - 0s 915us/step - loss: 0.6919 - accuracy: 0.4
688
Epoch 142/400
80/80 [==============================] - 0s 895us/step - loss: 0.6923 - accuracy: 0.5
500
Epoch 143/400
80/80 [==============================] - 0s 884us/step - loss: 0.6916 - accuracy: 0.4
500
Epoch 144/400
80/80 [==============================] - 0s 902us/step - loss: 0.6923 - accuracy: 0.6
313
Epoch 145/400
80/80 [==============================] - 0s 896us/step - loss: 0.6922 - accuracy: 0.5
688
Epoch 146/400
80/80 [==============================] - 0s 935us/step - loss: 0.6920 - accuracy: 0.4
250
Epoch 147/400
80/80 [==============================] - 0s 963us/step - loss: 0.6916 - accuracy: 0.6
438
Epoch 148/400
80/80 [==============================] - 0s 921us/step - loss: 0.6919 - accuracy: 0.5
063
Epoch 149/400
80/80 [==============================] - 0s 909us/step - loss: 0.6915 - accuracy: 0.6
062
Epoch 150/400
80/80 [==============================] - 0s 884us/step - loss: 0.6916 - accuracy: 0.5
938
Epoch 151/400
80/80 [==============================] - 0s 882us/step - loss: 0.6920 - accuracy: 0.4
000
Epoch 152/400
80/80 [==============================] - 0s 877us/step - loss: 0.6917 - accuracy: 0.4
875
Epoch 153/400
80/80 [==============================] - 0s 922us/step - loss: 0.6917 - accuracy: 0.5
312
Epoch 154/400
80/80 [==============================] - 0s 909us/step - loss: 0.6919 - accuracy: 0.5
938
Epoch 155/400
80/80 [==============================] - 0s 908us/step - loss: 0.6915 - accuracy: 0.4
125
Epoch 156/400
80/80 [==============================] - 0s 871us/step - loss: 0.6924 - accuracy: 0.5
938
Epoch 157/400
80/80 [==============================] - 0s 939us/step - loss: 0.6922 - accuracy: 0.5
375
Epoch 158/400
80/80 [==============================] - 0s 922us/step - loss: 0.6917 - accuracy: 0.5
750
Epoch 159/400
80/80 [==============================] - 0s 922us/step - loss: 0.6917 - accuracy: 0.3
938
Epoch 160/400
80/80 [==============================] - 0s 921us/step - loss: 0.6916 - accuracy: 0.5
813
```

```
Epoch 161/400
80/80 [==============================] - 0s 909us/step - loss: 0.6914 - accuracy: 0.5
375
Epoch 162/400
80/80 [==============================] - 0s 934us/step - loss: 0.6917 - accuracy: 0.5
188
Epoch 163/400
80/80 [==============================] - 0s 884us/step - loss: 0.6914 - accuracy: 0.5
125
Epoch 164/400
80/80 [==============================] - 0s 871us/step - loss: 0.6915 - accuracy: 0.4
125
Epoch 165/400
80/80 [==============================] - 0s 884us/step - loss: 0.6914 - accuracy: 0.4
625
Epoch 166/400
80/80 [==============================] - 0s 884us/step - loss: 0.6913 - accuracy: 0.5
375
Epoch 167/400
80/80 [==============================] - 0s 920us/step - loss: 0.6915 - accuracy: 0.6
125
Epoch 168/400
80/80 [==============================] - 0s 894us/step - loss: 0.6910 - accuracy: 0.4
625
Epoch 169/400
80/80 [==============================] - 0s 928us/step - loss: 0.6916 - accuracy: 0.5
437
Epoch 170/400
80/80 [==============================] - 0s 922us/step - loss: 0.6911 - accuracy: 0.6
125
Epoch 171/400
80/80 [==============================] - 0s 909us/step - loss: 0.6900 - accuracy: 0.4
938
Epoch 172/400
80/80 [==============================] - 0s 908us/step - loss: 0.6910 - accuracy: 0.6
000
Epoch 173/400
80/80 [==============================] - 0s 887us/step - loss: 0.6913 - accuracy: 0.5
750
Epoch 174/400
80/80 [==============================] - 0s 887us/step - loss: 0.6910 - accuracy: 0.5
625
Epoch 175/400
80/80 [==============================] - 0s 896us/step - loss: 0.6911 - accuracy: 0.5
312
Epoch 176/400
80/80 [==============================] - 0s 881us/step - loss: 0.6911 - accuracy: 0.4
187
Epoch 177/400
80/80 [==============================] - 0s 871us/step - loss: 0.6907 - accuracy: 0.4
187
Epoch 178/400
80/80 [==============================] - 0s 884us/step - loss: 0.6908 - accuracy: 0.6
375
Epoch 179/400
80/80 [==============================] - 0s 871us/step - loss: 0.6908 - accuracy: 0.5
188
Epoch 180/400
80/80 [==============================] - 0s 884us/step - loss: 0.6911 - accuracy: 0.5
688
```

```
Epoch 181/400
80/80 [==============================] - 0s 884us/step - loss: 0.6909 - accuracy: 0.5
750
Epoch 182/400
80/80 [==============================] - 0s 888us/step - loss: 0.6908 - accuracy: 0.5
688
Epoch 183/400
80/80 [==============================] - 0s 896us/step - loss: 0.6909 - accuracy: 0.4
938
Epoch 184/400
80/80 [==============================] - 0s 922us/step - loss: 0.6905 - accuracy: 0.5
375
Epoch 185/400
80/80 [==============================] - 0s 957us/step - loss: 0.6902 - accuracy: 0.4
812
Epoch 186/400
80/80 [==============================] - 0s 972us/step - loss: 0.6906 - accuracy: 0.6
313
Epoch 187/400
80/80 [==============================] - 0s 959us/step - loss: 0.6905 - accuracy: 0.5
125
Epoch 188/400
80/80 [==============================] - 0s 959us/step - loss: 0.6899 - accuracy: 0.4
250
Epoch 189/400
80/80 [==============================] - 0s 930us/step - loss: 0.6902 - accuracy: 0.4
875
Epoch 190/400
80/80 [==============================] - 0s 941us/step - loss: 0.6897 - accuracy: 0.6
375
Epoch 191/400
80/80 [==============================] - 0s 966us/step - loss: 0.6907 - accuracy: 0.5
437
Epoch 192/400
80/80 [==============================] - 0s 934us/step - loss: 0.6903 - accuracy: 0.4
437
Epoch 193/400
80/80 [==============================] - 0s 956us/step - loss: 0.6899 - accuracy: 0.6
250
Epoch 194/400
80/80 [==============================] - 0s 896us/step - loss: 0.6899 - accuracy: 0.6
000
Epoch 195/400
80/80 [==============================] - 0s 896us/step - loss: 0.6902 - accuracy: 0.4
000
Epoch 196/400
80/80 [==============================] - 0s 972us/step - loss: 0.6900 - accuracy: 0.5
875
Epoch 197/400
80/80 [==============================] - 0s 955us/step - loss: 0.6896 - accuracy: 0.4
750
Epoch 198/400
80/80 [==============================] - 0s 984us/step - loss: 0.6893 - accuracy: 0.4
750
Epoch 199/400
80/80 [==============================] - 0s 934us/step - loss: 0.6896 - accuracy: 0.5
688
Epoch 200/400
80/80 [==============================] - 0s 934us/step - loss: 0.6890 - accuracy: 0.6
438
```

```
Epoch 201/400
80/80 [==============================] - 0s 931us/step - loss: 0.6895 - accuracy: 0.5
375
Epoch 202/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6891 - accuracy: 0.487
5
Epoch 203/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6893 - accuracy: 0.618
7
Epoch 204/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6893 - accuracy: 0.456
3
Epoch 205/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6890 - accuracy: 0.537
5
Epoch 206/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6885 - accuracy: 0.662
5
Epoch 207/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6881 - accuracy: 0.468
8
Epoch 208/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6896 - accuracy: 0.612
5
Epoch 209/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6886 - accuracy: 0.518
8
Epoch 210/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6888 - accuracy: 0.575
0
Epoch 211/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6889 - accuracy: 0.568
8
Epoch 212/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6886 - accuracy: 0.518
8
Epoch 213/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6884 - accuracy: 0.575
0
Epoch 214/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6887 - accuracy: 0.556
2
Epoch 215/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6880 - accuracy: 0.493
8
Epoch 216/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6880 - accuracy: 0.587
5
Epoch 217/400
80/80 [==============================] - 0s 959us/step - loss: 0.6883 - accuracy: 0.6
125
Epoch 218/400
80/80 [==============================] - 0s 972us/step - loss: 0.6882 - accuracy: 0.5
875
Epoch 219/400
80/80 [==============================] - 0s 972us/step - loss: 0.6877 - accuracy: 0.4
875
Epoch 220/400
80/80 [==============================] - 0s 950us/step - loss: 0.6862 - accuracy: 0.6
438
```

```
Epoch 221/400
80/80 [==============================] - 0s 969us/step - loss: 0.6878 - accuracy: 0.5
437
Epoch 222/400
80/80 [==============================] - 0s 954us/step - loss: 0.6875 - accuracy: 0.4
812
Epoch 223/400
80/80 [==============================] - 0s 959us/step - loss: 0.6871 - accuracy: 0.6
313
Epoch 224/400
80/80 [==============================] - 0s 938us/step - loss: 0.6874 - accuracy: 0.5
375
Epoch 225/400
80/80 [==============================] - 0s 959us/step - loss: 0.6868 - accuracy: 0.5
562
Epoch 226/400
80/80 [==============================] - 0s 926us/step - loss: 0.6867 - accuracy: 0.5
875
Epoch 227/400
80/80 [==============================] - 0s 925us/step - loss: 0.6871 - accuracy: 0.4
187
Epoch 228/400
80/80 [==============================] - 0s 959us/step - loss: 0.6859 - accuracy: 0.5
000
Epoch 229/400
80/80 [==============================] - 0s 929us/step - loss: 0.6862 - accuracy: 0.5
875
Epoch 230/400
80/80 [==============================] - 0s 934us/step - loss: 0.6863 - accuracy: 0.6
313
Epoch 231/400
80/80 [==============================] - 0s 927us/step - loss: 0.6867 - accuracy: 0.6
250
Epoch 232/400
80/80 [==============================] - 0s 929us/step - loss: 0.6861 - accuracy: 0.6
125
Epoch 233/400
80/80 [==============================] - 0s 943us/step - loss: 0.6866 - accuracy: 0.6
187
Epoch 234/400
80/80 [==============================] - 0s 980us/step - loss: 0.6860 - accuracy: 0.5
375
Epoch 235/400
80/80 [==============================] - 0s 959us/step - loss: 0.6861 - accuracy: 0.4
500
Epoch 236/400
80/80 [==============================] - 0s 975us/step - loss: 0.6861 - accuracy: 0.6
187
Epoch 237/400
80/80 [==============================] - 0s 989us/step - loss: 0.6857 - accuracy: 0.5
250
Epoch 238/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6856 - accuracy: 0.593
8
Epoch 239/400
80/80 [==============================] - 0s 981us/step - loss: 0.6856 - accuracy: 0.5
875
Epoch 240/400
80/80 [==============================] - 0s 964us/step - loss: 0.6863 - accuracy: 0.5
625
```

```
Epoch 241/400
80/80 [==============================] - 0s 957us/step - loss: 0.6849 - accuracy: 0.6
125
Epoch 242/400
80/80 [==============================] - 0s 942us/step - loss: 0.6852 - accuracy: 0.6
438
Epoch 243/400
80/80 [==============================] - 0s 947us/step - loss: 0.6854 - accuracy: 0.5
625
Epoch 244/400
80/80 [==============================] - 0s 974us/step - loss: 0.6848 - accuracy: 0.5
437
Epoch 245/400
80/80 [==============================] - 0s 947us/step - loss: 0.6848 - accuracy: 0.5
375
Epoch 246/400
80/80 [==============================] - 0s 947us/step - loss: 0.6843 - accuracy: 0.6
125
Epoch 247/400
80/80 [==============================] - 0s 945us/step - loss: 0.6844 - accuracy: 0.5
437
Epoch 248/400
80/80 [==============================] - 0s 979us/step - loss: 0.6844 - accuracy: 0.5
688
Epoch 249/400
80/80 [==============================] - 0s 949us/step - loss: 0.6844 - accuracy: 0.5
938
Epoch 250/400
80/80 [==============================] - 0s 949us/step - loss: 0.6839 - accuracy: 0.5
938
Epoch 251/400
80/80 [==============================] - 0s 932us/step - loss: 0.6835 - accuracy: 0.6
125
Epoch 252/400
80/80 [==============================] - 0s 921us/step - loss: 0.6833 - accuracy: 0.5
562
Epoch 253/400
80/80 [==============================] - 0s 948us/step - loss: 0.6834 - accuracy: 0.5
500
Epoch 254/400
80/80 [==============================] - 0s 947us/step - loss: 0.6833 - accuracy: 0.5
938
Epoch 255/400
80/80 [==============================] - 0s 975us/step - loss: 0.6829 - accuracy: 0.5
500
Epoch 256/400
80/80 [==============================] - 0s 947us/step - loss: 0.6828 - accuracy: 0.6
250
Epoch 257/400
80/80 [==============================] - 0s 929us/step - loss: 0.6817 - accuracy: 0.4
875
Epoch 258/400
80/80 [==============================] - 0s 947us/step - loss: 0.6827 - accuracy: 0.6
375
Epoch 259/400
80/80 [==============================] - 0s 941us/step - loss: 0.6815 - accuracy: 0.5
562
Epoch 260/400
80/80 [==============================] - 0s 922us/step - loss: 0.6818 - accuracy: 0.6
000
```

```
Epoch 261/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6821 - accuracy: 0.575
0
Epoch 262/400
80/80 [==============================] - 0s 953us/step - loss: 0.6818 - accuracy: 0.6
438
Epoch 263/400
80/80 [==============================] - 0s 949us/step - loss: 0.6810 - accuracy: 0.6
687
Epoch 264/400
80/80 [==============================] - 0s 937us/step - loss: 0.6809 - accuracy: 0.5
000
Epoch 265/400
80/80 [==============================] - 0s 941us/step - loss: 0.6811 - accuracy: 0.6
500
Epoch 266/400
80/80 [==============================] - 0s 969us/step - loss: 0.6810 - accuracy: 0.6
250
Epoch 267/400
80/80 [==============================] - 0s 966us/step - loss: 0.6803 - accuracy: 0.5
562
Epoch 268/400
80/80 [==============================] - 0s 947us/step - loss: 0.6805 - accuracy: 0.5
375
Epoch 269/400
80/80 [==============================] - 0s 959us/step - loss: 0.6807 - accuracy: 0.6
500
Epoch 270/400
80/80 [==============================] - 0s 970us/step - loss: 0.6790 - accuracy: 0.5
688
Epoch 271/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6799 - accuracy: 0.618
7
Epoch 272/400
80/80 [==============================] - 0s 954us/step - loss: 0.6793 - accuracy: 0.6
438
Epoch 273/400
80/80 [==============================] - 0s 962us/step - loss: 0.6793 - accuracy: 0.5
375
Epoch 274/400
80/80 [==============================] - 0s 917us/step - loss: 0.6791 - accuracy: 0.5
875
Epoch 275/400
80/80 [==============================] - 0s 967us/step - loss: 0.6785 - accuracy: 0.5
562
Epoch 276/400
80/80 [==============================] - 0s 976us/step - loss: 0.6786 - accuracy: 0.6
625
Epoch 277/400
80/80 [==============================] - 0s 941us/step - loss: 0.6783 - accuracy: 0.5
437
Epoch 278/400
80/80 [==============================] - 0s 952us/step - loss: 0.6779 - accuracy: 0.6
375
Epoch 279/400
80/80 [==============================] - 0s 950us/step - loss: 0.6780 - accuracy: 0.5
938
Epoch 280/400
80/80 [==============================] - 0s 917us/step - loss: 0.6779 - accuracy: 0.6
125
```

```
Epoch 281/400
80/80 [==============================] - 0s 944us/step - loss: 0.6776 - accuracy: 0.6
125
Epoch 282/400
80/80 [==============================] - 0s 947us/step - loss: 0.6764 - accuracy: 0.4
875
Epoch 283/400
80/80 [==============================] - 0s 964us/step - loss: 0.6766 - accuracy: 0.6
000
Epoch 284/400
80/80 [==============================] - 0s 966us/step - loss: 0.6773 - accuracy: 0.6
250
Epoch 285/400
80/80 [==============================] - 0s 978us/step - loss: 0.6761 - accuracy: 0.6
250
Epoch 286/400
80/80 [==============================] - 0s 986us/step - loss: 0.6761 - accuracy: 0.6
375
Epoch 287/400
80/80 [==============================] - 0s 946us/step - loss: 0.6758 - accuracy: 0.6
438
Epoch 288/400
80/80 [==============================] - 0s 948us/step - loss: 0.6752 - accuracy: 0.6
250
Epoch 289/400
80/80 [==============================] - 0s 972us/step - loss: 0.6751 - accuracy: 0.5
813
Epoch 290/400
80/80 [==============================] - 0s 962us/step - loss: 0.6746 - accuracy: 0.6
438
Epoch 291/400
80/80 [==============================] - 0s 963us/step - loss: 0.6745 - accuracy: 0.5
437
Epoch 292/400
80/80 [==============================] - 0s 981us/step - loss: 0.6740 - accuracy: 0.6
625
Epoch 293/400
80/80 [==============================] - 0s 964us/step - loss: 0.6737 - accuracy: 0.6
000
Epoch 294/400
80/80 [==============================] - 0s 953us/step - loss: 0.6732 - accuracy: 0.6
125
Epoch 295/400
80/80 [==============================] - 0s 958us/step - loss: 0.6734 - accuracy: 0.6
062
Epoch 296/400
80/80 [==============================] - 0s 985us/step - loss: 0.6729 - accuracy: 0.6
375
Epoch 297/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6732 - accuracy: 0.643
8
Epoch 298/400
80/80 [==============================] - 0s 971us/step - loss: 0.6721 - accuracy: 0.6
313
Epoch 299/400
80/80 [==============================] - 0s 967us/step - loss: 0.6712 - accuracy: 0.6
375
Epoch 300/400
80/80 [==============================] - 0s 970us/step - loss: 0.6707 - accuracy: 0.6
562
```

```
Epoch 301/400
80/80 [==============================] - 0s 960us/step - loss: 0.6712 - accuracy: 0.6
375
Epoch 302/400
80/80 [==============================] - 0s 948us/step - loss: 0.6707 - accuracy: 0.6
187
Epoch 303/400
80/80 [==============================] - 0s 956us/step - loss: 0.6700 - accuracy: 0.6
187
Epoch 304/400
80/80 [==============================] - 0s 985us/step - loss: 0.6696 - accuracy: 0.6
125
Epoch 305/400
80/80 [==============================] - 0s 968us/step - loss: 0.6695 - accuracy: 0.6
000
Epoch 306/400
80/80 [==============================] - 0s 947us/step - loss: 0.6692 - accuracy: 0.6
250
Epoch 307/400
80/80 [==============================] - 0s 950us/step - loss: 0.6673 - accuracy: 0.5
875
Epoch 308/400
80/80 [==============================] - 0s 947us/step - loss: 0.6684 - accuracy: 0.6
562
Epoch 309/400
80/80 [==============================] - 0s 947us/step - loss: 0.6677 - accuracy: 0.6
687
Epoch 310/400
80/80 [==============================] - 0s 991us/step - loss: 0.6662 - accuracy: 0.6
187
Epoch 311/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6667 - accuracy: 0.656
2
Epoch 312/400
80/80 [==============================] - 0s 982us/step - loss: 0.6664 - accuracy: 0.6
750
Epoch 313/400
80/80 [==============================] - 0s 952us/step - loss: 0.6648 - accuracy: 0.6
625
Epoch 314/400
80/80 [==============================] - 0s 934us/step - loss: 0.6650 - accuracy: 0.6
000
Epoch 315/400
80/80 [==============================] - 0s 982us/step - loss: 0.6639 - accuracy: 0.6
125
Epoch 316/400
80/80 [==============================] - 0s 934us/step - loss: 0.6635 - accuracy: 0.6
687
Epoch 317/400
80/80 [==============================] - 0s 955us/step - loss: 0.6631 - accuracy: 0.6
562
Epoch 318/400
80/80 [==============================] - 0s 975us/step - loss: 0.6629 - accuracy: 0.6
250
Epoch 319/400
80/80 [==============================] - 0s 934us/step - loss: 0.6619 - accuracy: 0.6
438
Epoch 320/400
80/80 [==============================] - 0s 934us/step - loss: 0.6608 - accuracy: 0.5
875
```

```
Epoch 321/400
80/80 [==============================] - 0s 956us/step - loss: 0.6599 - accuracy: 0.6
750
Epoch 322/400
80/80 [==============================] - 0s 955us/step - loss: 0.6591 - accuracy: 0.6
187
Epoch 323/400
80/80 [==============================] - 0s 924us/step - loss: 0.6589 - accuracy: 0.6
750
Epoch 324/400
80/80 [==============================] - 0s 896us/step - loss: 0.6586 - accuracy: 0.6
375
Epoch 325/400
80/80 [==============================] - 0s 878us/step - loss: 0.6581 - accuracy: 0.6
562
Epoch 326/400
80/80 [==============================] - 0s 896us/step - loss: 0.6565 - accuracy: 0.6
375
Epoch 327/400
80/80 [==============================] - 0s 871us/step - loss: 0.6565 - accuracy: 0.6
562
Epoch 328/400
80/80 [==============================] - 0s 884us/step - loss: 0.6548 - accuracy: 0.6
625
Epoch 329/400
80/80 [==============================] - 0s 916us/step - loss: 0.6549 - accuracy: 0.6
375
Epoch 330/400
80/80 [==============================] - 0s 918us/step - loss: 0.6543 - accuracy: 0.6
750
Epoch 331/400
80/80 [==============================] - 0s 921us/step - loss: 0.6536 - accuracy: 0.6
875
Epoch 332/400
80/80 [==============================] - 0s 909us/step - loss: 0.6513 - accuracy: 0.6
313
Epoch 333/400
80/80 [==============================] - 0s 959us/step - loss: 0.6508 - accuracy: 0.6
625
Epoch 334/400
80/80 [==============================] - 0s 964us/step - loss: 0.6503 - accuracy: 0.6
625
Epoch 335/400
80/80 [==============================] - 0s 951us/step - loss: 0.6489 - accuracy: 0.6
313
Epoch 336/400
80/80 [==============================] - 0s 966us/step - loss: 0.6469 - accuracy: 0.6
562
Epoch 337/400
80/80 [==============================] - 0s 972us/step - loss: 0.6457 - accuracy: 0.6
313
Epoch 338/400
80/80 [==============================] - 0s 934us/step - loss: 0.6456 - accuracy: 0.6
812
Epoch 339/400
80/80 [==============================] - 0s 978us/step - loss: 0.6448 - accuracy: 0.6
812
Epoch 340/400
80/80 [==============================] - 0s 976us/step - loss: 0.6431 - accuracy: 0.6
562
```

```
Epoch 341/400
80/80 [==============================] - 0s 914us/step - loss: 0.6411 - accuracy: 0.6
625
Epoch 342/400
80/80 [==============================] - 0s 895us/step - loss: 0.6385 - accuracy: 0.6
625
Epoch 343/400
80/80 [==============================] - 0s 896us/step - loss: 0.6390 - accuracy: 0.6
750
Epoch 344/400
80/80 [==============================] - 0s 919us/step - loss: 0.6370 - accuracy: 0.6
875
Epoch 345/400
80/80 [==============================] - 0s 947us/step - loss: 0.6350 - accuracy: 0.6
875
Epoch 346/400
80/80 [==============================] - 0s 985us/step - loss: 0.6326 - accuracy: 0.6
750
Epoch 347/400
80/80 [==============================] - 0s 993us/step - loss: 0.6322 - accuracy: 0.6
750
Epoch 348/400
80/80 [==============================] - 0s 921us/step - loss: 0.6282 - accuracy: 0.6
750
Epoch 349/400
80/80 [==============================] - 0s 947us/step - loss: 0.6270 - accuracy: 0.6
687
Epoch 350/400
80/80 [==============================] - 0s 985us/step - loss: 0.6240 - accuracy: 0.6
875
Epoch 351/400
80/80 [==============================] - 0s 934us/step - loss: 0.6213 - accuracy: 0.6
687
Epoch 352/400
80/80 [==============================] - 0s 932us/step - loss: 0.6199 - accuracy: 0.6
812
Epoch 353/400
80/80 [==============================] - 0s 961us/step - loss: 0.6155 - accuracy: 0.6
812
Epoch 354/400
80/80 [==============================] - 0s 947us/step - loss: 0.6124 - accuracy: 0.6
750
Epoch 355/400
80/80 [==============================] - 0s 947us/step - loss: 0.6081 - accuracy: 0.6
875
Epoch 356/400
80/80 [==============================] - 0s 946us/step - loss: 0.6039 - accuracy: 0.6
812
Epoch 357/400
80/80 [==============================] - 0s 934us/step - loss: 0.5987 - accuracy: 0.6
812
Epoch 358/400
80/80 [==============================] - 0s 909us/step - loss: 0.5939 - accuracy: 0.6
938
Epoch 359/400
80/80 [==============================] - 0s 909us/step - loss: 0.5886 - accuracy: 0.6
812
Epoch 360/400
80/80 [==============================] - 0s 896us/step - loss: 0.5838 - accuracy: 0.6
687
```

```
Epoch 361/400
80/80 [==============================] - 0s 906us/step - loss: 0.5760 - accuracy: 0.7
125
Epoch 362/400
80/80 [==============================] - 0s 888us/step - loss: 0.5659 - accuracy: 0.7
250
Epoch 363/400
80/80 [==============================] - 0s 927us/step - loss: 0.5617 - accuracy: 0.7
000
Epoch 364/400
80/80 [==============================] - 0s 947us/step - loss: 0.5526 - accuracy: 0.7
188
Epoch 365/400
80/80 [==============================] - 0s 985us/step - loss: 0.5437 - accuracy: 0.7
000
Epoch 366/400
80/80 [==============================] - 0s 940us/step - loss: 0.5295 - accuracy: 0.7
625
Epoch 367/400
80/80 [==============================] - 0s 944us/step - loss: 0.5237 - accuracy: 0.7
312
Epoch 368/400
80/80 [==============================] - 0s 947us/step - loss: 0.5063 - accuracy: 0.7
875
Epoch 369/400
80/80 [==============================] - 0s 944us/step - loss: 0.4960 - accuracy: 0.7
625
Epoch 370/400
80/80 [==============================] - 0s 947us/step - loss: 0.4835 - accuracy: 0.8
000
Epoch 371/400
80/80 [==============================] - 0s 909us/step - loss: 0.4661 - accuracy: 0.7
875
Epoch 372/400
80/80 [==============================] - 0s 949us/step - loss: 0.4519 - accuracy: 0.8
188
Epoch 373/400
80/80 [==============================] - 0s 959us/step - loss: 0.4499 - accuracy: 0.8
125
Epoch 374/400
80/80 [==============================] - 0s 954us/step - loss: 0.4406 - accuracy: 0.8
250
Epoch 375/400
80/80 [==============================] - 0s 952us/step - loss: 0.4937 - accuracy: 0.8
125
Epoch 376/400
80/80 [==============================] - 0s 921us/step - loss: 1.9596 - accuracy: 0.5
125
Epoch 377/400
80/80 [==============================] - 0s 934us/step - loss: 1.8083 - accuracy: 0.5
000
Epoch 378/400
80/80 [==============================] - 0s 922us/step - loss: 1.6281 - accuracy: 0.5
000
Epoch 379/400
80/80 [==============================] - 0s 922us/step - loss: 1.4567 - accuracy: 0.5
000
Epoch 380/400
80/80 [==============================] - 0s 909us/step - loss: 1.2968 - accuracy: 0.5
000
```

```
Epoch 381/400
80/80 [==============================] - 0s 878us/step - loss: 1.1521 - accuracy: 0.5
000
Epoch 382/400
80/80 [==============================] - 0s 909us/step - loss: 1.0257 - accuracy: 0.5
000
Epoch 383/400
80/80 [==============================] - 0s 947us/step - loss: 0.9208 - accuracy: 0.5
000
Epoch 384/400
80/80 [==============================] - 0s 948us/step - loss: 0.8392 - accuracy: 0.5
000
Epoch 385/400
80/80 [==============================] - 0s 934us/step - loss: 0.7803 - accuracy: 0.5
000
Epoch 386/400
80/80 [==============================] - 0s 923us/step - loss: 0.7420 - accuracy: 0.5
000
Epoch 387/400
80/80 [==============================] - 0s 922us/step - loss: 0.7190 - accuracy: 0.5
000
Epoch 388/400
80/80 [==============================] - 0s 922us/step - loss: 0.7057 - accuracy: 0.5
000
Epoch 389/400
80/80 [==============================] - 0s 908us/step - loss: 0.6991 - accuracy: 0.5
000
Epoch 390/400
80/80 [==============================] - 0s 909us/step - loss: 0.6965 - accuracy: 0.5
000
Epoch 391/400
80/80 [==============================] - 0s 938us/step - loss: 0.6952 - accuracy: 0.5
000
Epoch 392/400
80/80 [==============================] - 0s 947us/step - loss: 0.6949 - accuracy: 0.5
000
Epoch 393/400
80/80 [==============================] - 0s 884us/step - loss: 0.6945 - accuracy: 0.4
750
Epoch 394/400
80/80 [==============================] - 0s 884us/step - loss: 0.6944 - accuracy: 0.4
625
Epoch 395/400
80/80 [==============================] - 0s 922us/step - loss: 0.6947 - accuracy: 0.4
625
Epoch 396/400
80/80 [==============================] - 0s 959us/step - loss: 0.6949 - accuracy: 0.4
125
Epoch 397/400
80/80 [==============================] - 0s 934us/step - loss: 0.6947 - accuracy: 0.4
375
Epoch 398/400
80/80 [==============================] - 0s 937us/step - loss: 0.6946 - accuracy: 0.4
250
Epoch 399/400
80/80 [==============================] - 0s 934us/step - loss: 0.6946 - accuracy: 0.4
625
Epoch 400/400
80/80 [==============================] - 0s 942us/step - loss: 0.6945 - accuracy: 0.4
```

```
000
5/5 [==============================] - 0s 1ms/step - loss: 0.6932 - accuracy: 0.5000
```

In [99]:
```python
# Relu
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'relu'))
model.add(Dense(2, activation = 'relu'))
model.add(Dense(2, activation = 'relu'))
model.add(Dense(1, activation='relu'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accuracy'])
model.fit(X, y, batch_size = 2, epochs = 400)
relu = model.evaluate(X, y)
```

```
Epoch 1/400
80/80 [==============================] - 0s 922us/step - loss: 7.7125 - accuracy: 0.5
000
Epoch 2/400
80/80 [==============================] - 0s 972us/step - loss: 7.7125 - accuracy: 0.5
000
Epoch 3/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 4/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 5/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 6/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 7/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 8/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
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5/5 [==============================] - 0s 2ms/step - loss: 7.7125 - accuracy: 0.5000
```

In [110…

```python
print(tanh, sigmoid, softplus, relu)
```

[0.5785650014877319, 0.675000011920929] [0.6931526064872742, 0.5] [7.712473869323730
5, 0.5] [7.7124738693237305, 0.5]

Of the four, softplus has the lowest loss and highest accuracy.

Try other Activation functions as well (https://keras.io/activations/) Again with the most optimal setup, try other optimizers (instead of SGD) and report on the loss score. (https://keras.io/optimizers/)

Optimizing Softplus

In [107…

```python
# Softplus with SGD:
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(1, activation='softplus'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'sgd', metrics=['accuracy'])
model.fit(X, y, batch_size = 2, epochs = 400)
sgd = model.evaluate(X, y)
```

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Epoch 1/400
80/80 [==============================] - 0s 903us/step - loss: 0.7849 - accuracy: 0.5
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Epoch 2/400
80/80 [==============================] - 0s 990us/step - loss: 0.7044 - accuracy: 0.5
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Epoch 3/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6968 - accuracy: 0.543
7
Epoch 4/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6949 - accuracy: 0.512
5
Epoch 5/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6974 - accuracy: 0.518
8
Epoch 6/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6965 - accuracy: 0.525
0
Epoch 7/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6962 - accuracy: 0.468
8
Epoch 8/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6970 - accuracy: 0.493
8
Epoch 9/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6965 - accuracy: 0.475
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Epoch 10/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6955 - accuracy: 0.506
3
Epoch 11/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6953 - accuracy: 0.500
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Epoch 12/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6955 - accuracy: 0.487
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Epoch 13/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6951 - accuracy: 0.487
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Epoch 14/400
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Epoch 15/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6957 - accuracy: 0.512
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Epoch 16/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6955 - accuracy: 0.512
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80/80 [==============================] - 0s 1ms/step - loss: 0.6950 - accuracy: 0.450
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Epoch 18/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6949 - accuracy: 0.500
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Epoch 19/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6932 - accuracy: 0.537
5
Epoch 20/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6946 - accuracy: 0.468
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Epoch 21/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6942 - accuracy: 0.468
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Epoch 22/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6954 - accuracy: 0.500
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Epoch 23/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6951 - accuracy: 0.525
0
Epoch 24/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6947 - accuracy: 0.443
7
Epoch 25/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6921 - accuracy: 0.456
3
Epoch 26/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6944 - accuracy: 0.500
0
Epoch 27/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6946 - accuracy: 0.468
8
Epoch 28/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6952 - accuracy: 0.481
2
Epoch 29/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6932 - accuracy: 0.456
3
Epoch 30/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6938 - accuracy: 0.475
0
Epoch 31/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6932 - accuracy: 0.512
5
Epoch 32/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6939 - accuracy: 0.456
3
Epoch 33/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6925 - accuracy: 0.481
2
Epoch 34/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6924 - accuracy: 0.512
5
Epoch 35/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6928 - accuracy: 0.468
8
Epoch 36/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6927 - accuracy: 0.481
2
Epoch 37/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6905 - accuracy: 0.506
3
Epoch 38/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6928 - accuracy: 0.543
7
Epoch 39/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6916 - accuracy: 0.468
8
Epoch 40/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6923 - accuracy: 0.500
0
```

```
Epoch 41/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6913 - accuracy: 0.500
0
Epoch 42/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6911 - accuracy: 0.500
0
Epoch 43/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6909 - accuracy: 0.531
2
Epoch 44/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6898 - accuracy: 0.487
5
Epoch 45/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6912 - accuracy: 0.506
3
Epoch 46/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6903 - accuracy: 0.462
5
Epoch 47/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6916 - accuracy: 0.512
5
Epoch 48/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6900 - accuracy: 0.556
2
Epoch 49/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6889 - accuracy: 0.468
8
Epoch 50/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6898 - accuracy: 0.568
8
Epoch 51/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6898 - accuracy: 0.450
0
Epoch 52/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6881 - accuracy: 0.518
8
Epoch 53/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6876 - accuracy: 0.518
8
Epoch 54/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6870 - accuracy: 0.581
3
Epoch 55/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6867 - accuracy: 0.506
3
Epoch 56/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6865 - accuracy: 0.518
8
Epoch 57/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6826 - accuracy: 0.537
5
Epoch 58/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6879 - accuracy: 0.493
8
Epoch 59/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6852 - accuracy: 0.456
3
Epoch 60/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6851 - accuracy: 0.506
3
```

```
Epoch 61/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6847 - accuracy: 0.550
0
Epoch 62/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6859 - accuracy: 0.568
8
Epoch 63/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6846 - accuracy: 0.556
2
Epoch 64/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6811 - accuracy: 0.456
3
Epoch 65/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6823 - accuracy: 0.506
3
Epoch 66/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6819 - accuracy: 0.587
5
Epoch 67/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6814 - accuracy: 0.443
7
Epoch 68/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6812 - accuracy: 0.537
5
Epoch 69/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6811 - accuracy: 0.581
3
Epoch 70/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6773 - accuracy: 0.568
8
Epoch 71/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6790 - accuracy: 0.500
0
Epoch 72/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6777 - accuracy: 0.518
8
Epoch 73/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6773 - accuracy: 0.618
7
Epoch 74/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6739 - accuracy: 0.493
8
Epoch 75/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6765 - accuracy: 0.606
2
Epoch 76/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6759 - accuracy: 0.537
5
Epoch 77/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6742 - accuracy: 0.556
2
Epoch 78/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6730 - accuracy: 0.593
8
Epoch 79/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6742 - accuracy: 0.525
0
Epoch 80/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6711 - accuracy: 0.606
2
```

```
Epoch 81/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6718 - accuracy: 0.587
5
Epoch 82/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6716 - accuracy: 0.556
2
Epoch 83/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6703 - accuracy: 0.612
5
Epoch 84/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6673 - accuracy: 0.512
5
Epoch 85/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6683 - accuracy: 0.587
5
Epoch 86/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6683 - accuracy: 0.593
8
Epoch 87/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6663 - accuracy: 0.600
0
Epoch 88/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6636 - accuracy: 0.625
0
Epoch 89/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6641 - accuracy: 0.518
8
Epoch 90/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6612 - accuracy: 0.637
5
Epoch 91/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6620 - accuracy: 0.537
5
Epoch 92/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6612 - accuracy: 0.568
8
Epoch 93/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6600 - accuracy: 0.581
3
Epoch 94/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6611 - accuracy: 0.606
2
Epoch 95/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6582 - accuracy: 0.562
5
Epoch 96/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6589 - accuracy: 0.612
5
Epoch 97/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6536 - accuracy: 0.618
7
Epoch 98/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6549 - accuracy: 0.593
8
Epoch 99/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6539 - accuracy: 0.618
7
Epoch 100/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6529 - accuracy: 0.600
0
```

```
Epoch 101/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6500 - accuracy: 0.606
2
Epoch 102/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6518 - accuracy: 0.618
7
Epoch 103/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6483 - accuracy: 0.637
5
Epoch 104/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6492 - accuracy: 0.618
7
Epoch 105/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6475 - accuracy: 0.606
2
Epoch 106/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6456 - accuracy: 0.637
5
Epoch 107/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6444 - accuracy: 0.612
5
Epoch 108/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6438 - accuracy: 0.618
7
Epoch 109/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6408 - accuracy: 0.575
0
Epoch 110/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6422 - accuracy: 0.643
8
Epoch 111/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6383 - accuracy: 0.593
8
Epoch 112/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6384 - accuracy: 0.637
5
Epoch 113/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6384 - accuracy: 0.625
0
Epoch 114/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6358 - accuracy: 0.637
5
Epoch 115/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6321 - accuracy: 0.593
8
Epoch 116/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6331 - accuracy: 0.625
0
Epoch 117/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6319 - accuracy: 0.618
7
Epoch 118/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6301 - accuracy: 0.631
3
Epoch 119/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6287 - accuracy: 0.631
3
Epoch 120/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6277 - accuracy: 0.625
0
```

```
Epoch 121/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6258 - accuracy: 0.631
3
Epoch 122/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6234 - accuracy: 0.606
2
Epoch 123/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6202 - accuracy: 0.618
7
Epoch 124/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6211 - accuracy: 0.643
8
Epoch 125/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6207 - accuracy: 0.625
0
Epoch 126/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6178 - accuracy: 0.625
0
Epoch 127/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6170 - accuracy: 0.618
7
Epoch 128/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6156 - accuracy: 0.625
0
Epoch 129/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6133 - accuracy: 0.631
3
Epoch 130/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6127 - accuracy: 0.631
3
Epoch 131/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6108 - accuracy: 0.625
0
Epoch 132/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6083 - accuracy: 0.631
3
Epoch 133/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6073 - accuracy: 0.637
5
Epoch 134/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6062 - accuracy: 0.637
5
Epoch 135/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6019 - accuracy: 0.612
5
Epoch 136/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6002 - accuracy: 0.637
5
Epoch 137/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6007 - accuracy: 0.581
3
Epoch 138/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5992 - accuracy: 0.618
7
Epoch 139/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5943 - accuracy: 0.643
8
Epoch 140/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5937 - accuracy: 0.625
0
```

```
Epoch 141/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5908 - accuracy: 0.618
7
Epoch 142/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5877 - accuracy: 0.625
0
Epoch 143/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5857 - accuracy: 0.637
5
Epoch 144/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5841 - accuracy: 0.606
2
Epoch 145/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5785 - accuracy: 0.637
5
Epoch 146/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5767 - accuracy: 0.612
5
Epoch 147/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5741 - accuracy: 0.606
2
Epoch 148/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5723 - accuracy: 0.612
5
Epoch 149/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5678 - accuracy: 0.625
0
Epoch 150/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5642 - accuracy: 0.612
5
Epoch 151/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5579 - accuracy: 0.650
0
Epoch 152/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5522 - accuracy: 0.625
0
Epoch 153/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5515 - accuracy: 0.631
3
Epoch 154/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5403 - accuracy: 0.631
3
Epoch 155/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5450 - accuracy: 0.587
5
Epoch 156/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5369 - accuracy: 0.606
2
Epoch 157/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5312 - accuracy: 0.593
8
Epoch 158/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5252 - accuracy: 0.587
5
Epoch 159/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5156 - accuracy: 0.637
5
Epoch 160/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5033 - accuracy: 0.706
3
```

```
Epoch 161/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5077 - accuracy: 0.643
8
Epoch 162/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5041 - accuracy: 0.625
0
Epoch 163/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4945 - accuracy: 0.618
7
Epoch 164/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4855 - accuracy: 0.681
2
Epoch 165/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4808 - accuracy: 0.681
2
Epoch 166/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4736 - accuracy: 0.706
3
Epoch 167/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4663 - accuracy: 0.712
5
Epoch 168/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4628 - accuracy: 0.731
2
Epoch 169/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4530 - accuracy: 0.743
7
Epoch 170/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4466 - accuracy: 0.787
5
Epoch 171/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4415 - accuracy: 0.768
8
Epoch 172/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4352 - accuracy: 0.762
5
Epoch 173/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4232 - accuracy: 0.775
0
Epoch 174/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4257 - accuracy: 0.793
7
Epoch 175/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4200 - accuracy: 0.793
7
Epoch 176/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4054 - accuracy: 0.818
8
Epoch 177/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4019 - accuracy: 0.825
0
Epoch 178/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3913 - accuracy: 0.831
3
Epoch 179/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3930 - accuracy: 0.831
3
Epoch 180/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3743 - accuracy: 0.850
0
```

```
Epoch 181/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4607 - accuracy: 0.837
5
Epoch 182/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4227 - accuracy: 0.800
0
Epoch 183/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3597 - accuracy: 0.831
3
Epoch 184/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3744 - accuracy: 0.850
0
Epoch 185/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5972 - accuracy: 0.725
0
Epoch 186/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3816 - accuracy: 0.850
0
Epoch 187/400
80/80 [==============================] - 0s 1ms/step - loss: 3.7495 - accuracy: 0.681
2
Epoch 188/400
80/80 [==============================] - 0s 1ms/step - loss: 5.6247 - accuracy: 0.500
0
Epoch 189/400
80/80 [==============================] - 0s 1ms/step - loss: 1.2070 - accuracy: 0.500
0
Epoch 190/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5877 - accuracy: 0.650
0
Epoch 191/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5003 - accuracy: 0.793
7
Epoch 192/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4815 - accuracy: 0.781
2
Epoch 193/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4708 - accuracy: 0.781
2
Epoch 194/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4578 - accuracy: 0.756
3
Epoch 195/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4468 - accuracy: 0.806
2
Epoch 196/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4325 - accuracy: 0.812
5
Epoch 197/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4223 - accuracy: 0.831
3
Epoch 198/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4093 - accuracy: 0.843
8
Epoch 199/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4027 - accuracy: 0.856
2
Epoch 200/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3906 - accuracy: 0.850
0
```

```
Epoch 201/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3859 - accuracy: 0.843
8
Epoch 202/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3771 - accuracy: 0.856
2
Epoch 203/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3714 - accuracy: 0.843
8
Epoch 204/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3643 - accuracy: 0.850
0
Epoch 205/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3588 - accuracy: 0.862
5
Epoch 206/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3535 - accuracy: 0.868
7
Epoch 207/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3448 - accuracy: 0.843
8
Epoch 208/400
80/80 [==============================] - 0s 2ms/step - loss: 0.3449 - accuracy: 0.843
8
Epoch 209/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3420 - accuracy: 0.862
5
Epoch 210/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3349 - accuracy: 0.862
5
Epoch 211/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3282 - accuracy: 0.856
2
Epoch 212/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3392 - accuracy: 0.862
5
Epoch 213/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3296 - accuracy: 0.868
7
Epoch 214/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3264 - accuracy: 0.868
7
Epoch 215/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3225 - accuracy: 0.843
8
Epoch 216/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4008 - accuracy: 0.868
7
Epoch 217/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3194 - accuracy: 0.856
2
Epoch 218/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3140 - accuracy: 0.862
5
Epoch 219/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3088 - accuracy: 0.850
0
Epoch 220/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3254 - accuracy: 0.862
5
```

```
Epoch 221/400
80/80 [==============================] - 0s 2ms/step - loss: 0.3132 - accuracy: 0.875
0
Epoch 222/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3153 - accuracy: 0.856
2
Epoch 223/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3091 - accuracy: 0.850
0
Epoch 224/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3150 - accuracy: 0.856
2
Epoch 225/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3109 - accuracy: 0.868
7
Epoch 226/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3095 - accuracy: 0.856
2
Epoch 227/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3132 - accuracy: 0.862
5
Epoch 228/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3069 - accuracy: 0.856
2
Epoch 229/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3032 - accuracy: 0.856
2
Epoch 230/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3135 - accuracy: 0.856
2
Epoch 231/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3059 - accuracy: 0.862
5
Epoch 232/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3068 - accuracy: 0.862
5
Epoch 233/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3028 - accuracy: 0.875
0
Epoch 234/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2966 - accuracy: 0.862
5
Epoch 235/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3138 - accuracy: 0.862
5
Epoch 236/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3067 - accuracy: 0.862
5
Epoch 237/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3052 - accuracy: 0.856
2
Epoch 238/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3101 - accuracy: 0.856
2
Epoch 239/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3062 - accuracy: 0.868
7
Epoch 240/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2990 - accuracy: 0.850
0
```

```
Epoch 241/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3001 - accuracy: 0.875
0
Epoch 242/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3031 - accuracy: 0.868
7
Epoch 243/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3022 - accuracy: 0.862
5
Epoch 244/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2999 - accuracy: 0.868
7
Epoch 245/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3045 - accuracy: 0.862
5
Epoch 246/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3107 - accuracy: 0.862
5
Epoch 247/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2944 - accuracy: 0.856
2
Epoch 248/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3006 - accuracy: 0.862
5
Epoch 249/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3771 - accuracy: 0.887
5
Epoch 250/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3006 - accuracy: 0.868
7
Epoch 251/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2985 - accuracy: 0.862
5
Epoch 252/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2966 - accuracy: 0.887
5
Epoch 253/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3054 - accuracy: 0.868
7
Epoch 254/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3062 - accuracy: 0.862
5
Epoch 255/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2945 - accuracy: 0.887
5
Epoch 256/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3029 - accuracy: 0.862
5
Epoch 257/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3050 - accuracy: 0.875
0
Epoch 258/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3026 - accuracy: 0.856
2
Epoch 259/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3037 - accuracy: 0.868
7
Epoch 260/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2992 - accuracy: 0.875
0
```

```
Epoch 261/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2996 - accuracy: 0.862
5
Epoch 262/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2977 - accuracy: 0.875
0
Epoch 263/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2982 - accuracy: 0.868
7
Epoch 264/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3017 - accuracy: 0.862
5
Epoch 265/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2940 - accuracy: 0.868
7
Epoch 266/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2986 - accuracy: 0.875
0
Epoch 267/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2939 - accuracy: 0.868
7
Epoch 268/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2984 - accuracy: 0.875
0
Epoch 269/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3013 - accuracy: 0.868
7
Epoch 270/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3017 - accuracy: 0.856
2
Epoch 271/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2912 - accuracy: 0.893
8
Epoch 272/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2948 - accuracy: 0.868
7
Epoch 273/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2969 - accuracy: 0.868
7
Epoch 274/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3084 - accuracy: 0.868
7
Epoch 275/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3069 - accuracy: 0.868
7
Epoch 276/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2955 - accuracy: 0.868
7
Epoch 277/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2955 - accuracy: 0.862
5
Epoch 278/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2982 - accuracy: 0.862
5
Epoch 279/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2946 - accuracy: 0.868
7
Epoch 280/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2908 - accuracy: 0.868
7
```

```
Epoch 281/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2959 - accuracy: 0.856
2
Epoch 282/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2929 - accuracy: 0.868
7
Epoch 283/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2954 - accuracy: 0.862
5
Epoch 284/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2977 - accuracy: 0.881
3
Epoch 285/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2899 - accuracy: 0.881
3
Epoch 286/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2931 - accuracy: 0.862
5
Epoch 287/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2974 - accuracy: 0.875
0
Epoch 288/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2929 - accuracy: 0.856
2
Epoch 289/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2930 - accuracy: 0.868
7
Epoch 290/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2950 - accuracy: 0.862
5
Epoch 291/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2916 - accuracy: 0.881
3
Epoch 292/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2923 - accuracy: 0.856
2
Epoch 293/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2931 - accuracy: 0.887
5
Epoch 294/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2932 - accuracy: 0.862
5
Epoch 295/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2934 - accuracy: 0.868
7
Epoch 296/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2919 - accuracy: 0.856
2
Epoch 297/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2941 - accuracy: 0.868
7
Epoch 298/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2912 - accuracy: 0.868
7
Epoch 299/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2879 - accuracy: 0.881
3
Epoch 300/400
80/80 [==============================] - 0s 1ms/step - loss: 0.3293 - accuracy: 0.868
7
```

```
Epoch 301/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2916 - accuracy: 0.868
7
Epoch 302/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2917 - accuracy: 0.875
0
Epoch 303/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2901 - accuracy: 0.875
0
Epoch 304/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2914 - accuracy: 0.881
3
Epoch 305/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2913 - accuracy: 0.881
3
Epoch 306/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2932 - accuracy: 0.875
0
Epoch 307/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2909 - accuracy: 0.875
0
Epoch 308/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2917 - accuracy: 0.868
7
Epoch 309/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2906 - accuracy: 0.875
0
Epoch 310/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2899 - accuracy: 0.875
0
Epoch 311/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2890 - accuracy: 0.856
2
Epoch 312/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2901 - accuracy: 0.875
0
Epoch 313/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2888 - accuracy: 0.875
0
Epoch 314/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2891 - accuracy: 0.868
7
Epoch 315/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2888 - accuracy: 0.868
7
Epoch 316/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2850 - accuracy: 0.875
0
Epoch 317/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2871 - accuracy: 0.887
5
Epoch 318/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2864 - accuracy: 0.868
7
Epoch 319/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2833 - accuracy: 0.875
0
Epoch 320/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2911 - accuracy: 0.868
7
```

```
Epoch 321/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2856 - accuracy: 0.875
0
Epoch 322/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2871 - accuracy: 0.862
5
Epoch 323/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2893 - accuracy: 0.868
7
Epoch 324/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2867 - accuracy: 0.868
7
Epoch 325/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2902 - accuracy: 0.868
7
Epoch 326/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2875 - accuracy: 0.868
7
Epoch 327/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2894 - accuracy: 0.881
3
Epoch 328/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2864 - accuracy: 0.875
0
Epoch 329/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2867 - accuracy: 0.862
5
Epoch 330/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2890 - accuracy: 0.881
3
Epoch 331/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2903 - accuracy: 0.875
0
Epoch 332/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2875 - accuracy: 0.875
0
Epoch 333/400
80/80 [==============================] - 0s 1ms/step - loss: 0.2878 - accuracy: 0.868
7
Epoch 334/400
80/80 [==============================] - 0s 1ms/step - loss: 4.0900 - accuracy: 0.706
3
Epoch 335/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 336/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 337/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 338/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 339/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 340/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
```

```
Epoch 341/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 342/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 343/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 344/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 345/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 346/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 347/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 348/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 349/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 350/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 351/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 352/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 353/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 354/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 355/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 356/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 357/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 358/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 359/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 360/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
```

```
Epoch 361/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 362/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 363/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 364/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 365/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 366/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 367/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
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Epoch 368/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 369/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 370/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 371/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 372/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 373/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 374/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 375/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 376/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 377/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 378/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 379/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 380/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
```

```
Epoch 381/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 382/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 383/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 384/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 385/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 386/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 387/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 388/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 389/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 390/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 391/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 392/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 393/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 394/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 395/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 396/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 397/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 398/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 399/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
0
Epoch 400/400
80/80 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.500
```

```
0
5/5 [==============================] - 0s 1ms/step - loss: 7.7125 - accuracy: 0.5000
```

In [102…

```python
# Softplus with RMSprop:
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(1, activation='softplus'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'RMSprop', metrics=['accuracy
model.fit(X, y, batch_size = 2, epochs = 400)
RMSprop = model.evaluate(X, y)
```

```
Epoch 1/400
80/80 [==============================] - 1s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 2/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 3/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 4/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 5/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 6/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 7/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 8/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 9/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 10/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 11/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 12/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 13/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 14/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 15/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 16/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 17/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 18/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 19/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 20/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
```

```
Epoch 21/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 22/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 23/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 24/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 25/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 26/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 27/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 28/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 29/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 30/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 31/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 32/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 33/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 34/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 35/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 36/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 37/400
80/80 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 38/400
80/80 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 39/400
80/80 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 40/400
80/80 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.500
0
```

```
Epoch 41/400
80/80 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 42/400
80/80 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.500
0
Epoch 43/400
80/80 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.500
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Epoch 44/400
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Epoch 400/400
80/80 [==============================] - 0s 1ms/step - loss: 7.6246 - accuracy: 0.500
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0
5/5 [==============================] - 0s 2ms/step - loss: 7.6246 - accuracy: 0.5000
```

In [104…

```python
# Softplus with Adam:
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(1, activation='softplus'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'adam', metrics=['accuracy'])
model.fit(X, y, batch_size = 2, epochs = 400)
adam = model.evaluate(X, y)
```

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Epoch 1/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7568 - accuracy: 0.500
0
Epoch 2/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7228 - accuracy: 0.500
0
Epoch 3/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7058 - accuracy: 0.500
0
Epoch 4/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6973 - accuracy: 0.500
0
Epoch 5/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6928 - accuracy: 0.500
0
Epoch 6/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6885 - accuracy: 0.568
8
Epoch 7/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6870 - accuracy: 0.581
3
Epoch 8/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6856 - accuracy: 0.606
2
Epoch 9/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6848 - accuracy: 0.537
5
Epoch 10/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6838 - accuracy: 0.512
5
Epoch 11/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6831 - accuracy: 0.512
5
Epoch 12/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6821 - accuracy: 0.500
0
Epoch 13/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6813 - accuracy: 0.493
8
Epoch 14/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6805 - accuracy: 0.481
2
Epoch 15/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6792 - accuracy: 0.487
5
Epoch 16/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6795 - accuracy: 0.518
8
Epoch 17/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6778 - accuracy: 0.493
8
Epoch 18/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6764 - accuracy: 0.500
0
Epoch 19/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6753 - accuracy: 0.481
2
Epoch 20/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6744 - accuracy: 0.481
2
```

```
Epoch 21/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6731 - accuracy: 0.493
8
Epoch 22/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6721 - accuracy: 0.487
5
Epoch 23/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6705 - accuracy: 0.500
0
Epoch 24/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6687 - accuracy: 0.493
8
Epoch 25/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6670 - accuracy: 0.487
5
Epoch 26/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6651 - accuracy: 0.487
5
Epoch 27/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6636 - accuracy: 0.493
8
Epoch 28/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6622 - accuracy: 0.475
0
Epoch 29/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6605 - accuracy: 0.487
5
Epoch 30/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6582 - accuracy: 0.487
5
Epoch 31/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6571 - accuracy: 0.500
0
Epoch 32/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6562 - accuracy: 0.481
2
Epoch 33/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6526 - accuracy: 0.487
5
Epoch 34/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6507 - accuracy: 0.493
8
Epoch 35/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6495 - accuracy: 0.493
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Epoch 36/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6468 - accuracy: 0.493
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Epoch 37/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6444 - accuracy: 0.512
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Epoch 38/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6426 - accuracy: 0.493
8
Epoch 39/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6406 - accuracy: 0.512
5
Epoch 40/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6392 - accuracy: 0.500
0
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Epoch 41/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6369 - accuracy: 0.500
0
Epoch 42/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6368 - accuracy: 0.481
2
Epoch 43/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6328 - accuracy: 0.518
8
Epoch 44/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6318 - accuracy: 0.487
5
Epoch 45/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6295 - accuracy: 0.562
5
Epoch 46/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6281 - accuracy: 0.550
0
Epoch 47/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6259 - accuracy: 0.506
3
Epoch 48/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6238 - accuracy: 0.518
8
Epoch 49/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6232 - accuracy: 0.581
3
Epoch 50/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6204 - accuracy: 0.512
5
Epoch 51/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6185 - accuracy: 0.537
5
Epoch 52/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6162 - accuracy: 0.593
8
Epoch 53/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6152 - accuracy: 0.537
5
Epoch 54/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6133 - accuracy: 0.581
3
Epoch 55/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6108 - accuracy: 0.568
8
Epoch 56/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6099 - accuracy: 0.575
0
Epoch 57/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6089 - accuracy: 0.587
5
Epoch 58/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6059 - accuracy: 0.568
8
Epoch 59/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6044 - accuracy: 0.581
3
Epoch 60/400
80/80 [==============================] - 0s 2ms/step - loss: 0.6026 - accuracy: 0.581
3
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Epoch 61/400
80/80 [==============================] - 0s 1ms/step - loss: 0.6011 - accuracy: 0.593
8
Epoch 62/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5990 - accuracy: 0.593
8
Epoch 63/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5982 - accuracy: 0.581
3
Epoch 64/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5970 - accuracy: 0.581
3
Epoch 65/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5945 - accuracy: 0.581
3
Epoch 66/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5927 - accuracy: 0.600
0
Epoch 67/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5906 - accuracy: 0.593
8
Epoch 68/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5895 - accuracy: 0.587
5
Epoch 69/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5880 - accuracy: 0.581
3
Epoch 70/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5860 - accuracy: 0.575
0
Epoch 71/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5844 - accuracy: 0.593
8
Epoch 72/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5837 - accuracy: 0.587
5
Epoch 73/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5808 - accuracy: 0.593
8
Epoch 74/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5794 - accuracy: 0.600
0
Epoch 75/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5773 - accuracy: 0.593
8
Epoch 76/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5757 - accuracy: 0.593
8
Epoch 77/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5737 - accuracy: 0.593
8
Epoch 78/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5729 - accuracy: 0.593
8
Epoch 79/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5704 - accuracy: 0.593
8
Epoch 80/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5684 - accuracy: 0.593
8
```

```
Epoch 81/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5667 - accuracy: 0.587
5
Epoch 82/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5649 - accuracy: 0.600
0
Epoch 83/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5629 - accuracy: 0.587
5
Epoch 84/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5614 - accuracy: 0.587
5
Epoch 85/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5581 - accuracy: 0.593
8
Epoch 86/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5565 - accuracy: 0.593
8
Epoch 87/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5537 - accuracy: 0.593
8
Epoch 88/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5516 - accuracy: 0.600
0
Epoch 89/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5497 - accuracy: 0.581
3
Epoch 90/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5479 - accuracy: 0.550
0
Epoch 91/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5439 - accuracy: 0.600
0
Epoch 92/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5410 - accuracy: 0.600
0
Epoch 93/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5371 - accuracy: 0.587
5
Epoch 94/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5342 - accuracy: 0.593
8
Epoch 95/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5327 - accuracy: 0.550
0
Epoch 96/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5303 - accuracy: 0.593
8
Epoch 97/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5313 - accuracy: 0.493
8
Epoch 98/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5273 - accuracy: 0.587
5
Epoch 99/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5240 - accuracy: 0.575
0
Epoch 100/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5225 - accuracy: 0.543
7
```

```
Epoch 101/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5213 - accuracy: 0.562
5
Epoch 102/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5196 - accuracy: 0.512
5
Epoch 103/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5182 - accuracy: 0.493
8
Epoch 104/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5166 - accuracy: 0.506
3
Epoch 105/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5147 - accuracy: 0.562
5
Epoch 106/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5138 - accuracy: 0.512
5
Epoch 107/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5130 - accuracy: 0.512
5
Epoch 108/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5117 - accuracy: 0.543
7
Epoch 109/400
80/80 [==============================] - 0s 2ms/step - loss: 0.5104 - accuracy: 0.487
5
Epoch 110/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5092 - accuracy: 0.506
3
Epoch 111/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5084 - accuracy: 0.506
3
Epoch 112/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5071 - accuracy: 0.512
5
Epoch 113/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5065 - accuracy: 0.493
8
Epoch 114/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5061 - accuracy: 0.518
8
Epoch 115/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5041 - accuracy: 0.506
3
Epoch 116/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5033 - accuracy: 0.506
3
Epoch 117/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5023 - accuracy: 0.500
0
Epoch 118/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5021 - accuracy: 0.537
5
Epoch 119/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5011 - accuracy: 0.537
5
Epoch 120/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5005 - accuracy: 0.506
3
```

```
Epoch 121/400
80/80 [==============================] - 0s 1ms/step - loss: 0.5004 - accuracy: 0.543
7
Epoch 122/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4983 - accuracy: 0.500
0
Epoch 123/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4979 - accuracy: 0.500
0
Epoch 124/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4978 - accuracy: 0.512
5
Epoch 125/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4964 - accuracy: 0.506
3
Epoch 126/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4967 - accuracy: 0.525
0
Epoch 127/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4951 - accuracy: 0.500
0
Epoch 128/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4955 - accuracy: 0.543
7
Epoch 129/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4941 - accuracy: 0.531
2
Epoch 130/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4934 - accuracy: 0.500
0
Epoch 131/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4927 - accuracy: 0.506
3
Epoch 132/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4927 - accuracy: 0.500
0
Epoch 133/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4913 - accuracy: 0.512
5
Epoch 134/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4915 - accuracy: 0.500
0
Epoch 135/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4903 - accuracy: 0.506
3
Epoch 136/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4896 - accuracy: 0.493
8
Epoch 137/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4894 - accuracy: 0.556
2
Epoch 138/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4890 - accuracy: 0.506
3
Epoch 139/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4886 - accuracy: 0.543
7
Epoch 140/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4883 - accuracy: 0.506
3
```

```
Epoch 141/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4874 - accuracy: 0.537
5
Epoch 142/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4869 - accuracy: 0.518
8
Epoch 143/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4870 - accuracy: 0.543
7
Epoch 144/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4859 - accuracy: 0.556
2
Epoch 145/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4852 - accuracy: 0.518
8
Epoch 146/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4847 - accuracy: 0.493
8
Epoch 147/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4861 - accuracy: 0.518
8
Epoch 148/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4838 - accuracy: 0.518
8
Epoch 149/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4838 - accuracy: 0.537
5
Epoch 150/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4834 - accuracy: 0.568
8
Epoch 151/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4817 - accuracy: 0.512
5
Epoch 152/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4820 - accuracy: 0.531
2
Epoch 153/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4815 - accuracy: 0.512
5
Epoch 154/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4821 - accuracy: 0.543
7
Epoch 155/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4816 - accuracy: 0.525
0
Epoch 156/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4821 - accuracy: 0.587
5
Epoch 157/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4809 - accuracy: 0.525
0
Epoch 158/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4805 - accuracy: 0.506
3
Epoch 159/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4796 - accuracy: 0.506
3
Epoch 160/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4801 - accuracy: 0.550
0
```

```
Epoch 161/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4806 - accuracy: 0.531
2
Epoch 162/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4788 - accuracy: 0.531
2
Epoch 163/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4782 - accuracy: 0.562
5
Epoch 164/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4788 - accuracy: 0.518
8
Epoch 165/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4773 - accuracy: 0.518
8
Epoch 166/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4770 - accuracy: 0.537
5
Epoch 167/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4784 - accuracy: 0.518
8
Epoch 168/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4777 - accuracy: 0.556
2
Epoch 169/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4773 - accuracy: 0.512
5
Epoch 170/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4758 - accuracy: 0.575
0
Epoch 171/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4756 - accuracy: 0.500
0
Epoch 172/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4748 - accuracy: 0.543
7
Epoch 173/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4755 - accuracy: 0.506
3
Epoch 174/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4744 - accuracy: 0.581
3
Epoch 175/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4737 - accuracy: 0.531
2
Epoch 176/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4738 - accuracy: 0.562
5
Epoch 177/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4739 - accuracy: 0.550
0
Epoch 178/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4744 - accuracy: 0.543
7
Epoch 179/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4745 - accuracy: 0.543
7
Epoch 180/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4730 - accuracy: 0.575
0
```

```
Epoch 181/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4727 - accuracy: 0.550
0
Epoch 182/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4727 - accuracy: 0.525
0
Epoch 183/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4729 - accuracy: 0.506
3
Epoch 184/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4719 - accuracy: 0.550
0
Epoch 185/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4715 - accuracy: 0.543
7
Epoch 186/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4715 - accuracy: 0.593
8
Epoch 187/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4714 - accuracy: 0.556
2
Epoch 188/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4713 - accuracy: 0.543
7
Epoch 189/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4707 - accuracy: 0.506
3
Epoch 190/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4700 - accuracy: 0.575
0
Epoch 191/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4701 - accuracy: 0.525
0
Epoch 192/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4702 - accuracy: 0.525
0
Epoch 193/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4697 - accuracy: 0.556
2
Epoch 194/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4703 - accuracy: 0.500
0
Epoch 195/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4693 - accuracy: 0.568
8
Epoch 196/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4684 - accuracy: 0.537
5
Epoch 197/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4701 - accuracy: 0.568
8
Epoch 198/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4689 - accuracy: 0.512
5
Epoch 199/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4683 - accuracy: 0.518
8
Epoch 200/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4684 - accuracy: 0.525
0
```

```
Epoch 201/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4678 - accuracy: 0.562
5
Epoch 202/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4676 - accuracy: 0.543
7
Epoch 203/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4673 - accuracy: 0.543
7
Epoch 204/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4675 - accuracy: 0.525
0
Epoch 205/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4668 - accuracy: 0.518
8
Epoch 206/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4673 - accuracy: 0.518
8
Epoch 207/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4668 - accuracy: 0.531
2
Epoch 208/400
80/80 [==============================] - 0s 2ms/step - loss: 0.4656 - accuracy: 0.531
2
Epoch 209/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4657 - accuracy: 0.537
5
Epoch 210/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4669 - accuracy: 0.537
5
Epoch 211/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4659 - accuracy: 0.581
3
Epoch 212/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4645 - accuracy: 0.543
7
Epoch 213/400
80/80 [==============================] - 0s 2ms/step - loss: 0.4650 - accuracy: 0.550
0
Epoch 214/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4643 - accuracy: 0.531
2
Epoch 215/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4645 - accuracy: 0.562
5
Epoch 216/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4643 - accuracy: 0.525
0
Epoch 217/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4643 - accuracy: 0.568
8
Epoch 218/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4644 - accuracy: 0.543
7
Epoch 219/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4641 - accuracy: 0.518
8
Epoch 220/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4647 - accuracy: 0.518
8
```

```
Epoch 221/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4634 - accuracy: 0.506
3
Epoch 222/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4634 - accuracy: 0.568
8
Epoch 223/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4639 - accuracy: 0.537
5
Epoch 224/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4622 - accuracy: 0.531
2
Epoch 225/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4628 - accuracy: 0.562
5
Epoch 226/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4620 - accuracy: 0.525
0
Epoch 227/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4620 - accuracy: 0.506
3
Epoch 228/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4638 - accuracy: 0.568
8
Epoch 229/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4653 - accuracy: 0.581
3
Epoch 230/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4613 - accuracy: 0.512
5
Epoch 231/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4627 - accuracy: 0.612
5
Epoch 232/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4620 - accuracy: 0.568
8
Epoch 233/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4634 - accuracy: 0.593
8
Epoch 234/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4619 - accuracy: 0.506
3
Epoch 235/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4621 - accuracy: 0.518
8
Epoch 236/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4608 - accuracy: 0.568
8
Epoch 237/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4616 - accuracy: 0.506
3
Epoch 238/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4603 - accuracy: 0.506
3
Epoch 239/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4602 - accuracy: 0.575
0
Epoch 240/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4604 - accuracy: 0.512
5
```

```
Epoch 241/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4599 - accuracy: 0.512
5
Epoch 242/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4605 - accuracy: 0.543
7
Epoch 243/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4600 - accuracy: 0.537
5
Epoch 244/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4603 - accuracy: 0.518
8
Epoch 245/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4594 - accuracy: 0.550
0
Epoch 246/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4594 - accuracy: 0.525
0
Epoch 247/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4587 - accuracy: 0.562
5
Epoch 248/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4603 - accuracy: 0.537
5
Epoch 249/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4604 - accuracy: 0.550
0
Epoch 250/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4597 - accuracy: 0.593
8
Epoch 251/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4588 - accuracy: 0.525
0
Epoch 252/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4580 - accuracy: 0.550
0
Epoch 253/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4570 - accuracy: 0.531
2
Epoch 254/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4582 - accuracy: 0.525
0
Epoch 255/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4579 - accuracy: 0.512
5
Epoch 256/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4594 - accuracy: 0.525
0
Epoch 257/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4568 - accuracy: 0.568
8
Epoch 258/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4574 - accuracy: 0.556
2
Epoch 259/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4580 - accuracy: 0.500
0
Epoch 260/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4571 - accuracy: 0.543
7
```

```
Epoch 261/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4564 - accuracy: 0.537
5
Epoch 262/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4573 - accuracy: 0.525
0
Epoch 263/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4571 - accuracy: 0.562
5
Epoch 264/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4569 - accuracy: 0.525
0
Epoch 265/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4552 - accuracy: 0.568
8
Epoch 266/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4565 - accuracy: 0.537
5
Epoch 267/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4544 - accuracy: 0.550
0
Epoch 268/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4567 - accuracy: 0.531
2
Epoch 269/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4557 - accuracy: 0.562
5
Epoch 270/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4564 - accuracy: 0.562
5
Epoch 271/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4545 - accuracy: 0.531
2
Epoch 272/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4552 - accuracy: 0.562
5
Epoch 273/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4550 - accuracy: 0.537
5
Epoch 274/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4557 - accuracy: 0.550
0
Epoch 275/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4543 - accuracy: 0.562
5
Epoch 276/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4542 - accuracy: 0.531
2
Epoch 277/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4535 - accuracy: 0.556
2
Epoch 278/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4539 - accuracy: 0.587
5
Epoch 279/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4542 - accuracy: 0.518
8
Epoch 280/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4536 - accuracy: 0.506
3
```

```
Epoch 281/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4548 - accuracy: 0.537
5
Epoch 282/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4542 - accuracy: 0.568
8
Epoch 283/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4540 - accuracy: 0.556
2
Epoch 284/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4532 - accuracy: 0.568
8
Epoch 285/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4546 - accuracy: 0.543
7
Epoch 286/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4534 - accuracy: 0.600
0
Epoch 287/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4532 - accuracy: 0.531
2
Epoch 288/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4532 - accuracy: 0.543
7
Epoch 289/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4521 - accuracy: 0.581
3
Epoch 290/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4524 - accuracy: 0.543
7
Epoch 291/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4530 - accuracy: 0.575
0
Epoch 292/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4519 - accuracy: 0.543
7
Epoch 293/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4523 - accuracy: 0.543
7
Epoch 294/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4529 - accuracy: 0.531
2
Epoch 295/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4507 - accuracy: 0.556
2
Epoch 296/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4523 - accuracy: 0.543
7
Epoch 297/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4501 - accuracy: 0.556
2
Epoch 298/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4507 - accuracy: 0.568
8
Epoch 299/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4508 - accuracy: 0.531
2
Epoch 300/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4519 - accuracy: 0.518
8
```

```
Epoch 301/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4516 - accuracy: 0.556
2
Epoch 302/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4510 - accuracy: 0.525
0
Epoch 303/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4517 - accuracy: 0.556
2
Epoch 304/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4522 - accuracy: 0.600
0
Epoch 305/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4507 - accuracy: 0.543
7
Epoch 306/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4512 - accuracy: 0.562
5
Epoch 307/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4501 - accuracy: 0.568
8
Epoch 308/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4501 - accuracy: 0.512
5
Epoch 309/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4501 - accuracy: 0.568
8
Epoch 310/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4496 - accuracy: 0.550
0
Epoch 311/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4499 - accuracy: 0.568
8
Epoch 312/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4504 - accuracy: 0.537
5
Epoch 313/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4502 - accuracy: 0.587
5
Epoch 314/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4487 - accuracy: 0.568
8
Epoch 315/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4497 - accuracy: 0.537
5
Epoch 316/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4502 - accuracy: 0.556
2
Epoch 317/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4488 - accuracy: 0.525
0
Epoch 318/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4476 - accuracy: 0.550
0
Epoch 319/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4488 - accuracy: 0.537
5
Epoch 320/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4490 - accuracy: 0.568
8
```

```
Epoch 321/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4481 - accuracy: 0.593
8
Epoch 322/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4491 - accuracy: 0.556
2
Epoch 323/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4489 - accuracy: 0.537
5
Epoch 324/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4477 - accuracy: 0.568
8
Epoch 325/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4477 - accuracy: 0.543
7
Epoch 326/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4475 - accuracy: 0.587
5
Epoch 327/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4485 - accuracy: 0.550
0
Epoch 328/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4478 - accuracy: 0.575
0
Epoch 329/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4476 - accuracy: 0.543
7
Epoch 330/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4474 - accuracy: 0.581
3
Epoch 331/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4472 - accuracy: 0.556
2
Epoch 332/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4468 - accuracy: 0.568
8
Epoch 333/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4487 - accuracy: 0.562
5
Epoch 334/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4460 - accuracy: 0.593
8
Epoch 335/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4484 - accuracy: 0.587
5
Epoch 336/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4468 - accuracy: 0.556
2
Epoch 337/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4461 - accuracy: 0.568
8
Epoch 338/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4461 - accuracy: 0.562
5
Epoch 339/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4468 - accuracy: 0.550
0
Epoch 340/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4451 - accuracy: 0.562
5
```

```
Epoch 341/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4461 - accuracy: 0.562
5
Epoch 342/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4463 - accuracy: 0.518
8
Epoch 343/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4464 - accuracy: 0.575
0
Epoch 344/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4457 - accuracy: 0.556
2
Epoch 345/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4469 - accuracy: 0.550
0
Epoch 346/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4459 - accuracy: 0.575
0
Epoch 347/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4467 - accuracy: 0.618
7
Epoch 348/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4449 - accuracy: 0.587
5
Epoch 349/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4454 - accuracy: 0.593
8
Epoch 350/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4457 - accuracy: 0.568
8
Epoch 351/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4477 - accuracy: 0.543
7
Epoch 352/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4453 - accuracy: 0.606
2
Epoch 353/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4453 - accuracy: 0.587
5
Epoch 354/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4457 - accuracy: 0.593
8
Epoch 355/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4444 - accuracy: 0.568
8
Epoch 356/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4437 - accuracy: 0.575
0
Epoch 357/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4448 - accuracy: 0.562
5
Epoch 358/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4445 - accuracy: 0.575
0
Epoch 359/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4441 - accuracy: 0.568
8
Epoch 360/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4448 - accuracy: 0.525
0
```

```
Epoch 361/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4433 - accuracy: 0.581
3
Epoch 362/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4438 - accuracy: 0.581
3
Epoch 363/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4432 - accuracy: 0.568
8
Epoch 364/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4432 - accuracy: 0.606
2
Epoch 365/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4441 - accuracy: 0.543
7
Epoch 366/400
80/80 [==============================] - 0s 2ms/step - loss: 0.4431 - accuracy: 0.575
0
Epoch 367/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4437 - accuracy: 0.562
5
Epoch 368/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4422 - accuracy: 0.600
0
Epoch 369/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4448 - accuracy: 0.581
3
Epoch 370/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4445 - accuracy: 0.556
2
Epoch 371/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4431 - accuracy: 0.612
5
Epoch 372/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4428 - accuracy: 0.593
8
Epoch 373/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4437 - accuracy: 0.550
0
Epoch 374/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4419 - accuracy: 0.587
5
Epoch 375/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4427 - accuracy: 0.581
3
Epoch 376/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4426 - accuracy: 0.568
8
Epoch 377/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4429 - accuracy: 0.562
5
Epoch 378/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4431 - accuracy: 0.593
8
Epoch 379/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4427 - accuracy: 0.612
5
Epoch 380/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4423 - accuracy: 0.562
5
```

```
Epoch 381/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4410 - accuracy: 0.587
5
Epoch 382/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4421 - accuracy: 0.581
3
Epoch 383/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4418 - accuracy: 0.581
3
Epoch 384/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4413 - accuracy: 0.587
5
Epoch 385/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4419 - accuracy: 0.568
8
Epoch 386/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4431 - accuracy: 0.575
0
Epoch 387/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4420 - accuracy: 0.568
8
Epoch 388/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4411 - accuracy: 0.600
0
Epoch 389/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4434 - accuracy: 0.543
7
Epoch 390/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4409 - accuracy: 0.581
3
Epoch 391/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4410 - accuracy: 0.581
3
Epoch 392/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4413 - accuracy: 0.593
8
Epoch 393/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4430 - accuracy: 0.543
7
Epoch 394/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4406 - accuracy: 0.562
5
Epoch 395/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4416 - accuracy: 0.625
0
Epoch 396/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4437 - accuracy: 0.525
0
Epoch 397/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4408 - accuracy: 0.550
0
Epoch 398/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4418 - accuracy: 0.631
3
Epoch 399/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4398 - accuracy: 0.575
0
Epoch 400/400
80/80 [==============================] - 0s 1ms/step - loss: 0.4397 - accuracy: 0.556
```

```
2
5/5 [==============================] - 0s 2ms/step - loss: 0.4384 - accuracy: 0.5750
```

In [105…

```python
# Softplus with Adagrad:
model = Sequential()
model.add(Dense(2, input_dim = 2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(2, activation = 'softplus'))
model.add(Dense(1, activation='softplus'))
sgd = SGD(learning_rate = 0.1)
model.compile(loss = 'binary_crossentropy', optimizer = 'adagrad', metrics=['accuracy
model.fit(X, y, batch_size = 2, epochs = 400)
adagrad = model.evaluate(X, y)
```

```
Epoch 1/400
80/80 [==============================] - 0s 997us/step - loss: 0.8990 - accuracy: 0.5
000
Epoch 2/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8793 - accuracy: 0.500
0
Epoch 3/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8682 - accuracy: 0.500
0
Epoch 4/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8599 - accuracy: 0.500
0
Epoch 5/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8530 - accuracy: 0.500
0
Epoch 6/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8472 - accuracy: 0.500
0
Epoch 7/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8421 - accuracy: 0.500
0
Epoch 8/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8376 - accuracy: 0.500
0
Epoch 9/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8335 - accuracy: 0.500
0
Epoch 10/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8298 - accuracy: 0.500
0
Epoch 11/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8264 - accuracy: 0.500
0
Epoch 12/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8232 - accuracy: 0.500
0
Epoch 13/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8203 - accuracy: 0.500
0
Epoch 14/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8175 - accuracy: 0.500
0
Epoch 15/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8149 - accuracy: 0.500
0
Epoch 16/400
80/80 [==============================] - 0s 2ms/step - loss: 0.8124 - accuracy: 0.500
0
Epoch 17/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8101 - accuracy: 0.500
0
Epoch 18/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8079 - accuracy: 0.500
0
Epoch 19/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8058 - accuracy: 0.500
0
Epoch 20/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8038 - accuracy: 0.500
0
```

```
Epoch 21/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8019 - accuracy: 0.500
0
Epoch 22/400
80/80 [==============================] - 0s 1ms/step - loss: 0.8001 - accuracy: 0.500
0
Epoch 23/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7983 - accuracy: 0.500
0
Epoch 24/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7966 - accuracy: 0.500
0
Epoch 25/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7950 - accuracy: 0.500
0
Epoch 26/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7934 - accuracy: 0.500
0
Epoch 27/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7919 - accuracy: 0.500
0
Epoch 28/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7905 - accuracy: 0.500
0
Epoch 29/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7891 - accuracy: 0.500
0
Epoch 30/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7877 - accuracy: 0.500
0
Epoch 31/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7864 - accuracy: 0.500
0
Epoch 32/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7851 - accuracy: 0.500
0
Epoch 33/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7839 - accuracy: 0.500
0
Epoch 34/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7827 - accuracy: 0.500
0
Epoch 35/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7815 - accuracy: 0.500
0
Epoch 36/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7804 - accuracy: 0.500
0
Epoch 37/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7793 - accuracy: 0.500
0
Epoch 38/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7782 - accuracy: 0.500
0
Epoch 39/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7772 - accuracy: 0.500
0
Epoch 40/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7762 - accuracy: 0.500
0
```

```
Epoch 41/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7752 - accuracy: 0.500
0
Epoch 42/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7742 - accuracy: 0.500
0
Epoch 43/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7733 - accuracy: 0.500
0
Epoch 44/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7724 - accuracy: 0.500
0
Epoch 45/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7715 - accuracy: 0.500
0
Epoch 46/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7706 - accuracy: 0.500
0
Epoch 47/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7697 - accuracy: 0.500
0
Epoch 48/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7689 - accuracy: 0.500
0
Epoch 49/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7681 - accuracy: 0.500
0
Epoch 50/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7673 - accuracy: 0.500
0
Epoch 51/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7665 - accuracy: 0.500
0
Epoch 52/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7657 - accuracy: 0.500
0
Epoch 53/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7650 - accuracy: 0.500
0
Epoch 54/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7642 - accuracy: 0.500
0
Epoch 55/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7635 - accuracy: 0.500
0
Epoch 56/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7628 - accuracy: 0.500
0
Epoch 57/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7621 - accuracy: 0.500
0
Epoch 58/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7614 - accuracy: 0.500
0
Epoch 59/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7608 - accuracy: 0.500
0
Epoch 60/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7601 - accuracy: 0.500
0
```

```
Epoch 61/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7595 - accuracy: 0.500
0
Epoch 62/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7588 - accuracy: 0.500
0
Epoch 63/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7582 - accuracy: 0.500
0
Epoch 64/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7576 - accuracy: 0.500
0
Epoch 65/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7570 - accuracy: 0.500
0
Epoch 66/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7564 - accuracy: 0.500
0
Epoch 67/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7558 - accuracy: 0.500
0
Epoch 68/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7553 - accuracy: 0.500
0
Epoch 69/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7547 - accuracy: 0.500
0
Epoch 70/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7541 - accuracy: 0.500
0
Epoch 71/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7536 - accuracy: 0.500
0
Epoch 72/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7531 - accuracy: 0.500
0
Epoch 73/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7525 - accuracy: 0.500
0
Epoch 74/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7520 - accuracy: 0.500
0
Epoch 75/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7515 - accuracy: 0.500
0
Epoch 76/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7510 - accuracy: 0.500
0
Epoch 77/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7505 - accuracy: 0.500
0
Epoch 78/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7500 - accuracy: 0.500
0
Epoch 79/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7496 - accuracy: 0.500
0
Epoch 80/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7491 - accuracy: 0.500
0
```

```
Epoch 81/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7486 - accuracy: 0.500
0
Epoch 82/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7482 - accuracy: 0.500
0
Epoch 83/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7477 - accuracy: 0.500
0
Epoch 84/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7473 - accuracy: 0.500
0
Epoch 85/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7468 - accuracy: 0.500
0
Epoch 86/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7464 - accuracy: 0.500
0
Epoch 87/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7460 - accuracy: 0.500
0
Epoch 88/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7455 - accuracy: 0.500
0
Epoch 89/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7451 - accuracy: 0.500
0
Epoch 90/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7447 - accuracy: 0.500
0
Epoch 91/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7443 - accuracy: 0.500
0
Epoch 92/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7439 - accuracy: 0.500
0
Epoch 93/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7435 - accuracy: 0.500
0
Epoch 94/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7431 - accuracy: 0.500
0
Epoch 95/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7428 - accuracy: 0.500
0
Epoch 96/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7424 - accuracy: 0.500
0
Epoch 97/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7420 - accuracy: 0.500
0
Epoch 98/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7416 - accuracy: 0.500
0
Epoch 99/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7413 - accuracy: 0.500
0
Epoch 100/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7409 - accuracy: 0.500
0
```

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Epoch 101/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7405 - accuracy: 0.500
0
Epoch 102/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7402 - accuracy: 0.500
0
Epoch 103/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7399 - accuracy: 0.500
0
Epoch 104/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7395 - accuracy: 0.500
0
Epoch 105/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7392 - accuracy: 0.500
0
Epoch 106/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7388 - accuracy: 0.500
0
Epoch 107/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7385 - accuracy: 0.500
0
Epoch 108/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7382 - accuracy: 0.500
0
Epoch 109/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7379 - accuracy: 0.500
0
Epoch 110/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7375 - accuracy: 0.500
0
Epoch 111/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7372 - accuracy: 0.500
0
Epoch 112/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7369 - accuracy: 0.500
0
Epoch 113/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7366 - accuracy: 0.500
0
Epoch 114/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7363 - accuracy: 0.500
0
Epoch 115/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7360 - accuracy: 0.500
0
Epoch 116/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7357 - accuracy: 0.500
0
Epoch 117/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7354 - accuracy: 0.500
0
Epoch 118/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7351 - accuracy: 0.500
0
Epoch 119/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7348 - accuracy: 0.500
0
Epoch 120/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7345 - accuracy: 0.500
0
```

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Epoch 121/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7342 - accuracy: 0.500
0
Epoch 122/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7340 - accuracy: 0.500
0
Epoch 123/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7337 - accuracy: 0.500
0
Epoch 124/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7334 - accuracy: 0.500
0
Epoch 125/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7331 - accuracy: 0.500
0
Epoch 126/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7329 - accuracy: 0.500
0
Epoch 127/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7326 - accuracy: 0.500
0
Epoch 128/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7323 - accuracy: 0.500
0
Epoch 129/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7321 - accuracy: 0.500
0
Epoch 130/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7318 - accuracy: 0.500
0
Epoch 131/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7316 - accuracy: 0.500
0
Epoch 132/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7313 - accuracy: 0.500
0
Epoch 133/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7311 - accuracy: 0.500
0
Epoch 134/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7308 - accuracy: 0.500
0
Epoch 135/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7306 - accuracy: 0.500
0
Epoch 136/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7303 - accuracy: 0.500
0
Epoch 137/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7301 - accuracy: 0.500
0
Epoch 138/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7299 - accuracy: 0.500
0
Epoch 139/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7296 - accuracy: 0.500
0
Epoch 140/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7294 - accuracy: 0.500
0
```

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Epoch 141/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7292 - accuracy: 0.500
0
Epoch 142/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7289 - accuracy: 0.500
0
Epoch 143/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7287 - accuracy: 0.500
0
Epoch 144/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7285 - accuracy: 0.500
0
Epoch 145/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7283 - accuracy: 0.500
0
Epoch 146/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7280 - accuracy: 0.500
0
Epoch 147/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7278 - accuracy: 0.500
0
Epoch 148/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7276 - accuracy: 0.500
0
Epoch 149/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7274 - accuracy: 0.500
0
Epoch 150/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7272 - accuracy: 0.500
0
Epoch 151/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7270 - accuracy: 0.500
0
Epoch 152/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7268 - accuracy: 0.500
0
Epoch 153/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7266 - accuracy: 0.500
0
Epoch 154/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7264 - accuracy: 0.500
0
Epoch 155/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7262 - accuracy: 0.500
0
Epoch 156/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7260 - accuracy: 0.500
0
Epoch 157/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7258 - accuracy: 0.500
0
Epoch 158/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7256 - accuracy: 0.500
0
Epoch 159/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7254 - accuracy: 0.500
0
Epoch 160/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7252 - accuracy: 0.500
0
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Epoch 161/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7250 - accuracy: 0.500
0
Epoch 162/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7248 - accuracy: 0.500
0
Epoch 163/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7246 - accuracy: 0.500
0
Epoch 164/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7244 - accuracy: 0.500
0
Epoch 165/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7242 - accuracy: 0.500
0
Epoch 166/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7241 - accuracy: 0.500
0
Epoch 167/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7239 - accuracy: 0.500
0
Epoch 168/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7237 - accuracy: 0.500
0
Epoch 169/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7235 - accuracy: 0.500
0
Epoch 170/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7233 - accuracy: 0.500
0
Epoch 171/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7232 - accuracy: 0.500
0
Epoch 172/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7230 - accuracy: 0.500
0
Epoch 173/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7228 - accuracy: 0.500
0
Epoch 174/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7226 - accuracy: 0.500
0
Epoch 175/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7225 - accuracy: 0.500
0
Epoch 176/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7223 - accuracy: 0.500
0
Epoch 177/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7221 - accuracy: 0.500
0
Epoch 178/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7220 - accuracy: 0.500
0
Epoch 179/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7218 - accuracy: 0.500
0
Epoch 180/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7216 - accuracy: 0.500
0
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Epoch 181/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7215 - accuracy: 0.500
0
Epoch 182/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7213 - accuracy: 0.500
0
Epoch 183/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7212 - accuracy: 0.500
0
Epoch 184/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7210 - accuracy: 0.500
0
Epoch 185/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7208 - accuracy: 0.500
0
Epoch 186/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7207 - accuracy: 0.500
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Epoch 187/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7205 - accuracy: 0.500
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Epoch 188/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7204 - accuracy: 0.500
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Epoch 189/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7202 - accuracy: 0.500
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Epoch 190/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7201 - accuracy: 0.500
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Epoch 191/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7199 - accuracy: 0.500
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Epoch 192/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7198 - accuracy: 0.500
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Epoch 193/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7196 - accuracy: 0.500
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Epoch 194/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7195 - accuracy: 0.500
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Epoch 195/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7193 - accuracy: 0.500
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Epoch 196/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7192 - accuracy: 0.500
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Epoch 197/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7191 - accuracy: 0.500
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Epoch 198/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7189 - accuracy: 0.500
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Epoch 199/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7188 - accuracy: 0.500
0
Epoch 200/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7186 - accuracy: 0.500
0
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Epoch 201/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7185 - accuracy: 0.500
0
Epoch 202/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7184 - accuracy: 0.500
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Epoch 203/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7182 - accuracy: 0.500
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Epoch 204/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7181 - accuracy: 0.500
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Epoch 205/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7179 - accuracy: 0.500
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Epoch 206/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7178 - accuracy: 0.500
0
Epoch 207/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7177 - accuracy: 0.500
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Epoch 208/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7175 - accuracy: 0.500
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Epoch 209/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7174 - accuracy: 0.500
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Epoch 210/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7173 - accuracy: 0.500
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Epoch 211/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7172 - accuracy: 0.500
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Epoch 212/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7170 - accuracy: 0.500
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Epoch 213/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7169 - accuracy: 0.500
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Epoch 214/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7168 - accuracy: 0.500
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Epoch 215/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7166 - accuracy: 0.500
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Epoch 216/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7165 - accuracy: 0.500
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Epoch 217/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7164 - accuracy: 0.500
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Epoch 218/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7163 - accuracy: 0.500
0
Epoch 219/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7162 - accuracy: 0.500
0
Epoch 220/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7160 - accuracy: 0.500
0
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Epoch 221/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7159 - accuracy: 0.500
0
Epoch 222/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7158 - accuracy: 0.500
0
Epoch 223/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7157 - accuracy: 0.500
0
Epoch 224/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7156 - accuracy: 0.500
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Epoch 225/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7154 - accuracy: 0.500
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Epoch 226/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7153 - accuracy: 0.500
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Epoch 227/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7152 - accuracy: 0.500
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Epoch 228/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7151 - accuracy: 0.500
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Epoch 229/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7150 - accuracy: 0.500
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Epoch 230/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7149 - accuracy: 0.500
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Epoch 231/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7148 - accuracy: 0.500
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Epoch 232/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7146 - accuracy: 0.500
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Epoch 233/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7145 - accuracy: 0.500
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Epoch 234/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7144 - accuracy: 0.500
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Epoch 235/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7143 - accuracy: 0.500
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Epoch 236/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7142 - accuracy: 0.500
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Epoch 237/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7141 - accuracy: 0.500
0
Epoch 238/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7140 - accuracy: 0.500
0
Epoch 239/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7139 - accuracy: 0.500
0
Epoch 240/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7138 - accuracy: 0.500
0
```

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Epoch 241/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7137 - accuracy: 0.500
0
Epoch 242/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7136 - accuracy: 0.500
0
Epoch 243/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7135 - accuracy: 0.500
0
Epoch 244/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7134 - accuracy: 0.500
0
Epoch 245/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7133 - accuracy: 0.500
0
Epoch 246/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7132 - accuracy: 0.500
0
Epoch 247/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7131 - accuracy: 0.500
0
Epoch 248/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7130 - accuracy: 0.500
0
Epoch 249/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7129 - accuracy: 0.500
0
Epoch 250/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7128 - accuracy: 0.500
0
Epoch 251/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7127 - accuracy: 0.500
0
Epoch 252/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7126 - accuracy: 0.500
0
Epoch 253/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7125 - accuracy: 0.500
0
Epoch 254/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7124 - accuracy: 0.500
0
Epoch 255/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7123 - accuracy: 0.500
0
Epoch 256/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7122 - accuracy: 0.500
0
Epoch 257/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7121 - accuracy: 0.500
0
Epoch 258/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7120 - accuracy: 0.500
0
Epoch 259/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7119 - accuracy: 0.500
0
Epoch 260/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7118 - accuracy: 0.500
0
```

```
Epoch 261/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7117 - accuracy: 0.500
0
Epoch 262/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7116 - accuracy: 0.500
0
Epoch 263/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7115 - accuracy: 0.500
0
Epoch 264/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7114 - accuracy: 0.500
0
Epoch 265/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7114 - accuracy: 0.500
0
Epoch 266/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7113 - accuracy: 0.500
0
Epoch 267/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7112 - accuracy: 0.500
0
Epoch 268/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7111 - accuracy: 0.500
0
Epoch 269/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7110 - accuracy: 0.500
0
Epoch 270/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7109 - accuracy: 0.500
0
Epoch 271/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7108 - accuracy: 0.500
0
Epoch 272/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7107 - accuracy: 0.500
0
Epoch 273/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7107 - accuracy: 0.500
0
Epoch 274/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7106 - accuracy: 0.500
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Epoch 275/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7105 - accuracy: 0.500
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Epoch 276/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7104 - accuracy: 0.500
0
Epoch 277/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7103 - accuracy: 0.500
0
Epoch 278/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7102 - accuracy: 0.500
0
Epoch 279/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7102 - accuracy: 0.500
0
Epoch 280/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7101 - accuracy: 0.500
0
```

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Epoch 281/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7100 - accuracy: 0.500
0
Epoch 282/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7099 - accuracy: 0.500
0
Epoch 283/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7098 - accuracy: 0.500
0
Epoch 284/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7098 - accuracy: 0.500
0
Epoch 285/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7097 - accuracy: 0.500
0
Epoch 286/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7096 - accuracy: 0.500
0
Epoch 287/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7095 - accuracy: 0.500
0
Epoch 288/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7094 - accuracy: 0.500
0
Epoch 289/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7094 - accuracy: 0.500
0
Epoch 290/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7093 - accuracy: 0.500
0
Epoch 291/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7092 - accuracy: 0.500
0
Epoch 292/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7091 - accuracy: 0.500
0
Epoch 293/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7091 - accuracy: 0.500
0
Epoch 294/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7090 - accuracy: 0.500
0
Epoch 295/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7089 - accuracy: 0.500
0
Epoch 296/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7088 - accuracy: 0.500
0
Epoch 297/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7088 - accuracy: 0.500
0
Epoch 298/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7087 - accuracy: 0.500
0
Epoch 299/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7086 - accuracy: 0.500
0
Epoch 300/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7085 - accuracy: 0.500
0
```

```
Epoch 301/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7085 - accuracy: 0.500
0
Epoch 302/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7084 - accuracy: 0.500
0
Epoch 303/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7083 - accuracy: 0.500
0
Epoch 304/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7082 - accuracy: 0.500
0
Epoch 305/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7082 - accuracy: 0.500
0
Epoch 306/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7081 - accuracy: 0.500
0
Epoch 307/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7080 - accuracy: 0.500
0
Epoch 308/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7080 - accuracy: 0.500
0
Epoch 309/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7079 - accuracy: 0.500
0
Epoch 310/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7078 - accuracy: 0.500
0
Epoch 311/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7078 - accuracy: 0.500
0
Epoch 312/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7077 - accuracy: 0.500
0
Epoch 313/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7076 - accuracy: 0.500
0
Epoch 314/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7076 - accuracy: 0.500
0
Epoch 315/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7075 - accuracy: 0.500
0
Epoch 316/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7074 - accuracy: 0.500
0
Epoch 317/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7074 - accuracy: 0.500
0
Epoch 318/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7073 - accuracy: 0.500
0
Epoch 319/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7072 - accuracy: 0.500
0
Epoch 320/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7072 - accuracy: 0.500
0
```

```
Epoch 321/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7071 - accuracy: 0.500
0
Epoch 322/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7070 - accuracy: 0.500
0
Epoch 323/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7070 - accuracy: 0.500
0
Epoch 324/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7069 - accuracy: 0.500
0
Epoch 325/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7068 - accuracy: 0.500
0
Epoch 326/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7068 - accuracy: 0.500
0
Epoch 327/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7067 - accuracy: 0.500
0
Epoch 328/400
80/80 [==============================] - 0s 2ms/step - loss: 0.7067 - accuracy: 0.500
0
Epoch 329/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7066 - accuracy: 0.500
0
Epoch 330/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7065 - accuracy: 0.500
0
Epoch 331/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7065 - accuracy: 0.500
0
Epoch 332/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7064 - accuracy: 0.500
0
Epoch 333/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7064 - accuracy: 0.500
0
Epoch 334/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7063 - accuracy: 0.500
0
Epoch 335/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7062 - accuracy: 0.500
0
Epoch 336/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7062 - accuracy: 0.500
0
Epoch 337/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7061 - accuracy: 0.500
0
Epoch 338/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7061 - accuracy: 0.500
0
Epoch 339/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7060 - accuracy: 0.500
0
Epoch 340/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7059 - accuracy: 0.500
0
```

```
Epoch 341/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7059 - accuracy: 0.500
0
Epoch 342/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7058 - accuracy: 0.500
0
Epoch 343/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7058 - accuracy: 0.500
0
Epoch 344/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7057 - accuracy: 0.500
0
Epoch 345/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7056 - accuracy: 0.500
0
Epoch 346/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7056 - accuracy: 0.500
0
Epoch 347/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7055 - accuracy: 0.500
0
Epoch 348/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7055 - accuracy: 0.500
0
Epoch 349/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7054 - accuracy: 0.500
0
Epoch 350/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7054 - accuracy: 0.500
0
Epoch 351/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7053 - accuracy: 0.500
0
Epoch 352/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7053 - accuracy: 0.500
0
Epoch 353/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7052 - accuracy: 0.500
0
Epoch 354/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7052 - accuracy: 0.500
0
Epoch 355/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7051 - accuracy: 0.500
0
Epoch 356/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7050 - accuracy: 0.500
0
Epoch 357/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7050 - accuracy: 0.500
0
Epoch 358/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7049 - accuracy: 0.500
0
Epoch 359/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7049 - accuracy: 0.500
0
Epoch 360/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7048 - accuracy: 0.500
0
```

```
Epoch 361/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7048 - accuracy: 0.500
0
Epoch 362/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7047 - accuracy: 0.500
0
Epoch 363/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7047 - accuracy: 0.500
0
Epoch 364/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7046 - accuracy: 0.500
0
Epoch 365/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7046 - accuracy: 0.500
0
Epoch 366/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7045 - accuracy: 0.500
0
Epoch 367/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7045 - accuracy: 0.500
0
Epoch 368/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7044 - accuracy: 0.500
0
Epoch 369/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7044 - accuracy: 0.500
0
Epoch 370/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7043 - accuracy: 0.500
0
Epoch 371/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7043 - accuracy: 0.500
0
Epoch 372/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7042 - accuracy: 0.500
0
Epoch 373/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7042 - accuracy: 0.500
0
Epoch 374/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7041 - accuracy: 0.500
0
Epoch 375/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7041 - accuracy: 0.500
0
Epoch 376/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7040 - accuracy: 0.500
0
Epoch 377/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7040 - accuracy: 0.500
0
Epoch 378/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7039 - accuracy: 0.500
0
Epoch 379/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7039 - accuracy: 0.500
0
Epoch 380/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7038 - accuracy: 0.500
0
```

```
Epoch 381/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7038 - accuracy: 0.500
0
Epoch 382/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7037 - accuracy: 0.500
0
Epoch 383/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7037 - accuracy: 0.500
0
Epoch 384/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7036 - accuracy: 0.500
0
Epoch 385/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7036 - accuracy: 0.500
0
Epoch 386/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7036 - accuracy: 0.500
0
Epoch 387/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7035 - accuracy: 0.500
0
Epoch 388/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7035 - accuracy: 0.500
0
Epoch 389/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7034 - accuracy: 0.500
0
Epoch 390/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7034 - accuracy: 0.500
0
Epoch 391/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7033 - accuracy: 0.500
0
Epoch 392/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7033 - accuracy: 0.500
0
Epoch 393/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7032 - accuracy: 0.500
0
Epoch 394/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7032 - accuracy: 0.500
0
Epoch 395/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7031 - accuracy: 0.500
0
Epoch 396/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7031 - accuracy: 0.500
0
Epoch 397/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7031 - accuracy: 0.500
0
Epoch 398/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7030 - accuracy: 0.500
0
Epoch 399/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7030 - accuracy: 0.500
0
Epoch 400/400
80/80 [==============================] - 0s 1ms/step - loss: 0.7029 - accuracy: 0.500
```

```
0
5/5 [==============================] - 0s 1ms/step - loss: 0.7029 - accuracy: 0.5000
```

In [113…

```python
print(sgd, RMSprop, adam, adagrad)
```

```
<keras.optimizer_v2.gradient_descent.SGD object at 0x00000180F9824BB0> [7.62461948394
7754, 0.5] [0.4383772909641266, 0.574999988079071] [0.7029020190238953, 0.5]
```

It is interesting, sometimes softplus "breaks" between 325-375 epochs and the loss score jumps from ~.50 to 7+. However, if I reduce the epochs to around 300, softplus is consistently the best. Seems there is a lot to play with here.

Using Diabetes data

http://archive.ics.uci.edu/ml/machine-learning-databases/pima-indians-diabetes/pima-indians-diabetes.data

1. Number of times pregnant
2. Plasma glucose concentration a 2 hours in an oral glucose tolerance test
3. Diastolic blood pressure (mm Hg)
4. Triceps skin fold thickness (mm)
5. 2-Hour serum insulin (mu U/ml)
6. Body mass index (weight in kg/(height in m)^2)
7. Diabetes pedigree function
8. Age (years)
9. Class variable (0 or 1)

In [178…

```python
dataset = np.loadtxt("../data/pima-indians-diabetes.data", delimiter=",")
dataset
```

Out[178]:
```
array([[  6.   , 148.   ,  72.   , ...,   0.627,  50.   ,   1.   ],
       [  1.   ,  85.   ,  66.   , ...,   0.351,  31.   ,   0.   ],
       [  8.   , 183.   ,  64.   , ...,   0.672,  32.   ,   1.   ],
       ...,
       [  5.   , 121.   ,  72.   , ...,   0.245,  30.   ,   0.   ],
       [  1.   , 126.   ,  60.   , ...,   0.349,  47.   ,   1.   ],
       [  1.   ,  93.   ,  70.   , ...,   0.315,  23.   ,   0.   ]])
```

In [181…

```python
df = pd.DataFrame(dataset)
df
```

Out[181]:

	0	1	2	3	4	5	6	7	8
0	6.0	148.0	72.0	35.0	0.0	33.6	0.627	50.0	1.0
1	1.0	85.0	66.0	29.0	0.0	26.6	0.351	31.0	0.0
2	8.0	183.0	64.0	0.0	0.0	23.3	0.672	32.0	1.0
3	1.0	89.0	66.0	23.0	94.0	28.1	0.167	21.0	0.0
4	0.0	137.0	40.0	35.0	168.0	43.1	2.288	33.0	1.0
...	...	...	...	...	...	...	...	...	...
763	10.0	101.0	76.0	48.0	180.0	32.9	0.171	63.0	0.0
764	2.0	122.0	70.0	27.0	0.0	36.8	0.340	27.0	0.0
765	5.0	121.0	72.0	23.0	112.0	26.2	0.245	30.0	0.0
766	1.0	126.0	60.0	0.0	0.0	30.1	0.349	47.0	1.0
767	1.0	93.0	70.0	31.0	0.0	30.4	0.315	23.0	0.0

768 rows × 9 columns

In [151...

```python
X = dataset[:,0:8]
print(X.shape)
X
```

Out[151]:

```
(768, 8)
array([[  6.   , 148.   ,  72.   , ...,  33.6  ,   0.627,  50.   ],
       [  1.   ,  85.   ,  66.   , ...,  26.6  ,   0.351,  31.   ],
       [  8.   , 183.   ,  64.   , ...,  23.3  ,   0.672,  32.   ],
       ...,
       [  5.   , 121.   ,  72.   , ...,  26.2  ,   0.245,  30.   ],
       [  1.   , 126.   ,  60.   , ...,  30.1  ,   0.349,  47.   ],
       [  1.   ,  93.   ,  70.   , ...,  30.4  ,   0.315,  23.   ]])
```

In [152...

```python
Y = dataset[:,8]
print(Y.shape)
Y
```

```
(768,)
```

```
Out[152]:  array([1., 0., 1., 0., 1., 0., 1., 0., 1., 1., 0., 1., 0., 1., 1., 1., 1.,
                  1., 0., 1., 0., 0., 1., 1., 1., 1., 1., 0., 0., 0., 0., 1., 0., 0.,
                  0., 0., 0., 1., 1., 1., 0., 0., 0., 1., 0., 1., 0., 0., 1., 0., 0.,
                  0., 0., 1., 0., 0., 1., 0., 0., 0., 0., 1., 0., 0., 1., 0., 1., 0.,
                  0., 0., 1., 0., 1., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 1.,
                  0., 0., 0., 1., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 1., 1., 0.,
                  0., 0., 0., 0., 0., 0., 0., 1., 1., 1., 0., 0., 1., 1., 1., 0., 0.,
                  0., 1., 0., 0., 0., 1., 1., 0., 0., 1., 1., 1., 1., 1., 0., 0., 0.,
                  0., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 0., 0., 0., 1.,
                  0., 1., 1., 0., 0., 0., 1., 0., 0., 0., 0., 1., 1., 0., 0., 0., 0.,
                  1., 1., 0., 0., 0., 1., 0., 1., 0., 1., 0., 0., 0., 0., 0., 1., 1.,
                  1., 1., 1., 0., 0., 1., 1., 0., 1., 0., 1., 1., 1., 0., 0., 0., 0.,
                  0., 0., 1., 1., 0., 1., 0., 0., 0., 1., 1., 1., 1., 0., 1., 1., 1.,
                  1., 0., 0., 0., 0., 0., 1., 0., 0., 1., 1., 0., 0., 0., 1., 1., 1.,
                  1., 0., 0., 0., 1., 1., 0., 1., 0., 0., 0., 0., 0., 0., 0., 0., 1.,
                  1., 0., 0., 0., 1., 0., 1., 0., 0., 1., 0., 1., 0., 0., 1., 1., 0.,
                  0., 0., 0., 0., 1., 0., 0., 0., 1., 0., 0., 1., 1., 0., 0., 1., 0.,
                  0., 0., 1., 1., 1., 0., 0., 1., 0., 1., 0., 1., 1., 0., 1., 0., 0.,
                  1., 0., 1., 1., 0., 0., 1., 0., 1., 0., 0., 1., 0., 1., 0., 1., 1.,
                  1., 0., 0., 1., 0., 1., 0., 0., 0., 1., 0., 0., 0., 0., 1., 1., 1.,
                  0., 0., 0., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 1., 1.,
                  1., 0., 1., 1., 0., 0., 1., 0., 0., 1., 0., 0., 1., 1., 0., 0., 0.,
                  0., 1., 0., 0., 1., 0., 0., 0., 0., 0., 0., 0., 1., 1., 1., 0., 0.,
                  1., 0., 0., 1., 0., 0., 1., 0., 1., 1., 0., 1., 0., 1., 0., 1., 0.,
                  1., 1., 0., 0., 0., 0., 1., 1., 0., 1., 0., 1., 0., 0., 0., 0., 1.,
                  1., 0., 1., 0., 1., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 1., 0.,
                  0., 1., 1., 1., 0., 0., 1., 0., 0., 1., 0., 0., 0., 1., 0., 0., 1.,
                  0., 0., 0., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 0., 0.,
                  1., 0., 0., 0., 1., 0., 0., 0., 1., 1., 0., 0., 0., 0., 0., 0., 0.,
                  1., 0., 0., 0., 0., 1., 0., 0., 0., 1., 0., 0., 0., 1., 0., 0., 0.,
                  1., 0., 0., 0., 0., 1., 1., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0.,
                  0., 0., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 1., 1., 1., 1., 0.,
                  0., 1., 1., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 0., 1.,
                  1., 0., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 0., 0., 0., 0., 1.,
                  0., 1., 1., 0., 0., 0., 1., 0., 1., 0., 1., 0., 1., 0., 1., 0., 0.,
                  1., 0., 0., 1., 0., 0., 0., 0., 1., 1., 0., 1., 0., 0., 0., 0., 1.,
                  1., 0., 1., 0., 0., 0., 1., 1., 0., 0., 0., 0., 0., 0., 0., 0., 0.,
                  0., 1., 0., 0., 0., 0., 1., 0., 0., 1., 0., 0., 0., 1., 0., 0., 0.,
                  1., 1., 1., 0., 0., 0., 0., 0., 0., 1., 0., 0., 0., 1., 0., 1., 1.,
                  1., 1., 0., 1., 1., 0., 0., 0., 0., 0., 0., 0., 1., 1., 0., 1., 0.,
                  0., 1., 0., 1., 0., 0., 0., 0., 0., 1., 0., 1., 0., 1., 0., 1., 1.,
                  0., 0., 0., 0., 1., 1., 0., 0., 0., 1., 0., 1., 1., 0., 0., 1., 0.,
                  0., 1., 1., 0., 0., 1., 0., 0., 1., 0., 0., 0., 0., 0., 0., 0., 1.,
                  1., 1., 0., 0., 0., 0., 0., 0., 1., 1., 0., 0., 1., 0., 0., 1., 0.,
                  1., 1., 1., 0., 0., 1., 1., 1., 0., 1., 0., 1., 0., 1., 0., 0., 0.,
                  0., 1., 0.])
```

```
In [346…   # create model
           model = Sequential()
           model.add(Dense(16, input_dim=8, activation='tanh'))
           model.add(Dense(16, activation='tanh'))
           model.add(Dense(1, activation='sigmoid'))
           # Compile model
           model.compile(loss='binary_crossentropy', optimizer='adam', metrics=['accuracy'])
           # Fit the model
           model.fit(X, Y, epochs=1000, batch_size=10)
           # evaluate the model
           scores = model.evaluate(X, Y)
           print("\n%s: %.2f%%" % (model.metrics_names[1], scores[1]*100))
```

```
Epoch 1/1000
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Input In [346], in <module>
      7 model.compile(loss='binary_crossentropy', optimizer='adam', metrics=['accurac
y'])
      8 # Fit the model
----> 9 model.fit(X, Y, epochs=1000, batch_size=10)
     10 # evaluate the model
     11 scores = model.evaluate(X, Y)

File c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\keras\utils\traceba
ck_utils.py:67, in filter_traceback.<locals>.error_handler(*args, **kwargs)
     65 except Exception as e:  # pylint: disable=broad-except
     66    filtered_tb = _process_traceback_frames(e.__traceback__)
---> 67    raise e.with_traceback(filtered_tb) from None
     68 finally:
     69    del filtered_tb

File c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\tensorflow\python\f
ramework\func_graph.py:1147, in func_graph_from_py_func.<locals>.autograph_handler(*a
rgs, **kwargs)
   1145 except Exception as e:  # pylint:disable=broad-except
   1146    if hasattr(e, "ag_error_metadata"):
-> 1147        raise e.ag_error_metadata.to_exception(e)
   1148    else:
   1149        raise

ValueError: in user code:

    File "c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\keras\engine\t
raining.py", line 1021, in train_function  *
        return step_function(self, iterator)
    File "c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\keras\engine\t
raining.py", line 1010, in step_function  **
        outputs = model.distribute_strategy.run(run_step, args=(data,))
    File "c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\keras\engine\t
raining.py", line 1000, in run_step  **
        outputs = model.train_step(data)
    File "c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\keras\engine\t
raining.py", line 859, in train_step
        y_pred = self(x, training=True)
    File "c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\keras\utils\tr
aceback_utils.py", line 67, in error_handler
        raise e.with_traceback(filtered_tb) from None
    File "c:\users\cneub\desktop\mlnn-masamitsu\venv\lib\site-packages\keras\engine\i
nput_spec.py", line 264, in assert_input_compatibility
        raise ValueError(f'Input {input_index} of layer "{layer_name}" is '

    ValueError: Input 0 of layer "sequential_150" is incompatible with the layer: exp
ected shape=(None, 8), found shape=(None, 12)
```

Part 2: BYOD - Wine Dataset

```
In [308...   import pandas as pd
            wine = pd.read_csv('../data/WineQT.csv', names=['fixedacid', 'volatileacid','citricac
```

```
wine = wine.iloc[1: , :]
wine
```

Out[308]:

	fixedacid	volatileacid	citricacid	residualsugar	chlorides	freesulfurdio	totalsulfurdio	density
1	7.4	0.7	0	1.9	0.076	11	34	0.9978
2	7.8	0.88	0	2.6	0.098	25	67	0.9968
3	7.8	0.76	0.04	2.3	0.092	15	54	0.997
4	11.2	0.28	0.56	1.9	0.075	17	60	0.998
5	7.4	0.7	0	1.9	0.076	11	34	0.9978
...	...	...	...	...	...	...	...	..
1138	5.4	0.74	0.09	1.7	0.089	16	26	0.99402
1139	6.3	0.51	0.13	2.3	0.076	29	40	0.99574
1140	6.8	0.62	0.08	1.9	0.068	28	38	0.99651
1141	6.2	0.6	0.08	2	0.09	32	44	0.9949
1142	5.9	0.55	0.1	2.2	0.062	39	51	0.99512

1142 rows × 12 columns

In [309...

```
wine["fixedacid"] = pd.to_numeric(wine.fixedacid, errors='coerce')
wine["volatileacid"] = pd.to_numeric(wine.volatileacid, errors='coerce')
wine["citricacid"] = pd.to_numeric(wine.citricacid, errors='coerce')
wine["residualsugar"] = pd.to_numeric(wine.residualsugar, errors='coerce')
wine["chlorides"] = pd.to_numeric(wine.chlorides, errors='coerce')
wine["freesulfurdio"] = pd.to_numeric(wine.freesulfurdio, errors='coerce')
wine["totalsulfurdio"] = pd.to_numeric(wine.totalsulfurdio, errors='coerce')
wine["density"] = pd.to_numeric(wine.density, errors='coerce')
wine["pH"] = pd.to_numeric(wine.pH, errors='coerce')
wine["sulphates"] = pd.to_numeric(wine.sulphates, errors='coerce')
wine["alcohol"] = pd.to_numeric(wine.alcohol, errors='coerce')
wine["quality"] = pd.to_numeric(wine.quality, errors='coerce')
```

In [310...

```
wine.head()
print(wine.dtypes)
```

```
fixedacid         float64
volatileacid      float64
citricacid        float64
residualsugar     float64
chlorides         float64
freesulfurdio     float64
totalsulfurdio    float64
density           float64
pH                float64
sulphates         float64
alcohol           float64
quality             int64
dtype: object
```

In [311…

```python
wine_array = wine.to_numpy()
wine_array
```

Out[311]:
```
array([[ 7.4 ,  0.7 ,  0.  , ...,  0.56,  9.4 ,  5.  ],
       [ 7.8 ,  0.88,  0.  , ...,  0.68,  9.8 ,  5.  ],
       [ 7.8 ,  0.76,  0.04, ...,  0.65,  9.8 ,  5.  ],
       ...,
       [ 6.8 ,  0.62,  0.08, ...,  0.82,  9.5 ,  6.  ],
       [ 6.2 ,  0.6 ,  0.08, ...,  0.58, 10.5 ,  5.  ],
       [ 5.9 ,  0.55,  0.1 , ...,  0.76, 11.2 ,  6.  ]])
```

In [342…

```python
X = wine_array[:,0:12]
print(X.shape)
X
```

Out[342]:
```
(1142, 12)
array([[ 7.4 ,  0.7 ,  0.  , ...,  0.56,  9.4 ,  5.  ],
       [ 7.8 ,  0.88,  0.  , ...,  0.68,  9.8 ,  5.  ],
       [ 7.8 ,  0.76,  0.04, ...,  0.65,  9.8 ,  5.  ],
       ...,
       [ 6.8 ,  0.62,  0.08, ...,  0.82,  9.5 ,  6.  ],
       [ 6.2 ,  0.6 ,  0.08, ...,  0.58, 10.5 ,  5.  ],
       [ 5.9 ,  0.55,  0.1 , ...,  0.76, 11.2 ,  6.  ]])
```

In [350…

```python
quality = pd.get_dummies(wine["quality"])
```

Out[350]:

	3	4	5	6	7	8
1	0	0	1	0	0	0
2	0	0	1	0	0	0
3	0	0	1	0	0	0
4	0	0	0	1	0	0
5	0	0	1	0	0	0
...	...	...	...	...	...	...
1138	0	0	0	1	0	0
1139	0	0	0	1	0	0
1140	0	0	0	1	0	0
1141	0	0	1	0	0	0
1142	0	0	0	1	0	0

1142 rows × 6 columns

In [351…

```python
Y = pd.get_dummies(wine["quality"])
print(Y.shape)
Y
```

```
(1142, 6)
```

Out[351]:

	3	4	5	6	7	8
1	0	0	1	0	0	0
2	0	0	1	0	0	0
3	0	0	1	0	0	0
4	0	0	0	1	0	0
5	0	0	1	0	0	0
...	...	...	...	...	...	...
1138	0	0	0	1	0	0
1139	0	0	0	1	0	0
1140	0	0	0	1	0	0
1141	0	0	1	0	0	0
1142	0	0	0	1	0	0

1142 rows × 6 columns

In [369…

```python
# Create model
model = Sequential()
model.add(Dense(20, input_dim = 12, activation='tanh'))
model.add(Dense(20, input_dim = 12, activation='tanh'))
model.add(Dense(20, input_dim = 12, activation='tanh'))
model.add(Dense(6, activation='sigmoid'))

# Compile model
sgd = SGD(learning_rate = 0.1)
model.compile(loss='CategoricalCrossentropy', optimizer='sgd', metrics=['accuracy'])

# Fit the model
model.fit(X, Y, epochs = 500, batch_size = 10)

# Evaluate the model
scores = model.evaluate(X, Y)
print("\n%s: %.2f%%" % (model.metrics_names[1], scores[1]*100))
```

```
Epoch 1/500
115/115 [==============================] - 0s 692us/step - loss: 1.3317 - accuracy:
0.4273
Epoch 2/500
115/115 [==============================] - 0s 646us/step - loss: 1.1679 - accuracy:
0.4807
Epoch 3/500
115/115 [==============================] - 0s 647us/step - loss: 1.1498 - accuracy:
0.4939
Epoch 4/500
115/115 [==============================] - 0s 647us/step - loss: 1.1430 - accuracy:
0.4982
Epoch 5/500
115/115 [==============================] - 0s 656us/step - loss: 1.1378 - accuracy:
0.4877
Epoch 6/500
115/115 [==============================] - 0s 663us/step - loss: 1.1308 - accuracy:
0.4947
Epoch 7/500
115/115 [==============================] - 0s 656us/step - loss: 1.1296 - accuracy:
0.4921
Epoch 8/500
115/115 [==============================] - 0s 639us/step - loss: 1.1346 - accuracy:
0.4869
Epoch 9/500
115/115 [==============================] - 0s 647us/step - loss: 1.1309 - accuracy:
0.4904
Epoch 10/500
115/115 [==============================] - 0s 665us/step - loss: 1.1248 - accuracy:
0.4991
Epoch 11/500
115/115 [==============================] - 0s 647us/step - loss: 1.1238 - accuracy:
0.4939
Epoch 12/500
115/115 [==============================] - 0s 647us/step - loss: 1.1193 - accuracy:
0.5000
Epoch 13/500
115/115 [==============================] - 0s 665us/step - loss: 1.1161 - accuracy:
0.5105
Epoch 14/500
115/115 [==============================] - 0s 656us/step - loss: 1.1209 - accuracy:
0.5026
Epoch 15/500
115/115 [==============================] - 0s 683us/step - loss: 1.1164 - accuracy:
0.5123
Epoch 16/500
115/115 [==============================] - 0s 661us/step - loss: 1.1197 - accuracy:
0.5140
Epoch 17/500
115/115 [==============================] - 0s 657us/step - loss: 1.1182 - accuracy:
0.5219
Epoch 18/500
115/115 [==============================] - 0s 639us/step - loss: 1.1134 - accuracy:
0.5061
Epoch 19/500
115/115 [==============================] - 0s 656us/step - loss: 1.1098 - accuracy:
0.5061
Epoch 20/500
115/115 [==============================] - 0s 656us/step - loss: 1.0990 - accuracy:
0.5088
```

```
Epoch 21/500
115/115 [==============================] - 0s 674us/step - loss: 1.0886 - accuracy:
0.5315
Epoch 22/500
115/115 [==============================] - 0s 674us/step - loss: 1.0950 - accuracy:
0.5149
Epoch 23/500
115/115 [==============================] - 0s 674us/step - loss: 1.0965 - accuracy:
0.5315
Epoch 24/500
115/115 [==============================] - 0s 674us/step - loss: 1.0784 - accuracy:
0.5377
Epoch 25/500
115/115 [==============================] - 0s 665us/step - loss: 1.0711 - accuracy:
0.5219
Epoch 26/500
115/115 [==============================] - 0s 656us/step - loss: 1.0727 - accuracy:
0.5359
Epoch 27/500
115/115 [==============================] - 0s 656us/step - loss: 1.0724 - accuracy:
0.5473
Epoch 28/500
115/115 [==============================] - 0s 665us/step - loss: 1.0537 - accuracy:
0.5587
Epoch 29/500
115/115 [==============================] - 0s 656us/step - loss: 1.0802 - accuracy:
0.5403
Epoch 30/500
115/115 [==============================] - 0s 665us/step - loss: 1.0639 - accuracy:
0.5420
Epoch 31/500
115/115 [==============================] - 0s 656us/step - loss: 1.0528 - accuracy:
0.5508
Epoch 32/500
115/115 [==============================] - 0s 665us/step - loss: 1.0174 - accuracy:
0.5736
Epoch 33/500
115/115 [==============================] - 0s 656us/step - loss: 1.0364 - accuracy:
0.5560
Epoch 34/500
115/115 [==============================] - 0s 674us/step - loss: 1.0271 - accuracy:
0.5464
Epoch 35/500
115/115 [==============================] - 0s 674us/step - loss: 1.0368 - accuracy:
0.5517
Epoch 36/500
115/115 [==============================] - 0s 656us/step - loss: 1.0063 - accuracy:
0.5622
Epoch 37/500
115/115 [==============================] - 0s 665us/step - loss: 1.0131 - accuracy:
0.5665
Epoch 38/500
115/115 [==============================] - 0s 682us/step - loss: 0.9790 - accuracy:
0.5709
Epoch 39/500
115/115 [==============================] - 0s 654us/step - loss: 1.0042 - accuracy:
0.5657
Epoch 40/500
115/115 [==============================] - 0s 665us/step - loss: 1.0072 - accuracy:
0.5578
```

```
Epoch 41/500
115/115 [==============================] - 0s 665us/step - loss: 1.0346 - accuracy:
0.5333
Epoch 42/500
115/115 [==============================] - 0s 656us/step - loss: 0.9961 - accuracy:
0.5876
Epoch 43/500
115/115 [==============================] - 0s 665us/step - loss: 0.9777 - accuracy:
0.5902
Epoch 44/500
115/115 [==============================] - 0s 674us/step - loss: 0.9768 - accuracy:
0.6068
Epoch 45/500
115/115 [==============================] - 0s 652us/step - loss: 0.9770 - accuracy:
0.5832
Epoch 46/500
115/115 [==============================] - 0s 665us/step - loss: 0.9432 - accuracy:
0.6077
Epoch 47/500
115/115 [==============================] - 0s 665us/step - loss: 1.0070 - accuracy:
0.5665
Epoch 48/500
115/115 [==============================] - 0s 647us/step - loss: 0.9568 - accuracy:
0.5779
Epoch 49/500
115/115 [==============================] - 0s 647us/step - loss: 0.9686 - accuracy:
0.5893
Epoch 50/500
115/115 [==============================] - 0s 665us/step - loss: 0.9780 - accuracy:
0.5771
Epoch 51/500
115/115 [==============================] - 0s 682us/step - loss: 0.9447 - accuracy:
0.6025
Epoch 52/500
115/115 [==============================] - 0s 647us/step - loss: 0.9281 - accuracy:
0.5981
Epoch 53/500
115/115 [==============================] - 0s 674us/step - loss: 0.9362 - accuracy:
0.5928
Epoch 54/500
115/115 [==============================] - 0s 647us/step - loss: 0.9446 - accuracy:
0.5981
Epoch 55/500
115/115 [==============================] - 0s 639us/step - loss: 0.9248 - accuracy:
0.6112
Epoch 56/500
115/115 [==============================] - 0s 639us/step - loss: 0.9365 - accuracy:
0.5876
Epoch 57/500
115/115 [==============================] - 0s 639us/step - loss: 0.9259 - accuracy:
0.6191
Epoch 58/500
115/115 [==============================] - 0s 667us/step - loss: 0.9082 - accuracy:
0.6200
Epoch 59/500
115/115 [==============================] - 0s 656us/step - loss: 0.8869 - accuracy:
0.6480
Epoch 60/500
115/115 [==============================] - 0s 647us/step - loss: 0.9049 - accuracy:
0.6200
```

```
Epoch 61/500
115/115 [==============================] - 0s 647us/step - loss: 0.8616 - accuracy:
0.6436
Epoch 62/500
115/115 [==============================] - 0s 656us/step - loss: 0.9122 - accuracy:
0.6051
Epoch 63/500
115/115 [==============================] - 0s 665us/step - loss: 0.8881 - accuracy:
0.6340
Epoch 64/500
115/115 [==============================] - 0s 656us/step - loss: 0.9012 - accuracy:
0.6068
Epoch 65/500
115/115 [==============================] - 0s 639us/step - loss: 0.8973 - accuracy:
0.6200
Epoch 66/500
115/115 [==============================] - 0s 647us/step - loss: 0.8881 - accuracy:
0.6278
Epoch 67/500
115/115 [==============================] - 0s 688us/step - loss: 0.8868 - accuracy:
0.6384
Epoch 68/500
115/115 [==============================] - 0s 639us/step - loss: 0.8669 - accuracy:
0.6419
Epoch 69/500
115/115 [==============================] - 0s 656us/step - loss: 0.8773 - accuracy:
0.6217
Epoch 70/500
115/115 [==============================] - 0s 656us/step - loss: 0.8781 - accuracy:
0.6182
Epoch 71/500
115/115 [==============================] - 0s 665us/step - loss: 0.8605 - accuracy:
0.6182
Epoch 72/500
115/115 [==============================] - 0s 639us/step - loss: 0.9201 - accuracy:
0.5674
Epoch 73/500
115/115 [==============================] - 0s 656us/step - loss: 0.9086 - accuracy:
0.6191
Epoch 74/500
115/115 [==============================] - 0s 647us/step - loss: 0.8792 - accuracy:
0.6287
Epoch 75/500
115/115 [==============================] - 0s 656us/step - loss: 0.8844 - accuracy:
0.6147
Epoch 76/500
115/115 [==============================] - 0s 665us/step - loss: 0.9286 - accuracy:
0.5841
Epoch 77/500
115/115 [==============================] - 0s 656us/step - loss: 0.8970 - accuracy:
0.6340
Epoch 78/500
115/115 [==============================] - 0s 656us/step - loss: 0.8812 - accuracy:
0.6366
Epoch 79/500
115/115 [==============================] - 0s 647us/step - loss: 0.8107 - accuracy:
0.6769
Epoch 80/500
115/115 [==============================] - 0s 639us/step - loss: 0.8472 - accuracy:
0.6445
```

```
Epoch 81/500
115/115 [==============================] - 0s 656us/step - loss: 0.8418 - accuracy:
0.6602
Epoch 82/500
115/115 [==============================] - 0s 647us/step - loss: 0.8105 - accuracy:
0.6795
Epoch 83/500
115/115 [==============================] - 0s 654us/step - loss: 0.8647 - accuracy:
0.6410
Epoch 84/500
115/115 [==============================] - 0s 646us/step - loss: 0.8464 - accuracy:
0.6427
Epoch 85/500
115/115 [==============================] - 0s 647us/step - loss: 0.7726 - accuracy:
0.6953
Epoch 86/500
115/115 [==============================] - 0s 647us/step - loss: 0.8693 - accuracy:
0.6349
Epoch 87/500
115/115 [==============================] - 0s 665us/step - loss: 0.8621 - accuracy:
0.6392
Epoch 88/500
115/115 [==============================] - 0s 656us/step - loss: 0.8690 - accuracy:
0.6357
Epoch 89/500
115/115 [==============================] - 0s 647us/step - loss: 0.7803 - accuracy:
0.6874
Epoch 90/500
115/115 [==============================] - 0s 639us/step - loss: 0.8032 - accuracy:
0.6804
Epoch 91/500
115/115 [==============================] - 0s 656us/step - loss: 0.8626 - accuracy:
0.6296
Epoch 92/500
115/115 [==============================] - 0s 647us/step - loss: 0.8492 - accuracy:
0.6559
Epoch 93/500
115/115 [==============================] - 0s 647us/step - loss: 0.9007 - accuracy:
0.6392
Epoch 94/500
115/115 [==============================] - 0s 639us/step - loss: 0.7834 - accuracy:
0.6996
Epoch 95/500
115/115 [==============================] - 0s 647us/step - loss: 0.7928 - accuracy:
0.6830
Epoch 96/500
115/115 [==============================] - 0s 647us/step - loss: 0.8312 - accuracy:
0.6585
Epoch 97/500
115/115 [==============================] - 0s 735us/step - loss: 0.7731 - accuracy:
0.6909
Epoch 98/500
115/115 [==============================] - 0s 655us/step - loss: 0.8439 - accuracy:
0.6471
Epoch 99/500
115/115 [==============================] - 0s 639us/step - loss: 0.7592 - accuracy:
0.6725
Epoch 100/500
115/115 [==============================] - 0s 647us/step - loss: 0.7823 - accuracy:
0.6891
```

```
Epoch 101/500
115/115 [==============================] - 0s 646us/step - loss: 0.7875 - accuracy:
0.6708
Epoch 102/500
115/115 [==============================] - 0s 644us/step - loss: 0.8041 - accuracy:
0.6690
Epoch 103/500
115/115 [==============================] - 0s 639us/step - loss: 0.7882 - accuracy:
0.6944
Epoch 104/500
115/115 [==============================] - 0s 665us/step - loss: 0.8203 - accuracy:
0.6567
Epoch 105/500
115/115 [==============================] - 0s 639us/step - loss: 0.8068 - accuracy:
0.6690
Epoch 106/500
115/115 [==============================] - 0s 656us/step - loss: 0.8114 - accuracy:
0.6567
Epoch 107/500
115/115 [==============================] - 0s 656us/step - loss: 0.8143 - accuracy:
0.6655
Epoch 108/500
115/115 [==============================] - 0s 647us/step - loss: 0.8073 - accuracy:
0.6620
Epoch 109/500
115/115 [==============================] - 0s 647us/step - loss: 0.7998 - accuracy:
0.6970
Epoch 110/500
115/115 [==============================] - 0s 647us/step - loss: 0.7677 - accuracy:
0.7040
Epoch 111/500
115/115 [==============================] - 0s 647us/step - loss: 0.7625 - accuracy:
0.6926
Epoch 112/500
115/115 [==============================] - 0s 656us/step - loss: 0.7772 - accuracy:
0.6804
Epoch 113/500
115/115 [==============================] - 0s 639us/step - loss: 0.8314 - accuracy:
0.6532
Epoch 114/500
115/115 [==============================] - 0s 665us/step - loss: 0.8558 - accuracy:
0.6602
Epoch 115/500
115/115 [==============================] - 0s 647us/step - loss: 0.8009 - accuracy:
0.6664
Epoch 116/500
115/115 [==============================] - 0s 647us/step - loss: 0.7500 - accuracy:
0.6856
Epoch 117/500
115/115 [==============================] - 0s 639us/step - loss: 0.7702 - accuracy:
0.6996
Epoch 118/500
115/115 [==============================] - 0s 639us/step - loss: 0.7501 - accuracy:
0.7128
Epoch 119/500
115/115 [==============================] - 0s 647us/step - loss: 0.7990 - accuracy:
0.6585
Epoch 120/500
115/115 [==============================] - 0s 639us/step - loss: 0.8115 - accuracy:
0.6821
```

```
Epoch 121/500
115/115 [==============================] - 0s 647us/step - loss: 0.7570 - accuracy:
0.6918
Epoch 122/500
115/115 [==============================] - 0s 647us/step - loss: 0.7799 - accuracy:
0.6760
Epoch 123/500
115/115 [==============================] - 0s 647us/step - loss: 0.7150 - accuracy:
0.7119
Epoch 124/500
115/115 [==============================] - 0s 639us/step - loss: 0.7961 - accuracy:
0.6900
Epoch 125/500
115/115 [==============================] - 0s 639us/step - loss: 0.7851 - accuracy:
0.6909
Epoch 126/500
115/115 [==============================] - 0s 656us/step - loss: 0.7344 - accuracy:
0.6725
Epoch 127/500
115/115 [==============================] - 0s 656us/step - loss: 0.8280 - accuracy:
0.6708
Epoch 128/500
115/115 [==============================] - 0s 665us/step - loss: 0.8259 - accuracy:
0.6480
Epoch 129/500
115/115 [==============================] - 0s 648us/step - loss: 0.8158 - accuracy:
0.6567
Epoch 130/500
115/115 [==============================] - 0s 655us/step - loss: 0.7783 - accuracy:
0.6856
Epoch 131/500
115/115 [==============================] - 0s 656us/step - loss: 0.8210 - accuracy:
0.6576
Epoch 132/500
115/115 [==============================] - 0s 656us/step - loss: 0.7374 - accuracy:
0.7023
Epoch 133/500
115/115 [==============================] - 0s 647us/step - loss: 0.7718 - accuracy:
0.6961
Epoch 134/500
115/115 [==============================] - 0s 656us/step - loss: 0.7119 - accuracy:
0.7224
Epoch 135/500
115/115 [==============================] - 0s 647us/step - loss: 0.7498 - accuracy:
0.7163
Epoch 136/500
115/115 [==============================] - 0s 639us/step - loss: 0.7357 - accuracy:
0.7189
Epoch 137/500
115/115 [==============================] - 0s 638us/step - loss: 0.7319 - accuracy:
0.7032
Epoch 138/500
115/115 [==============================] - 0s 647us/step - loss: 0.6511 - accuracy:
0.7461
Epoch 139/500
115/115 [==============================] - 0s 647us/step - loss: 0.6766 - accuracy:
0.7224
Epoch 140/500
115/115 [==============================] - 0s 647us/step - loss: 0.6935 - accuracy:
0.7180
```

```
Epoch 141/500
115/115 [==============================] - 0s 638us/step - loss: 0.7463 - accuracy:
0.7075
Epoch 142/500
115/115 [==============================] - 0s 647us/step - loss: 0.7221 - accuracy:
0.7075
Epoch 143/500
115/115 [==============================] - 0s 656us/step - loss: 0.7838 - accuracy:
0.6708
Epoch 144/500
115/115 [==============================] - 0s 656us/step - loss: 0.6662 - accuracy:
0.7329
Epoch 145/500
115/115 [==============================] - 0s 647us/step - loss: 0.6891 - accuracy:
0.7329
Epoch 146/500
115/115 [==============================] - 0s 639us/step - loss: 0.8138 - accuracy:
0.6646
Epoch 147/500
115/115 [==============================] - 0s 639us/step - loss: 0.7095 - accuracy:
0.7093
Epoch 148/500
115/115 [==============================] - 0s 647us/step - loss: 0.6609 - accuracy:
0.7215
Epoch 149/500
115/115 [==============================] - 0s 665us/step - loss: 0.7243 - accuracy:
0.7268
Epoch 150/500
115/115 [==============================] - 0s 648us/step - loss: 0.6834 - accuracy:
0.7145
Epoch 151/500
115/115 [==============================] - 0s 639us/step - loss: 0.7233 - accuracy:
0.7032
Epoch 152/500
115/115 [==============================] - 0s 656us/step - loss: 0.6718 - accuracy:
0.7408
Epoch 153/500
115/115 [==============================] - 0s 654us/step - loss: 0.7058 - accuracy:
0.7224
Epoch 154/500
115/115 [==============================] - 0s 647us/step - loss: 0.7246 - accuracy:
0.6970
Epoch 155/500
115/115 [==============================] - 0s 647us/step - loss: 0.7557 - accuracy:
0.6760
Epoch 156/500
115/115 [==============================] - 0s 665us/step - loss: 0.7039 - accuracy:
0.7408
Epoch 157/500
115/115 [==============================] - 0s 647us/step - loss: 0.6892 - accuracy:
0.7312
Epoch 158/500
115/115 [==============================] - 0s 645us/step - loss: 0.6629 - accuracy:
0.7294
Epoch 159/500
115/115 [==============================] - 0s 652us/step - loss: 0.6489 - accuracy:
0.7294
Epoch 160/500
115/115 [==============================] - 0s 639us/step - loss: 0.6575 - accuracy:
0.7443
```

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Epoch 161/500
115/115 [==============================] - 0s 665us/step - loss: 0.6656 - accuracy:
0.7277
Epoch 162/500
115/115 [==============================] - 0s 656us/step - loss: 0.7082 - accuracy:
0.7154
Epoch 163/500
115/115 [==============================] - 0s 638us/step - loss: 0.7042 - accuracy:
0.7128
Epoch 164/500
115/115 [==============================] - 0s 647us/step - loss: 0.6164 - accuracy:
0.7513
Epoch 165/500
115/115 [==============================] - 0s 639us/step - loss: 0.6604 - accuracy:
0.7426
Epoch 166/500
115/115 [==============================] - 0s 647us/step - loss: 0.6566 - accuracy:
0.7399
Epoch 167/500
115/115 [==============================] - 0s 674us/step - loss: 0.5992 - accuracy:
0.7609
Epoch 168/500
115/115 [==============================] - 0s 700us/step - loss: 0.7266 - accuracy:
0.7040
Epoch 169/500
115/115 [==============================] - 0s 709us/step - loss: 0.6316 - accuracy:
0.7434
Epoch 170/500
115/115 [==============================] - 0s 709us/step - loss: 0.6912 - accuracy:
0.7207
Epoch 171/500
115/115 [==============================] - 0s 726us/step - loss: 0.6083 - accuracy:
0.7583
Epoch 172/500
115/115 [==============================] - 0s 700us/step - loss: 0.8541 - accuracy:
0.6611
Epoch 173/500
115/115 [==============================] - 0s 691us/step - loss: 0.8150 - accuracy:
0.6629
Epoch 174/500
115/115 [==============================] - 0s 709us/step - loss: 0.8441 - accuracy:
0.6191
Epoch 175/500
115/115 [==============================] - 0s 700us/step - loss: 0.8448 - accuracy:
0.6462
Epoch 176/500
115/115 [==============================] - 0s 674us/step - loss: 0.7834 - accuracy:
0.6734
Epoch 177/500
115/115 [==============================] - 0s 652us/step - loss: 0.8112 - accuracy:
0.6734
Epoch 178/500
115/115 [==============================] - 0s 637us/step - loss: 0.7641 - accuracy:
0.7005
Epoch 179/500
115/115 [==============================] - 0s 647us/step - loss: 0.9044 - accuracy:
0.6480
Epoch 180/500
115/115 [==============================] - 0s 656us/step - loss: 0.7874 - accuracy:
0.6708
```

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Epoch 181/500
115/115 [==============================] - 0s 646us/step - loss: 0.6781 - accuracy:
0.7172
Epoch 182/500
115/115 [==============================] - 0s 656us/step - loss: 0.6850 - accuracy:
0.7215
Epoch 183/500
115/115 [==============================] - 0s 656us/step - loss: 0.6866 - accuracy:
0.7198
Epoch 184/500
115/115 [==============================] - 0s 656us/step - loss: 0.6396 - accuracy:
0.7662
Epoch 185/500
115/115 [==============================] - 0s 647us/step - loss: 0.6630 - accuracy:
0.7312
Epoch 186/500
115/115 [==============================] - 0s 656us/step - loss: 0.8068 - accuracy:
0.6708
Epoch 187/500
115/115 [==============================] - 0s 665us/step - loss: 0.6429 - accuracy:
0.7469
Epoch 188/500
115/115 [==============================] - 0s 665us/step - loss: 0.7261 - accuracy:
0.7110
Epoch 189/500
115/115 [==============================] - 0s 665us/step - loss: 0.6449 - accuracy:
0.7373
Epoch 190/500
115/115 [==============================] - 0s 656us/step - loss: 0.6958 - accuracy:
0.7242
Epoch 191/500
115/115 [==============================] - 0s 674us/step - loss: 0.6784 - accuracy:
0.7207
Epoch 192/500
115/115 [==============================] - 0s 647us/step - loss: 0.6593 - accuracy:
0.7487
Epoch 193/500
115/115 [==============================] - 0s 647us/step - loss: 0.6315 - accuracy:
0.7627
Epoch 194/500
115/115 [==============================] - 0s 656us/step - loss: 0.6338 - accuracy:
0.7671
Epoch 195/500
115/115 [==============================] - 0s 674us/step - loss: 0.7453 - accuracy:
0.7102
Epoch 196/500
115/115 [==============================] - 0s 665us/step - loss: 0.7397 - accuracy:
0.7154
Epoch 197/500
115/115 [==============================] - 0s 639us/step - loss: 0.7286 - accuracy:
0.7075
Epoch 198/500
115/115 [==============================] - 0s 647us/step - loss: 0.7138 - accuracy:
0.7268
Epoch 199/500
115/115 [==============================] - 0s 662us/step - loss: 0.6393 - accuracy:
0.7680
Epoch 200/500
115/115 [==============================] - 0s 662us/step - loss: 0.6394 - accuracy:
0.7373
```

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Epoch 201/500
115/115 [==============================] - 0s 647us/step - loss: 0.6852 - accuracy:
0.7391
Epoch 202/500
115/115 [==============================] - 0s 647us/step - loss: 0.6228 - accuracy:
0.7504
Epoch 203/500
115/115 [==============================] - 0s 656us/step - loss: 0.6164 - accuracy:
0.7820
Epoch 204/500
115/115 [==============================] - 0s 647us/step - loss: 0.6181 - accuracy:
0.7653
Epoch 205/500
115/115 [==============================] - 0s 647us/step - loss: 0.6650 - accuracy:
0.7224
Epoch 206/500
115/115 [==============================] - 0s 647us/step - loss: 0.6072 - accuracy:
0.7548
Epoch 207/500
115/115 [==============================] - 0s 665us/step - loss: 0.6327 - accuracy:
0.7478
Epoch 208/500
115/115 [==============================] - 0s 665us/step - loss: 0.5397 - accuracy:
0.7907
Epoch 209/500
115/115 [==============================] - 0s 656us/step - loss: 0.5421 - accuracy:
0.7881
Epoch 210/500
115/115 [==============================] - 0s 647us/step - loss: 0.6753 - accuracy:
0.7277
Epoch 211/500
115/115 [==============================] - 0s 647us/step - loss: 0.6331 - accuracy:
0.7574
Epoch 212/500
115/115 [==============================] - 0s 665us/step - loss: 0.5916 - accuracy:
0.7767
Epoch 213/500
115/115 [==============================] - 0s 647us/step - loss: 0.6646 - accuracy:
0.7382
Epoch 214/500
115/115 [==============================] - 0s 665us/step - loss: 0.5941 - accuracy:
0.7504
Epoch 215/500
115/115 [==============================] - 0s 647us/step - loss: 0.5628 - accuracy:
0.7846
Epoch 216/500
115/115 [==============================] - 0s 656us/step - loss: 0.6817 - accuracy:
0.7312
Epoch 217/500
115/115 [==============================] - 0s 682us/step - loss: 0.6828 - accuracy:
0.7224
Epoch 218/500
115/115 [==============================] - 0s 639us/step - loss: 0.6973 - accuracy:
0.7285
Epoch 219/500
115/115 [==============================] - 0s 656us/step - loss: 0.6137 - accuracy:
0.7574
Epoch 220/500
115/115 [==============================] - 0s 647us/step - loss: 0.6401 - accuracy:
0.7653
```

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Epoch 221/500
115/115 [==============================] - 0s 647us/step - loss: 0.5536 - accuracy:
0.7907
Epoch 222/500
115/115 [==============================] - 0s 656us/step - loss: 0.5758 - accuracy:
0.7802
Epoch 223/500
115/115 [==============================] - 0s 639us/step - loss: 0.6452 - accuracy:
0.7461
Epoch 224/500
115/115 [==============================] - 0s 639us/step - loss: 0.5155 - accuracy:
0.8135
Epoch 225/500
115/115 [==============================] - 0s 735us/step - loss: 0.5059 - accuracy:
0.8047
Epoch 226/500
115/115 [==============================] - 0s 665us/step - loss: 0.5645 - accuracy:
0.7802
Epoch 227/500
115/115 [==============================] - 0s 656us/step - loss: 0.5517 - accuracy:
0.7811
Epoch 228/500
115/115 [==============================] - 0s 656us/step - loss: 0.6019 - accuracy:
0.7618
Epoch 229/500
115/115 [==============================] - 0s 648us/step - loss: 0.6595 - accuracy:
0.7399
Epoch 230/500
115/115 [==============================] - 0s 656us/step - loss: 0.6682 - accuracy:
0.7426
Epoch 231/500
115/115 [==============================] - 0s 665us/step - loss: 0.6497 - accuracy:
0.7548
Epoch 232/500
115/115 [==============================] - 0s 660us/step - loss: 0.6223 - accuracy:
0.7601
Epoch 233/500
115/115 [==============================] - 0s 656us/step - loss: 0.5709 - accuracy:
0.7811
Epoch 234/500
115/115 [==============================] - 0s 662us/step - loss: 0.6008 - accuracy:
0.7496
Epoch 235/500
115/115 [==============================] - 0s 656us/step - loss: 0.6061 - accuracy:
0.7662
Epoch 236/500
115/115 [==============================] - 0s 656us/step - loss: 0.5482 - accuracy:
0.7793
Epoch 237/500
115/115 [==============================] - 0s 653us/step - loss: 0.5530 - accuracy:
0.7933
Epoch 238/500
115/115 [==============================] - 0s 652us/step - loss: 0.5848 - accuracy:
0.7653
Epoch 239/500
115/115 [==============================] - 0s 647us/step - loss: 0.5076 - accuracy:
0.8039
Epoch 240/500
115/115 [==============================] - 0s 639us/step - loss: 0.5312 - accuracy:
0.7916
```

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Epoch 241/500
115/115 [==============================] - 0s 647us/step - loss: 0.5458 - accuracy:
0.7890
Epoch 242/500
115/115 [==============================] - 0s 647us/step - loss: 0.5519 - accuracy:
0.7750
Epoch 243/500
115/115 [==============================] - 0s 639us/step - loss: 0.5676 - accuracy:
0.7820
Epoch 244/500
115/115 [==============================] - 0s 647us/step - loss: 0.5805 - accuracy:
0.7732
Epoch 245/500
115/115 [==============================] - 0s 647us/step - loss: 0.5716 - accuracy:
0.7811
Epoch 246/500
115/115 [==============================] - 0s 665us/step - loss: 0.6551 - accuracy:
0.7513
Epoch 247/500
115/115 [==============================] - 0s 651us/step - loss: 0.6699 - accuracy:
0.7504
Epoch 248/500
115/115 [==============================] - 0s 647us/step - loss: 0.6819 - accuracy:
0.7408
Epoch 249/500
115/115 [==============================] - 0s 647us/step - loss: 0.6337 - accuracy:
0.7504
Epoch 250/500
115/115 [==============================] - 0s 647us/step - loss: 0.5988 - accuracy:
0.7671
Epoch 251/500
115/115 [==============================] - 0s 656us/step - loss: 0.6099 - accuracy:
0.7653
Epoch 252/500
115/115 [==============================] - 0s 647us/step - loss: 0.6225 - accuracy:
0.7583
Epoch 253/500
115/115 [==============================] - 0s 656us/step - loss: 0.5205 - accuracy:
0.8152
Epoch 254/500
115/115 [==============================] - 0s 673us/step - loss: 0.5355 - accuracy:
0.7881
Epoch 255/500
115/115 [==============================] - 0s 662us/step - loss: 0.5414 - accuracy:
0.7925
Epoch 256/500
115/115 [==============================] - 0s 665us/step - loss: 0.6818 - accuracy:
0.7329
Epoch 257/500
115/115 [==============================] - 0s 647us/step - loss: 0.7989 - accuracy:
0.6856
Epoch 258/500
115/115 [==============================] - 0s 675us/step - loss: 0.6384 - accuracy:
0.7697
Epoch 259/500
115/115 [==============================] - 0s 674us/step - loss: 0.6172 - accuracy:
0.7627
Epoch 260/500
115/115 [==============================] - 0s 664us/step - loss: 0.5636 - accuracy:
0.7855
```

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Epoch 261/500
115/115 [==============================] - 0s 656us/step - loss: 0.6013 - accuracy:
0.7680
Epoch 262/500
115/115 [==============================] - 0s 656us/step - loss: 0.5346 - accuracy:
0.7986
Epoch 263/500
115/115 [==============================] - 0s 639us/step - loss: 0.5019 - accuracy:
0.8100
Epoch 264/500
115/115 [==============================] - 0s 639us/step - loss: 0.7480 - accuracy:
0.7023
Epoch 265/500
115/115 [==============================] - 0s 665us/step - loss: 0.5383 - accuracy:
0.7828
Epoch 266/500
115/115 [==============================] - 0s 639us/step - loss: 0.6082 - accuracy:
0.7671
Epoch 267/500
115/115 [==============================] - 0s 665us/step - loss: 0.6258 - accuracy:
0.7636
Epoch 268/500
115/115 [==============================] - 0s 647us/step - loss: 0.6911 - accuracy:
0.7207
Epoch 269/500
115/115 [==============================] - 0s 647us/step - loss: 0.5585 - accuracy:
0.7863
Epoch 270/500
115/115 [==============================] - 0s 661us/step - loss: 0.6698 - accuracy:
0.7145
Epoch 271/500
115/115 [==============================] - 0s 630us/step - loss: 0.5500 - accuracy:
0.7898
Epoch 272/500
115/115 [==============================] - 0s 647us/step - loss: 0.5554 - accuracy:
0.7855
Epoch 273/500
115/115 [==============================] - 0s 647us/step - loss: 0.6098 - accuracy:
0.7443
Epoch 274/500
115/115 [==============================] - 0s 649us/step - loss: 0.5921 - accuracy:
0.7732
Epoch 275/500
115/115 [==============================] - 0s 647us/step - loss: 0.5628 - accuracy:
0.7767
Epoch 276/500
115/115 [==============================] - 0s 656us/step - loss: 0.5543 - accuracy:
0.7793
Epoch 277/500
115/115 [==============================] - 0s 727us/step - loss: 0.5487 - accuracy:
0.7890
Epoch 278/500
115/115 [==============================] - 0s 681us/step - loss: 0.5811 - accuracy:
0.7802
Epoch 279/500
115/115 [==============================] - 0s 656us/step - loss: 0.5282 - accuracy:
0.7881
Epoch 280/500
115/115 [==============================] - 0s 648us/step - loss: 0.5439 - accuracy:
0.7811
```

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Epoch 281/500
115/115 [==============================] - 0s 647us/step - loss: 0.5920 - accuracy:
0.7767
Epoch 282/500
115/115 [==============================] - 0s 647us/step - loss: 0.6858 - accuracy:
0.7399
Epoch 283/500
115/115 [==============================] - 0s 656us/step - loss: 0.6460 - accuracy:
0.7338
Epoch 284/500
115/115 [==============================] - 0s 682us/step - loss: 0.6443 - accuracy:
0.7277
Epoch 285/500
115/115 [==============================] - 0s 656us/step - loss: 0.6779 - accuracy:
0.7382
Epoch 286/500
115/115 [==============================] - 0s 656us/step - loss: 0.5723 - accuracy:
0.7680
Epoch 287/500
115/115 [==============================] - 0s 656us/step - loss: 0.6276 - accuracy:
0.7513
Epoch 288/500
115/115 [==============================] - 0s 647us/step - loss: 0.5700 - accuracy:
0.7872
Epoch 289/500
115/115 [==============================] - 0s 639us/step - loss: 0.6111 - accuracy:
0.7785
Epoch 290/500
115/115 [==============================] - 0s 656us/step - loss: 0.5797 - accuracy:
0.7688
Epoch 291/500
115/115 [==============================] - 0s 647us/step - loss: 0.5006 - accuracy:
0.8144
Epoch 292/500
115/115 [==============================] - 0s 665us/step - loss: 0.4923 - accuracy:
0.8091
Epoch 293/500
115/115 [==============================] - 0s 656us/step - loss: 0.5527 - accuracy:
0.7846
Epoch 294/500
115/115 [==============================] - 0s 656us/step - loss: 0.5067 - accuracy:
0.8030
Epoch 295/500
115/115 [==============================] - 0s 656us/step - loss: 0.5823 - accuracy:
0.7820
Epoch 296/500
115/115 [==============================] - 0s 647us/step - loss: 0.5267 - accuracy:
0.7933
Epoch 297/500
115/115 [==============================] - 0s 645us/step - loss: 0.5386 - accuracy:
0.7942
Epoch 298/500
115/115 [==============================] - 0s 662us/step - loss: 0.4877 - accuracy:
0.8100
Epoch 299/500
115/115 [==============================] - 0s 649us/step - loss: 0.4946 - accuracy:
0.8161
Epoch 300/500
115/115 [==============================] - 0s 656us/step - loss: 0.5889 - accuracy:
0.7898
```

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Epoch 301/500
115/115 [==============================] - 0s 656us/step - loss: 0.4668 - accuracy:
0.8310
Epoch 302/500
115/115 [==============================] - 0s 670us/step - loss: 0.5085 - accuracy:
0.8100
Epoch 303/500
115/115 [==============================] - 0s 663us/step - loss: 0.5346 - accuracy:
0.8152
Epoch 304/500
115/115 [==============================] - 0s 647us/step - loss: 0.5880 - accuracy:
0.7863
Epoch 305/500
115/115 [==============================] - 0s 665us/step - loss: 0.5913 - accuracy:
0.7758
Epoch 306/500
115/115 [==============================] - 0s 639us/step - loss: 0.6002 - accuracy:
0.7557
Epoch 307/500
115/115 [==============================] - 0s 665us/step - loss: 0.5642 - accuracy:
0.7688
Epoch 308/500
115/115 [==============================] - 0s 691us/step - loss: 0.4607 - accuracy:
0.8406
Epoch 309/500
115/115 [==============================] - 0s 744us/step - loss: 0.5559 - accuracy:
0.7916
Epoch 310/500
115/115 [==============================] - 0s 735us/step - loss: 0.5542 - accuracy:
0.8152
Epoch 311/500
115/115 [==============================] - 0s 770us/step - loss: 0.5114 - accuracy:
0.8214
Epoch 312/500
115/115 [==============================] - 0s 779us/step - loss: 0.4341 - accuracy:
0.8380
Epoch 313/500
115/115 [==============================] - 0s 761us/step - loss: 0.5487 - accuracy:
0.8021
Epoch 314/500
115/115 [==============================] - 0s 752us/step - loss: 0.6251 - accuracy:
0.7557
Epoch 315/500
115/115 [==============================] - 0s 744us/step - loss: 0.5802 - accuracy:
0.7583
Epoch 316/500
115/115 [==============================] - 0s 747us/step - loss: 0.6629 - accuracy:
0.7513
Epoch 317/500
115/115 [==============================] - 0s 735us/step - loss: 0.4719 - accuracy:
0.8257
Epoch 318/500
115/115 [==============================] - 0s 761us/step - loss: 0.5587 - accuracy:
0.7863
Epoch 319/500
115/115 [==============================] - 0s 744us/step - loss: 0.3628 - accuracy:
0.8651
Epoch 320/500
115/115 [==============================] - 0s 770us/step - loss: 0.6084 - accuracy:
0.7715
```

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Epoch 321/500
115/115 [==============================] - 0s 849us/step - loss: 0.5273 - accuracy:
0.7986
Epoch 322/500
115/115 [==============================] - 0s 831us/step - loss: 0.5494 - accuracy:
0.7793
Epoch 323/500
115/115 [==============================] - 0s 766us/step - loss: 0.5603 - accuracy:
0.7828
Epoch 324/500
115/115 [==============================] - 0s 752us/step - loss: 0.5176 - accuracy:
0.8065
Epoch 325/500
115/115 [==============================] - 0s 744us/step - loss: 0.5189 - accuracy:
0.8074
Epoch 326/500
115/115 [==============================] - 0s 744us/step - loss: 0.4647 - accuracy:
0.8144
Epoch 327/500
115/115 [==============================] - 0s 770us/step - loss: 0.4848 - accuracy:
0.8091
Epoch 328/500
115/115 [==============================] - 0s 787us/step - loss: 0.4641 - accuracy:
0.8424
Epoch 329/500
115/115 [==============================] - 0s 783us/step - loss: 0.6354 - accuracy:
0.7347
Epoch 330/500
115/115 [==============================] - 0s 779us/step - loss: 0.4365 - accuracy:
0.8354
Epoch 331/500
115/115 [==============================] - 0s 831us/step - loss: 0.4831 - accuracy:
0.8310
Epoch 332/500
115/115 [==============================] - 0s 805us/step - loss: 0.6848 - accuracy:
0.7233
Epoch 333/500
115/115 [==============================] - 0s 796us/step - loss: 0.5292 - accuracy:
0.7837
Epoch 334/500
115/115 [==============================] - 0s 793us/step - loss: 0.4503 - accuracy:
0.8503
Epoch 335/500
115/115 [==============================] - 0s 787us/step - loss: 0.7780 - accuracy:
0.6786
Epoch 336/500
115/115 [==============================] - 0s 805us/step - loss: 0.6425 - accuracy:
0.7110
Epoch 337/500
115/115 [==============================] - 0s 796us/step - loss: 0.4588 - accuracy:
0.8301
Epoch 338/500
115/115 [==============================] - 0s 768us/step - loss: 0.5337 - accuracy:
0.8056
Epoch 339/500
115/115 [==============================] - 0s 761us/step - loss: 0.6809 - accuracy:
0.7250
Epoch 340/500
115/115 [==============================] - 0s 770us/step - loss: 0.5807 - accuracy:
0.7977
```

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Epoch 341/500
115/115 [==============================] - 0s 805us/step - loss: 0.5742 - accuracy:
0.7767
Epoch 342/500
115/115 [==============================] - 0s 761us/step - loss: 0.6776 - accuracy:
0.7242
Epoch 343/500
115/115 [==============================] - 0s 770us/step - loss: 0.5937 - accuracy:
0.7644
Epoch 344/500
115/115 [==============================] - 0s 796us/step - loss: 0.8106 - accuracy:
0.6830
Epoch 345/500
115/115 [==============================] - 0s 830us/step - loss: 0.6002 - accuracy:
0.7601
Epoch 346/500
115/115 [==============================] - 0s 840us/step - loss: 0.6593 - accuracy:
0.7338
Epoch 347/500
115/115 [==============================] - 0s 822us/step - loss: 0.5589 - accuracy:
0.7627
Epoch 348/500
115/115 [==============================] - 0s 787us/step - loss: 0.6335 - accuracy:
0.7723
Epoch 349/500
115/115 [==============================] - 0s 805us/step - loss: 0.6026 - accuracy:
0.7583
Epoch 350/500
115/115 [==============================] - 0s 795us/step - loss: 0.5951 - accuracy:
0.7785
Epoch 351/500
115/115 [==============================] - 0s 796us/step - loss: 0.5273 - accuracy:
0.7968
Epoch 352/500
115/115 [==============================] - 0s 796us/step - loss: 0.7645 - accuracy:
0.6996
Epoch 353/500
115/115 [==============================] - 0s 787us/step - loss: 0.6566 - accuracy:
0.7277
Epoch 354/500
115/115 [==============================] - 0s 805us/step - loss: 0.5860 - accuracy:
0.7478
Epoch 355/500
115/115 [==============================] - 0s 838us/step - loss: 0.5282 - accuracy:
0.7916
Epoch 356/500
115/115 [==============================] - 0s 822us/step - loss: 0.7686 - accuracy:
0.6725
Epoch 357/500
115/115 [==============================] - 0s 815us/step - loss: 0.7358 - accuracy:
0.7084
Epoch 358/500
115/115 [==============================] - 0s 779us/step - loss: 0.8408 - accuracy:
0.6349
Epoch 359/500
115/115 [==============================] - 0s 792us/step - loss: 0.8211 - accuracy:
0.6366
Epoch 360/500
115/115 [==============================] - 0s 801us/step - loss: 0.7877 - accuracy:
0.6716
```

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Epoch 361/500
115/115 [==============================] - 0s 779us/step - loss: 0.7501 - accuracy:
0.7032
Epoch 362/500
115/115 [==============================] - 0s 814us/step - loss: 0.7478 - accuracy:
0.6944
Epoch 363/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7525 - accuracy: 0.6
769
Epoch 364/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7355 - accuracy: 0.7
040
Epoch 365/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7630 - accuracy: 0.6
900
Epoch 366/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7939 - accuracy: 0.6
996
Epoch 367/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7491 - accuracy: 0.7
023
Epoch 368/500
115/115 [==============================] - 0s 1ms/step - loss: 0.8139 - accuracy: 0.6
567
Epoch 369/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7485 - accuracy: 0.7
137
Epoch 370/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7288 - accuracy: 0.7
145
Epoch 371/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7318 - accuracy: 0.7
102
Epoch 372/500
115/115 [==============================] - 0s 924us/step - loss: 0.7726 - accuracy:
0.6821
Epoch 373/500
115/115 [==============================] - 0s 888us/step - loss: 0.7195 - accuracy:
0.7049
Epoch 374/500
115/115 [==============================] - 0s 868us/step - loss: 0.7182 - accuracy:
0.7154
Epoch 375/500
115/115 [==============================] - 0s 886us/step - loss: 0.7621 - accuracy:
0.6839
Epoch 376/500
115/115 [==============================] - 0s 849us/step - loss: 0.7207 - accuracy:
0.7145
Epoch 377/500
115/115 [==============================] - 0s 854us/step - loss: 0.7314 - accuracy:
0.6856
Epoch 378/500
115/115 [==============================] - 0s 832us/step - loss: 0.8285 - accuracy:
0.6427
Epoch 379/500
115/115 [==============================] - 0s 821us/step - loss: 0.7798 - accuracy:
0.6646
Epoch 380/500
115/115 [==============================] - 0s 901us/step - loss: 0.7049 - accuracy:
0.7259
```

```
Epoch 381/500
115/115 [==============================] - 0s 857us/step - loss: 0.7429 - accuracy:
0.6996
Epoch 382/500
115/115 [==============================] - 0s 849us/step - loss: 0.6942 - accuracy:
0.6988
Epoch 383/500
115/115 [==============================] - 0s 805us/step - loss: 0.7082 - accuracy:
0.7189
Epoch 384/500
115/115 [==============================] - 0s 956us/step - loss: 0.7179 - accuracy:
0.7058
Epoch 385/500
115/115 [==============================] - 0s 867us/step - loss: 0.6920 - accuracy:
0.7233
Epoch 386/500
115/115 [==============================] - 0s 849us/step - loss: 0.7239 - accuracy:
0.6839
Epoch 387/500
115/115 [==============================] - 0s 840us/step - loss: 0.6860 - accuracy:
0.7172
Epoch 388/500
115/115 [==============================] - 0s 849us/step - loss: 0.7552 - accuracy:
0.6996
Epoch 389/500
115/115 [==============================] - 0s 866us/step - loss: 0.7618 - accuracy:
0.7032
Epoch 390/500
115/115 [==============================] - 0s 898us/step - loss: 0.7233 - accuracy:
0.6918
Epoch 391/500
115/115 [==============================] - 0s 901us/step - loss: 0.6977 - accuracy:
0.7189
Epoch 392/500
115/115 [==============================] - 0s 884us/step - loss: 0.7079 - accuracy:
0.7539
Epoch 393/500
115/115 [==============================] - 0s 875us/step - loss: 0.7599 - accuracy:
0.6848
Epoch 394/500
115/115 [==============================] - 0s 913us/step - loss: 0.7654 - accuracy:
0.6900
Epoch 395/500
115/115 [==============================] - 0s 895us/step - loss: 0.7199 - accuracy:
0.7189
Epoch 396/500
115/115 [==============================] - 0s 873us/step - loss: 0.7623 - accuracy:
0.7040
Epoch 397/500
115/115 [==============================] - 0s 875us/step - loss: 0.7108 - accuracy:
0.7233
Epoch 398/500
115/115 [==============================] - 0s 866us/step - loss: 0.7021 - accuracy:
0.7163
Epoch 399/500
115/115 [==============================] - 0s 849us/step - loss: 0.6929 - accuracy:
0.7233
Epoch 400/500
115/115 [==============================] - 0s 831us/step - loss: 0.7049 - accuracy:
0.6918
```

```
Epoch 401/500
115/115 [==============================] - 0s 857us/step - loss: 0.7048 - accuracy:
0.6988
Epoch 402/500
115/115 [==============================] - 0s 884us/step - loss: 0.6549 - accuracy:
0.7172
Epoch 403/500
115/115 [==============================] - 0s 884us/step - loss: 0.7040 - accuracy:
0.7145
Epoch 404/500
115/115 [==============================] - 0s 884us/step - loss: 0.6999 - accuracy:
0.7058
Epoch 405/500
115/115 [==============================] - 0s 941us/step - loss: 0.8109 - accuracy:
0.6804
Epoch 406/500
115/115 [==============================] - 0s 919us/step - loss: 0.6904 - accuracy:
0.7356
Epoch 407/500
115/115 [==============================] - 0s 917us/step - loss: 0.7545 - accuracy:
0.7137
Epoch 408/500
115/115 [==============================] - 0s 875us/step - loss: 0.7535 - accuracy:
0.6996
Epoch 409/500
115/115 [==============================] - 0s 875us/step - loss: 0.6572 - accuracy:
0.7277
Epoch 410/500
115/115 [==============================] - 0s 866us/step - loss: 0.7109 - accuracy:
0.6926
Epoch 411/500
115/115 [==============================] - 0s 913us/step - loss: 0.7735 - accuracy:
0.6673
Epoch 412/500
115/115 [==============================] - 0s 896us/step - loss: 0.7266 - accuracy:
0.6953
Epoch 413/500
115/115 [==============================] - 0s 875us/step - loss: 0.7095 - accuracy:
0.7207
Epoch 414/500
115/115 [==============================] - 0s 884us/step - loss: 0.7576 - accuracy:
0.7163
Epoch 415/500
115/115 [==============================] - 0s 884us/step - loss: 0.6296 - accuracy:
0.7618
Epoch 416/500
115/115 [==============================] - 0s 866us/step - loss: 0.6467 - accuracy:
0.7198
Epoch 417/500
115/115 [==============================] - 0s 910us/step - loss: 0.6828 - accuracy:
0.7285
Epoch 418/500
115/115 [==============================] - 0s 919us/step - loss: 0.6468 - accuracy:
0.7539
Epoch 419/500
115/115 [==============================] - 0s 945us/step - loss: 0.6710 - accuracy:
0.7557
Epoch 420/500
115/115 [==============================] - 0s 910us/step - loss: 0.6125 - accuracy:
0.7399
```

```
Epoch 421/500
115/115 [==============================] - 0s 949us/step - loss: 0.8143 - accuracy:
0.6699
Epoch 422/500
115/115 [==============================] - 0s 928us/step - loss: 0.7843 - accuracy:
0.6795
Epoch 423/500
115/115 [==============================] - 0s 954us/step - loss: 0.7218 - accuracy:
0.7154
Epoch 424/500
115/115 [==============================] - 0s 927us/step - loss: 0.7137 - accuracy:
0.7023
Epoch 425/500
115/115 [==============================] - 0s 910us/step - loss: 0.6643 - accuracy:
0.7583
Epoch 426/500
115/115 [==============================] - 0s 928us/step - loss: 0.7543 - accuracy:
0.7268
Epoch 427/500
115/115 [==============================] - 0s 916us/step - loss: 0.6238 - accuracy:
0.7504
Epoch 428/500
115/115 [==============================] - 0s 944us/step - loss: 0.6563 - accuracy:
0.7434
Epoch 429/500
115/115 [==============================] - 0s 920us/step - loss: 0.7178 - accuracy:
0.6979
Epoch 430/500
115/115 [==============================] - 0s 938us/step - loss: 0.6343 - accuracy:
0.7487
Epoch 431/500
115/115 [==============================] - 0s 927us/step - loss: 0.6013 - accuracy:
0.7566
Epoch 432/500
115/115 [==============================] - 0s 884us/step - loss: 0.7334 - accuracy:
0.6918
Epoch 433/500
115/115 [==============================] - 0s 910us/step - loss: 0.7202 - accuracy:
0.6944
Epoch 434/500
115/115 [==============================] - 0s 927us/step - loss: 0.6256 - accuracy:
0.7522
Epoch 435/500
115/115 [==============================] - 0s 923us/step - loss: 0.7227 - accuracy:
0.7040
Epoch 436/500
115/115 [==============================] - 0s 910us/step - loss: 1.1310 - accuracy:
0.5473
Epoch 437/500
115/115 [==============================] - 0s 884us/step - loss: 0.8082 - accuracy:
0.6725
Epoch 438/500
115/115 [==============================] - 0s 919us/step - loss: 0.6500 - accuracy:
0.7461
Epoch 439/500
115/115 [==============================] - 0s 919us/step - loss: 0.5939 - accuracy:
0.7443
Epoch 440/500
115/115 [==============================] - 0s 919us/step - loss: 0.6844 - accuracy:
0.7347
```

```
Epoch 441/500
115/115 [==============================] - 0s 933us/step - loss: 0.6683 - accuracy:
0.7259
Epoch 442/500
115/115 [==============================] - 0s 944us/step - loss: 0.5930 - accuracy:
0.7557
Epoch 443/500
115/115 [==============================] - 0s 930us/step - loss: 0.6109 - accuracy:
0.7566
Epoch 444/500
115/115 [==============================] - 0s 941us/step - loss: 0.6362 - accuracy:
0.7461
Epoch 445/500
115/115 [==============================] - 0s 938us/step - loss: 0.6835 - accuracy:
0.7338
Epoch 446/500
115/115 [==============================] - 0s 919us/step - loss: 0.6686 - accuracy:
0.7417
Epoch 447/500
115/115 [==============================] - 0s 945us/step - loss: 0.6812 - accuracy:
0.7189
Epoch 448/500
115/115 [==============================] - 0s 920us/step - loss: 0.5930 - accuracy:
0.7496
Epoch 449/500
115/115 [==============================] - 0s 951us/step - loss: 0.6873 - accuracy:
0.7364
Epoch 450/500
115/115 [==============================] - 0s 936us/step - loss: 0.6941 - accuracy:
0.7233
Epoch 451/500
115/115 [==============================] - 0s 948us/step - loss: 0.5781 - accuracy:
0.7890
Epoch 452/500
115/115 [==============================] - 0s 962us/step - loss: 0.5481 - accuracy:
0.7750
Epoch 453/500
115/115 [==============================] - 0s 1ms/step - loss: 0.5645 - accuracy: 0.7
793
Epoch 454/500
115/115 [==============================] - 0s 1ms/step - loss: 0.5463 - accuracy: 0.7
977
Epoch 455/500
115/115 [==============================] - 0s 972us/step - loss: 0.5831 - accuracy:
0.7785
Epoch 456/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6198 - accuracy: 0.7
461
Epoch 457/500
115/115 [==============================] - 0s 1ms/step - loss: 0.5360 - accuracy: 0.7
898
Epoch 458/500
115/115 [==============================] - 0s 1ms/step - loss: 0.8202 - accuracy: 0.6
970
Epoch 459/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7122 - accuracy: 0.7
356
Epoch 460/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7676 - accuracy: 0.6
935
```

```
Epoch 461/500
115/115 [==============================] - 0s 1ms/step - loss: 1.1379 - accuracy: 0.5
219
Epoch 462/500
115/115 [==============================] - 0s 1ms/step - loss: 0.9639 - accuracy: 0.5
928
Epoch 463/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7466 - accuracy: 0.7
163
Epoch 464/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7260 - accuracy: 0.7
128
Epoch 465/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6835 - accuracy: 0.7
250
Epoch 466/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7304 - accuracy: 0.7
084
Epoch 467/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6932 - accuracy: 0.7
259
Epoch 468/500
115/115 [==============================] - 0s 1ms/step - loss: 0.9059 - accuracy: 0.6
305
Epoch 469/500
115/115 [==============================] - 0s 1ms/step - loss: 1.0555 - accuracy: 0.5
219
Epoch 470/500
115/115 [==============================] - 0s 1ms/step - loss: 0.8421 - accuracy: 0.6
462
Epoch 471/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7000 - accuracy: 0.7
102
Epoch 472/500
115/115 [==============================] - 0s 971us/step - loss: 0.7142 - accuracy:
0.7014
Epoch 473/500
115/115 [==============================] - 0s 980us/step - loss: 0.8535 - accuracy:
0.6602
Epoch 474/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6788 - accuracy: 0.7
391
Epoch 475/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6068 - accuracy: 0.7
548
Epoch 476/500
115/115 [==============================] - 0s 966us/step - loss: 0.7893 - accuracy:
0.6786
Epoch 477/500
115/115 [==============================] - 0s 960us/step - loss: 0.8210 - accuracy:
0.6576
Epoch 478/500
115/115 [==============================] - 0s 942us/step - loss: 0.7723 - accuracy:
0.6778
Epoch 479/500
115/115 [==============================] - 0s 919us/step - loss: 0.6795 - accuracy:
0.7110
Epoch 480/500
115/115 [==============================] - 0s 903us/step - loss: 0.6917 - accuracy:
0.7093
```

```
Epoch 481/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6679 - accuracy: 0.7
434
Epoch 482/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6750 - accuracy: 0.7
277
Epoch 483/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7284 - accuracy: 0.7
434
Epoch 484/500
115/115 [==============================] - 0s 927us/step - loss: 0.6412 - accuracy:
0.7574
Epoch 485/500
115/115 [==============================] - 0s 919us/step - loss: 0.7297 - accuracy:
0.6909
Epoch 486/500
115/115 [==============================] - 0s 936us/step - loss: 0.5997 - accuracy:
0.7671
Epoch 487/500
115/115 [==============================] - 0s 927us/step - loss: 0.6858 - accuracy:
0.7496
Epoch 488/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7022 - accuracy: 0.7
434
Epoch 489/500
115/115 [==============================] - 0s 980us/step - loss: 0.6747 - accuracy:
0.7399
Epoch 490/500
115/115 [==============================] - 0s 997us/step - loss: 0.6064 - accuracy:
0.7513
Epoch 491/500
115/115 [==============================] - 0s 983us/step - loss: 0.6089 - accuracy:
0.7653
Epoch 492/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6214 - accuracy: 0.7
758
Epoch 493/500
115/115 [==============================] - 0s 973us/step - loss: 0.6049 - accuracy:
0.7706
Epoch 494/500
115/115 [==============================] - 0s 971us/step - loss: 0.6320 - accuracy:
0.7443
Epoch 495/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6056 - accuracy: 0.7
452
Epoch 496/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6668 - accuracy: 0.7
391
Epoch 497/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6355 - accuracy: 0.7
574
Epoch 498/500
115/115 [==============================] - 0s 1ms/step - loss: 0.5710 - accuracy: 0.8
004
Epoch 499/500
115/115 [==============================] - 0s 1ms/step - loss: 0.6583 - accuracy: 0.7
356
Epoch 500/500
115/115 [==============================] - 0s 1ms/step - loss: 0.7627 - accuracy: 0.6
760
```

```
36/36 [==============================] - 0s 928us/step - loss: 0.5506 - accuracy: 0.7
925
```

accuracy: 79.25%

After a while playing around with activations, optimizers, and neurons above, I found the best results with 20 neurons, tanh/sigmoid, and sgd as an optimizer. Below, I ran the same code as above to test it out with 1-5 layers.

In [375…
```python
num_layers = [1,2,3,4,5]
scores = []
for num_layer in num_layers:
    if num_layer == 1:
        model = Sequential()
        model.add(Dense(20, input_dim = 12, activation = 'tanh'))
        model.add(Dense(6, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'CategoricalCrossentropy', optimizer = 'sgd', metrics=['
        model.fit(X, Y, batch_size = 10, epochs = 300)
    if num_layer == 2:
        model = Sequential()
        model.add(Dense(20, input_dim = 12, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(6, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'CategoricalCrossentropy', optimizer = 'sgd', metrics=['
        model.fit(X, Y, batch_size = 10, epochs = 300)
    if num_layer == 3:
        model = Sequential()
        model.add(Dense(20, input_dim = 12, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(6, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'CategoricalCrossentropy', optimizer = 'sgd', metrics=['
        model.fit(X, Y, batch_size = 10, epochs = 300)
    if num_layer == 4:
        model = Sequential()
        model.add(Dense(20, input_dim = 12, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(6, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'CategoricalCrossentropy', optimizer = 'sgd', metrics=['
        model.fit(X, Y, batch_size = 10, epochs = 300)
    if num_layer == 5:
        model = Sequential()
        model.add(Dense(20, input_dim = 12, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(20, activation = 'tanh'))
        model.add(Dense(6, activation='sigmoid'))
        sgd = SGD(learning_rate = 0.1)
        model.compile(loss = 'CategoricalCrossentropy', optimizer = 'sgd', metrics=['
        model.fit(X, Y, batch_size = 10, epochs = 300)

    score = model.evaluate(X, Y)
```

```
        scores.append(score)
```

```
Epoch 1/300
115/115 [==============================] - 0s 596us/step - loss: 1.2898 - accuracy:
0.4221
Epoch 2/300
115/115 [==============================] - 0s 595us/step - loss: 1.1582 - accuracy:
0.4615
Epoch 3/300
115/115 [==============================] - 0s 586us/step - loss: 1.1516 - accuracy:
0.5053
Epoch 4/300
115/115 [==============================] - 0s 577us/step - loss: 1.1390 - accuracy:
0.4816
Epoch 5/300
115/115 [==============================] - 0s 569us/step - loss: 1.1377 - accuracy:
0.5035
Epoch 6/300
115/115 [==============================] - 0s 577us/step - loss: 1.1309 - accuracy:
0.5018
Epoch 7/300
115/115 [==============================] - 0s 604us/step - loss: 1.1263 - accuracy:
0.4851
Epoch 8/300
115/115 [==============================] - 0s 612us/step - loss: 1.1235 - accuracy:
0.4974
Epoch 9/300
115/115 [==============================] - 0s 586us/step - loss: 1.1233 - accuracy:
0.4877
Epoch 10/300
115/115 [==============================] - 0s 586us/step - loss: 1.1246 - accuracy:
0.5026
Epoch 11/300
115/115 [==============================] - 0s 586us/step - loss: 1.1209 - accuracy:
0.4930
Epoch 12/300
115/115 [==============================] - 0s 586us/step - loss: 1.1188 - accuracy:
0.5053
Epoch 13/300
115/115 [==============================] - 0s 586us/step - loss: 1.1200 - accuracy:
0.5018
Epoch 14/300
115/115 [==============================] - 0s 577us/step - loss: 1.1177 - accuracy:
0.5070
Epoch 15/300
115/115 [==============================] - 0s 577us/step - loss: 1.1166 - accuracy:
0.4904
Epoch 16/300
115/115 [==============================] - 0s 569us/step - loss: 1.1101 - accuracy:
0.5026
Epoch 17/300
115/115 [==============================] - 0s 569us/step - loss: 1.1384 - accuracy:
0.5018
Epoch 18/300
115/115 [==============================] - 0s 577us/step - loss: 1.1154 - accuracy:
0.5026
Epoch 19/300
115/115 [==============================] - 0s 577us/step - loss: 1.1211 - accuracy:
0.5061
Epoch 20/300
115/115 [==============================] - 0s 577us/step - loss: 1.1248 - accuracy:
0.4930
```

```
Epoch 21/300
115/115 [==============================] - 0s 577us/step - loss: 1.1237 - accuracy:
0.5061
Epoch 22/300
115/115 [==============================] - 0s 570us/step - loss: 1.1221 - accuracy:
0.5175
Epoch 23/300
115/115 [==============================] - 0s 586us/step - loss: 1.1220 - accuracy:
0.5035
Epoch 24/300
115/115 [==============================] - 0s 569us/step - loss: 1.1167 - accuracy:
0.5166
Epoch 25/300
115/115 [==============================] - 0s 569us/step - loss: 1.1173 - accuracy:
0.5035
Epoch 26/300
115/115 [==============================] - 0s 569us/step - loss: 1.1241 - accuracy:
0.5236
Epoch 27/300
115/115 [==============================] - 0s 569us/step - loss: 1.1200 - accuracy:
0.5018
Epoch 28/300
115/115 [==============================] - 0s 569us/step - loss: 1.1163 - accuracy:
0.4956
Epoch 29/300
115/115 [==============================] - 0s 577us/step - loss: 1.1179 - accuracy:
0.4947
Epoch 30/300
115/115 [==============================] - 0s 569us/step - loss: 1.1118 - accuracy:
0.4974
Epoch 31/300
115/115 [==============================] - 0s 569us/step - loss: 1.1152 - accuracy:
0.5123
Epoch 32/300
115/115 [==============================] - 0s 586us/step - loss: 1.1291 - accuracy:
0.5254
Epoch 33/300
115/115 [==============================] - 0s 577us/step - loss: 1.1194 - accuracy:
0.5123
Epoch 34/300
115/115 [==============================] - 0s 569us/step - loss: 1.1205 - accuracy:
0.5061
Epoch 35/300
115/115 [==============================] - 0s 569us/step - loss: 1.1099 - accuracy:
0.5123
Epoch 36/300
115/115 [==============================] - 0s 586us/step - loss: 1.1037 - accuracy:
0.4974
Epoch 37/300
115/115 [==============================] - 0s 577us/step - loss: 1.1002 - accuracy:
0.5315
Epoch 38/300
115/115 [==============================] - 0s 584us/step - loss: 1.1035 - accuracy:
0.5236
Epoch 39/300
115/115 [==============================] - 0s 577us/step - loss: 1.1048 - accuracy:
0.5193
Epoch 40/300
115/115 [==============================] - 0s 578us/step - loss: 1.0868 - accuracy:
0.5385
```

```
Epoch 41/300
115/115 [==============================] - 0s 565us/step - loss: 1.0859 - accuracy:
0.5271
Epoch 42/300
115/115 [==============================] - 0s 569us/step - loss: 1.0838 - accuracy:
0.5271
Epoch 43/300
115/115 [==============================] - 0s 569us/step - loss: 1.0757 - accuracy:
0.5333
Epoch 44/300
115/115 [==============================] - 0s 574us/step - loss: 1.0999 - accuracy:
0.5175
Epoch 45/300
115/115 [==============================] - 0s 569us/step - loss: 1.0684 - accuracy:
0.5201
Epoch 46/300
115/115 [==============================] - 0s 577us/step - loss: 1.0728 - accuracy:
0.5377
Epoch 47/300
115/115 [==============================] - 0s 577us/step - loss: 1.0889 - accuracy:
0.5088
Epoch 48/300
115/115 [==============================] - 0s 569us/step - loss: 1.0480 - accuracy:
0.5350
Epoch 49/300
115/115 [==============================] - 0s 587us/step - loss: 1.1128 - accuracy:
0.5131
Epoch 50/300
115/115 [==============================] - 0s 577us/step - loss: 1.0917 - accuracy:
0.5245
Epoch 51/300
115/115 [==============================] - 0s 577us/step - loss: 1.1006 - accuracy:
0.5193
Epoch 52/300
115/115 [==============================] - 0s 577us/step - loss: 1.0967 - accuracy:
0.5175
Epoch 53/300
115/115 [==============================] - 0s 577us/step - loss: 1.1027 - accuracy:
0.4956
Epoch 54/300
115/115 [==============================] - 0s 577us/step - loss: 1.0986 - accuracy:
0.5079
Epoch 55/300
115/115 [==============================] - 0s 569us/step - loss: 1.0904 - accuracy:
0.5140
Epoch 56/300
115/115 [==============================] - 0s 569us/step - loss: 1.0864 - accuracy:
0.5333
Epoch 57/300
115/115 [==============================] - 0s 569us/step - loss: 1.0717 - accuracy:
0.5429
Epoch 58/300
115/115 [==============================] - 0s 569us/step - loss: 1.0659 - accuracy:
0.5368
Epoch 59/300
115/115 [==============================] - 0s 560us/step - loss: 1.0695 - accuracy:
0.5595
Epoch 60/300
115/115 [==============================] - 0s 577us/step - loss: 1.0548 - accuracy:
0.5622
```

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Epoch 61/300
115/115 [==============================] - 0s 587us/step - loss: 1.0601 - accuracy:
0.5412
Epoch 62/300
115/115 [==============================] - 0s 569us/step - loss: 1.0601 - accuracy:
0.5420
Epoch 63/300
115/115 [==============================] - 0s 560us/step - loss: 1.0489 - accuracy:
0.5359
Epoch 64/300
115/115 [==============================] - 0s 595us/step - loss: 1.0539 - accuracy:
0.5333
Epoch 65/300
115/115 [==============================] - 0s 577us/step - loss: 1.0444 - accuracy:
0.5613
Epoch 66/300
115/115 [==============================] - 0s 577us/step - loss: 1.0526 - accuracy:
0.5595
Epoch 67/300
115/115 [==============================] - 0s 584us/step - loss: 1.0327 - accuracy:
0.5718
Epoch 68/300
115/115 [==============================] - 0s 569us/step - loss: 1.0463 - accuracy:
0.5420
Epoch 69/300
115/115 [==============================] - 0s 577us/step - loss: 1.0529 - accuracy:
0.5490
Epoch 70/300
115/115 [==============================] - 0s 577us/step - loss: 1.1146 - accuracy:
0.5324
Epoch 71/300
115/115 [==============================] - 0s 586us/step - loss: 1.0731 - accuracy:
0.5578
Epoch 72/300
115/115 [==============================] - 0s 576us/step - loss: 1.0699 - accuracy:
0.5455
Epoch 73/300
115/115 [==============================] - 0s 569us/step - loss: 1.0429 - accuracy:
0.5578
Epoch 74/300
115/115 [==============================] - 0s 578us/step - loss: 1.0792 - accuracy:
0.5131
Epoch 75/300
115/115 [==============================] - 0s 577us/step - loss: 1.0877 - accuracy:
0.5219
Epoch 76/300
115/115 [==============================] - 0s 569us/step - loss: 1.0941 - accuracy:
0.5394
Epoch 77/300
115/115 [==============================] - 0s 586us/step - loss: 1.0342 - accuracy:
0.5674
Epoch 78/300
115/115 [==============================] - 0s 586us/step - loss: 1.0655 - accuracy:
0.5736
Epoch 79/300
115/115 [==============================] - 0s 569us/step - loss: 1.0236 - accuracy:
0.5919
Epoch 80/300
115/115 [==============================] - 0s 577us/step - loss: 1.0258 - accuracy:
0.5771
```

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Epoch 81/300
115/115 [==============================] - 0s 569us/step - loss: 1.0050 - accuracy:
0.5919
Epoch 82/300
115/115 [==============================] - 0s 586us/step - loss: 1.0163 - accuracy:
0.5876
Epoch 83/300
115/115 [==============================] - 0s 569us/step - loss: 1.0643 - accuracy:
0.5727
Epoch 84/300
115/115 [==============================] - 0s 569us/step - loss: 1.1117 - accuracy:
0.5333
Epoch 85/300
115/115 [==============================] - 0s 560us/step - loss: 0.9909 - accuracy:
0.5972
Epoch 86/300
115/115 [==============================] - 0s 560us/step - loss: 0.9769 - accuracy:
0.6173
Epoch 87/300
115/115 [==============================] - 0s 560us/step - loss: 1.0175 - accuracy:
0.5639
Epoch 88/300
115/115 [==============================] - 0s 569us/step - loss: 1.0160 - accuracy:
0.5893
Epoch 89/300
115/115 [==============================] - 0s 569us/step - loss: 1.0254 - accuracy:
0.5823
Epoch 90/300
115/115 [==============================] - 0s 560us/step - loss: 1.0050 - accuracy:
0.5989
Epoch 91/300
115/115 [==============================] - 0s 560us/step - loss: 1.0322 - accuracy:
0.5762
Epoch 92/300
115/115 [==============================] - 0s 560us/step - loss: 0.9583 - accuracy:
0.6191
Epoch 93/300
115/115 [==============================] - 0s 560us/step - loss: 1.0725 - accuracy:
0.5587
Epoch 94/300
115/115 [==============================] - 0s 569us/step - loss: 1.0175 - accuracy:
0.5779
Epoch 95/300
115/115 [==============================] - 0s 567us/step - loss: 1.0497 - accuracy:
0.5665
Epoch 96/300
115/115 [==============================] - 0s 560us/step - loss: 1.0843 - accuracy:
0.5263
Epoch 97/300
115/115 [==============================] - 0s 604us/step - loss: 1.0122 - accuracy:
0.5884
Epoch 98/300
115/115 [==============================] - 0s 569us/step - loss: 0.9622 - accuracy:
0.6270
Epoch 99/300
115/115 [==============================] - 0s 577us/step - loss: 0.9543 - accuracy:
0.6200
Epoch 100/300
115/115 [==============================] - 0s 569us/step - loss: 0.9870 - accuracy:
0.6068
```

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Epoch 101/300
115/115 [==============================] - 0s 569us/step - loss: 0.9838 - accuracy:
0.6077
Epoch 102/300
115/115 [==============================] - 0s 586us/step - loss: 1.0587 - accuracy:
0.5394
Epoch 103/300
115/115 [==============================] - 0s 595us/step - loss: 1.0223 - accuracy:
0.5692
Epoch 104/300
115/115 [==============================] - 0s 735us/step - loss: 0.9890 - accuracy:
0.6007
Epoch 105/300
115/115 [==============================] - 0s 604us/step - loss: 0.9346 - accuracy:
0.6357
Epoch 106/300
115/115 [==============================] - 0s 595us/step - loss: 0.9948 - accuracy:
0.5867
Epoch 107/300
115/115 [==============================] - 0s 595us/step - loss: 0.9867 - accuracy:
0.6016
Epoch 108/300
115/115 [==============================] - 0s 630us/step - loss: 1.0077 - accuracy:
0.5841
Epoch 109/300
115/115 [==============================] - 0s 674us/step - loss: 0.9668 - accuracy:
0.6156
Epoch 110/300
115/115 [==============================] - 0s 794us/step - loss: 0.9735 - accuracy:
0.6051
Epoch 111/300
115/115 [==============================] - 0s 869us/step - loss: 0.9452 - accuracy:
0.6270
Epoch 112/300
115/115 [==============================] - 0s 884us/step - loss: 1.0030 - accuracy:
0.5701
Epoch 113/300
115/115 [==============================] - 0s 900us/step - loss: 0.9249 - accuracy:
0.6217
Epoch 114/300
115/115 [==============================] - 0s 937us/step - loss: 0.9160 - accuracy:
0.6217
Epoch 115/300
115/115 [==============================] - 0s 936us/step - loss: 0.9693 - accuracy:
0.6121
Epoch 116/300
115/115 [==============================] - 0s 951us/step - loss: 1.0477 - accuracy:
0.5543
Epoch 117/300
115/115 [==============================] - 0s 902us/step - loss: 0.9872 - accuracy:
0.5806
Epoch 118/300
115/115 [==============================] - 0s 888us/step - loss: 1.1012 - accuracy:
0.5158
Epoch 119/300
115/115 [==============================] - 0s 927us/step - loss: 0.9611 - accuracy:
0.6226
Epoch 120/300
115/115 [==============================] - 0s 997us/step - loss: 0.9699 - accuracy:
0.5858
```

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Epoch 121/300
115/115 [==============================] - 0s 971us/step - loss: 0.9094 - accuracy:
0.6366
Epoch 122/300
115/115 [==============================] - 0s 929us/step - loss: 0.9686 - accuracy:
0.5832
Epoch 123/300
115/115 [==============================] - 0s 940us/step - loss: 1.0036 - accuracy:
0.5972
Epoch 124/300
115/115 [==============================] - 0s 962us/step - loss: 0.9458 - accuracy:
0.6313
Epoch 125/300
115/115 [==============================] - 0s 996us/step - loss: 0.9399 - accuracy:
0.6147
Epoch 126/300
115/115 [==============================] - 0s 987us/step - loss: 0.9525 - accuracy:
0.6182
Epoch 127/300
115/115 [==============================] - 0s 939us/step - loss: 1.0054 - accuracy:
0.5657
Epoch 128/300
115/115 [==============================] - 0s 936us/step - loss: 0.9306 - accuracy:
0.6462
Epoch 129/300
115/115 [==============================] - 0s 926us/step - loss: 1.0181 - accuracy:
0.5937
Epoch 130/300
115/115 [==============================] - 0s 909us/step - loss: 0.9711 - accuracy:
0.6287
Epoch 131/300
115/115 [==============================] - 0s 903us/step - loss: 0.9610 - accuracy:
0.5989
Epoch 132/300
115/115 [==============================] - 0s 875us/step - loss: 0.9525 - accuracy:
0.6217
Epoch 133/300
115/115 [==============================] - 0s 919us/step - loss: 0.9752 - accuracy:
0.6103
Epoch 134/300
115/115 [==============================] - 0s 945us/step - loss: 0.9462 - accuracy:
0.6313
Epoch 135/300
115/115 [==============================] - 0s 931us/step - loss: 0.8894 - accuracy:
0.6576
Epoch 136/300
115/115 [==============================] - 0s 882us/step - loss: 0.9268 - accuracy:
0.6436
Epoch 137/300
115/115 [==============================] - 0s 869us/step - loss: 0.9575 - accuracy:
0.6173
Epoch 138/300
115/115 [==============================] - 0s 892us/step - loss: 0.9804 - accuracy:
0.6191
Epoch 139/300
115/115 [==============================] - 0s 925us/step - loss: 0.9077 - accuracy:
0.6524
Epoch 140/300
115/115 [==============================] - 0s 884us/step - loss: 1.0011 - accuracy:
0.6112
```

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Epoch 141/300
115/115 [==============================] - 0s 875us/step - loss: 1.0726 - accuracy:
0.5665
Epoch 142/300
115/115 [==============================] - 0s 887us/step - loss: 1.0335 - accuracy:
0.5604
Epoch 143/300
115/115 [==============================] - 0s 894us/step - loss: 0.9014 - accuracy:
0.6734
Epoch 144/300
115/115 [==============================] - 0s 877us/step - loss: 0.9345 - accuracy:
0.6357
Epoch 145/300
115/115 [==============================] - 0s 892us/step - loss: 0.8895 - accuracy:
0.6550
Epoch 146/300
115/115 [==============================] - 0s 927us/step - loss: 1.0766 - accuracy:
0.5517
Epoch 147/300
115/115 [==============================] - 0s 915us/step - loss: 0.9865 - accuracy:
0.6112
Epoch 148/300
115/115 [==============================] - 0s 949us/step - loss: 0.9301 - accuracy:
0.6182
Epoch 149/300
115/115 [==============================] - 0s 897us/step - loss: 0.9537 - accuracy:
0.6103
Epoch 150/300
115/115 [==============================] - 0s 894us/step - loss: 0.9008 - accuracy:
0.6690
Epoch 151/300
115/115 [==============================] - 0s 929us/step - loss: 0.9893 - accuracy:
0.6016
Epoch 152/300
115/115 [==============================] - 0s 879us/step - loss: 0.9010 - accuracy:
0.6541
Epoch 153/300
115/115 [==============================] - 0s 887us/step - loss: 0.8956 - accuracy:
0.6629
Epoch 154/300
115/115 [==============================] - 0s 873us/step - loss: 0.9353 - accuracy:
0.6436
Epoch 155/300
115/115 [==============================] - 0s 889us/step - loss: 0.9583 - accuracy:
0.6305
Epoch 156/300
115/115 [==============================] - 0s 921us/step - loss: 1.0267 - accuracy:
0.5762
Epoch 157/300
115/115 [==============================] - 0s 915us/step - loss: 0.9024 - accuracy:
0.6524
Epoch 158/300
115/115 [==============================] - 0s 875us/step - loss: 1.0602 - accuracy:
0.5210
Epoch 159/300
115/115 [==============================] - 0s 910us/step - loss: 0.8773 - accuracy:
0.6664
Epoch 160/300
115/115 [==============================] - 0s 920us/step - loss: 0.8907 - accuracy:
0.6655
```

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Epoch 161/300
115/115 [==============================] - 0s 881us/step - loss: 0.8738 - accuracy:
0.6769
Epoch 162/300
115/115 [==============================] - 0s 914us/step - loss: 0.9972 - accuracy:
0.6077
Epoch 163/300
115/115 [==============================] - 0s 945us/step - loss: 0.9560 - accuracy:
0.6366
Epoch 164/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8789 - accuracy: 0.6
620
Epoch 165/300
115/115 [==============================] - 0s 1ms/step - loss: 1.2055 - accuracy: 0.4
238
Epoch 166/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0835 - accuracy: 0.5
403
Epoch 167/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8807 - accuracy: 0.6
690
Epoch 168/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8878 - accuracy: 0.6
620
Epoch 169/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9657 - accuracy: 0.6
217
Epoch 170/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8924 - accuracy: 0.6
602
Epoch 171/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8804 - accuracy: 0.6
690
Epoch 172/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8935 - accuracy: 0.6
541
Epoch 173/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9298 - accuracy: 0.6
410
Epoch 174/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9269 - accuracy: 0.6
454
Epoch 175/300
115/115 [==============================] - 0s 935us/step - loss: 0.8572 - accuracy:
0.6856
Epoch 176/300
115/115 [==============================] - 0s 945us/step - loss: 0.9907 - accuracy:
0.6235
Epoch 177/300
115/115 [==============================] - 0s 919us/step - loss: 0.9799 - accuracy:
0.5989
Epoch 178/300
115/115 [==============================] - 0s 884us/step - loss: 0.9063 - accuracy:
0.6480
Epoch 179/300
115/115 [==============================] - 0s 869us/step - loss: 1.0594 - accuracy:
0.5394
Epoch 180/300
115/115 [==============================] - 0s 874us/step - loss: 0.8752 - accuracy:
0.6699
```

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Epoch 181/300
115/115 [==============================] - 0s 892us/step - loss: 0.8218 - accuracy:
0.7137
Epoch 182/300
115/115 [==============================] - 0s 894us/step - loss: 0.9045 - accuracy:
0.6471
Epoch 183/300
115/115 [==============================] - 0s 912us/step - loss: 0.9136 - accuracy:
0.6559
Epoch 184/300
115/115 [==============================] - 0s 874us/step - loss: 1.1413 - accuracy:
0.4562
Epoch 185/300
115/115 [==============================] - 0s 869us/step - loss: 0.9369 - accuracy:
0.6217
Epoch 186/300
115/115 [==============================] - 0s 840us/step - loss: 0.8939 - accuracy:
0.6629
Epoch 187/300
115/115 [==============================] - 0s 866us/step - loss: 0.9413 - accuracy:
0.6349
Epoch 188/300
115/115 [==============================] - 0s 913us/step - loss: 0.8332 - accuracy:
0.6970
Epoch 189/300
115/115 [==============================] - 0s 863us/step - loss: 0.8743 - accuracy:
0.6594
Epoch 190/300
115/115 [==============================] - 0s 834us/step - loss: 0.8737 - accuracy:
0.6673
Epoch 191/300
115/115 [==============================] - 0s 865us/step - loss: 0.8600 - accuracy:
0.6900
Epoch 192/300
115/115 [==============================] - 0s 902us/step - loss: 0.8348 - accuracy:
0.6926
Epoch 193/300
115/115 [==============================] - 0s 894us/step - loss: 0.8615 - accuracy:
0.6646
Epoch 194/300
115/115 [==============================] - 0s 857us/step - loss: 0.8427 - accuracy:
0.6874
Epoch 195/300
115/115 [==============================] - 0s 840us/step - loss: 0.8505 - accuracy:
0.6935
Epoch 196/300
115/115 [==============================] - 0s 857us/step - loss: 0.9016 - accuracy:
0.6489
Epoch 197/300
115/115 [==============================] - 0s 875us/step - loss: 1.0794 - accuracy:
0.5324
Epoch 198/300
115/115 [==============================] - 0s 868us/step - loss: 1.1759 - accuracy:
0.4370
Epoch 199/300
115/115 [==============================] - 0s 849us/step - loss: 1.0596 - accuracy:
0.5114
Epoch 200/300
115/115 [==============================] - 0s 823us/step - loss: 0.8641 - accuracy:
0.6848
```

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Epoch 201/300
115/115 [==============================] - 0s 822us/step - loss: 0.8515 - accuracy:
0.6900
Epoch 202/300
115/115 [==============================] - 0s 822us/step - loss: 0.9744 - accuracy:
0.6235
Epoch 203/300
115/115 [==============================] - 0s 868us/step - loss: 0.9133 - accuracy:
0.6305
Epoch 204/300
115/115 [==============================] - 0s 871us/step - loss: 0.8328 - accuracy:
0.7049
Epoch 205/300
115/115 [==============================] - 0s 866us/step - loss: 0.9749 - accuracy:
0.6191
Epoch 206/300
115/115 [==============================] - 0s 873us/step - loss: 0.8431 - accuracy:
0.6970
Epoch 207/300
115/115 [==============================] - 0s 878us/step - loss: 0.9519 - accuracy:
0.6349
Epoch 208/300
115/115 [==============================] - 0s 879us/step - loss: 0.8511 - accuracy:
0.6944
Epoch 209/300
115/115 [==============================] - 0s 851us/step - loss: 0.9096 - accuracy:
0.6550
Epoch 210/300
115/115 [==============================] - 0s 831us/step - loss: 0.8473 - accuracy:
0.6944
Epoch 211/300
115/115 [==============================] - 0s 857us/step - loss: 0.8594 - accuracy:
0.6673
Epoch 212/300
115/115 [==============================] - 0s 859us/step - loss: 0.8917 - accuracy:
0.6673
Epoch 213/300
115/115 [==============================] - 0s 841us/step - loss: 0.8624 - accuracy:
0.6769
Epoch 214/300
115/115 [==============================] - 0s 904us/step - loss: 0.9303 - accuracy:
0.6191
Epoch 215/300
115/115 [==============================] - 0s 884us/step - loss: 0.8734 - accuracy:
0.6804
Epoch 216/300
115/115 [==============================] - 0s 849us/step - loss: 0.8268 - accuracy:
0.7137
Epoch 217/300
115/115 [==============================] - 0s 831us/step - loss: 0.8585 - accuracy:
0.6839
Epoch 218/300
115/115 [==============================] - 0s 924us/step - loss: 0.9117 - accuracy:
0.6532
Epoch 219/300
115/115 [==============================] - 0s 939us/step - loss: 0.9646 - accuracy:
0.6121
Epoch 220/300
115/115 [==============================] - 0s 884us/step - loss: 0.8466 - accuracy:
0.6874
```

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Epoch 221/300
115/115 [==============================] - 0s 881us/step - loss: 0.8382 - accuracy:
0.6830
Epoch 222/300
115/115 [==============================] - 0s 860us/step - loss: 0.8118 - accuracy:
0.7058
Epoch 223/300
115/115 [==============================] - 0s 864us/step - loss: 0.9432 - accuracy:
0.6331
Epoch 224/300
115/115 [==============================] - 0s 880us/step - loss: 0.8569 - accuracy:
0.6699
Epoch 225/300
115/115 [==============================] - 0s 875us/step - loss: 0.7625 - accuracy:
0.7277
Epoch 226/300
115/115 [==============================] - 0s 872us/step - loss: 0.8353 - accuracy:
0.6970
Epoch 227/300
115/115 [==============================] - 0s 929us/step - loss: 0.8333 - accuracy:
0.6865
Epoch 228/300
115/115 [==============================] - 0s 876us/step - loss: 0.8715 - accuracy:
0.6821
Epoch 229/300
115/115 [==============================] - 0s 887us/step - loss: 0.8285 - accuracy:
0.6988
Epoch 230/300
115/115 [==============================] - 0s 905us/step - loss: 0.9959 - accuracy:
0.6305
Epoch 231/300
115/115 [==============================] - 0s 883us/step - loss: 0.8330 - accuracy:
0.6935
Epoch 232/300
115/115 [==============================] - 0s 834us/step - loss: 0.7998 - accuracy:
0.6953
Epoch 233/300
115/115 [==============================] - 0s 878us/step - loss: 0.8143 - accuracy:
0.6944
Epoch 234/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8178 - accuracy: 0.6
918
Epoch 235/300
115/115 [==============================] - 0s 875us/step - loss: 0.7911 - accuracy:
0.7040
Epoch 236/300
115/115 [==============================] - 0s 883us/step - loss: 1.2428 - accuracy:
0.4352
Epoch 237/300
115/115 [==============================] - 0s 866us/step - loss: 0.9002 - accuracy:
0.6611
Epoch 238/300
115/115 [==============================] - 0s 857us/step - loss: 0.7914 - accuracy:
0.7268
Epoch 239/300
115/115 [==============================] - 0s 857us/step - loss: 0.8974 - accuracy:
0.6550
Epoch 240/300
115/115 [==============================] - 0s 839us/step - loss: 0.8560 - accuracy:
0.6944
```

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Epoch 241/300
115/115 [==============================] - 0s 831us/step - loss: 0.8230 - accuracy:
0.7040
Epoch 242/300
115/115 [==============================] - 0s 873us/step - loss: 0.8333 - accuracy:
0.7084
Epoch 243/300
115/115 [==============================] - 0s 867us/step - loss: 0.8699 - accuracy:
0.6760
Epoch 244/300
115/115 [==============================] - 0s 835us/step - loss: 0.7833 - accuracy:
0.7093
Epoch 245/300
115/115 [==============================] - 0s 830us/step - loss: 0.8405 - accuracy:
0.6883
Epoch 246/300
115/115 [==============================] - 0s 831us/step - loss: 0.7876 - accuracy:
0.7233
Epoch 247/300
115/115 [==============================] - 0s 822us/step - loss: 0.7972 - accuracy:
0.6996
Epoch 248/300
115/115 [==============================] - 0s 839us/step - loss: 0.9441 - accuracy:
0.6410
Epoch 249/300
115/115 [==============================] - 0s 831us/step - loss: 1.2284 - accuracy:
0.4256
Epoch 250/300
115/115 [==============================] - 0s 822us/step - loss: 1.1698 - accuracy:
0.4186
Epoch 251/300
115/115 [==============================] - 0s 829us/step - loss: 0.9759 - accuracy:
0.5814
Epoch 252/300
115/115 [==============================] - 0s 848us/step - loss: 0.8423 - accuracy:
0.7023
Epoch 253/300
115/115 [==============================] - 0s 849us/step - loss: 0.8334 - accuracy:
0.6926
Epoch 254/300
115/115 [==============================] - 0s 857us/step - loss: 0.8713 - accuracy:
0.6786
Epoch 255/300
115/115 [==============================] - 0s 831us/step - loss: 0.8428 - accuracy:
0.6935
Epoch 256/300
115/115 [==============================] - 0s 901us/step - loss: 0.8339 - accuracy:
0.6961
Epoch 257/300
115/115 [==============================] - 0s 907us/step - loss: 1.0242 - accuracy:
0.5665
Epoch 258/300
115/115 [==============================] - 0s 866us/step - loss: 0.8261 - accuracy:
0.6830
Epoch 259/300
115/115 [==============================] - 0s 910us/step - loss: 0.7708 - accuracy:
0.7137
Epoch 260/300
115/115 [==============================] - 0s 911us/step - loss: 0.7754 - accuracy:
0.7233
```

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Epoch 261/300
115/115 [==============================] - 0s 897us/step - loss: 0.8272 - accuracy:
0.6900
Epoch 262/300
115/115 [==============================] - 0s 905us/step - loss: 0.8312 - accuracy:
0.7023
Epoch 263/300
115/115 [==============================] - 0s 874us/step - loss: 0.7828 - accuracy:
0.7154
Epoch 264/300
115/115 [==============================] - 0s 878us/step - loss: 0.9750 - accuracy:
0.6357
Epoch 265/300
115/115 [==============================] - 0s 868us/step - loss: 0.7613 - accuracy:
0.7364
Epoch 266/300
115/115 [==============================] - 0s 840us/step - loss: 0.7784 - accuracy:
0.7250
Epoch 267/300
115/115 [==============================] - 0s 831us/step - loss: 0.7904 - accuracy:
0.7172
Epoch 268/300
115/115 [==============================] - 0s 868us/step - loss: 0.7648 - accuracy:
0.7356
Epoch 269/300
115/115 [==============================] - 0s 877us/step - loss: 0.7904 - accuracy:
0.7189
Epoch 270/300
115/115 [==============================] - 0s 864us/step - loss: 0.7874 - accuracy:
0.7215
Epoch 271/300
115/115 [==============================] - 0s 839us/step - loss: 0.9167 - accuracy:
0.6585
Epoch 272/300
115/115 [==============================] - 0s 840us/step - loss: 0.7212 - accuracy:
0.7513
Epoch 273/300
115/115 [==============================] - 0s 840us/step - loss: 0.8893 - accuracy:
0.6708
Epoch 274/300
115/115 [==============================] - 0s 864us/step - loss: 0.9541 - accuracy:
0.6165
Epoch 275/300
115/115 [==============================] - 0s 866us/step - loss: 0.8105 - accuracy:
0.7145
Epoch 276/300
115/115 [==============================] - 0s 831us/step - loss: 0.8110 - accuracy:
0.7005
Epoch 277/300
115/115 [==============================] - 0s 849us/step - loss: 0.7442 - accuracy:
0.7391
Epoch 278/300
115/115 [==============================] - 0s 864us/step - loss: 0.8390 - accuracy:
0.7049
Epoch 279/300
115/115 [==============================] - 0s 845us/step - loss: 1.0594 - accuracy:
0.5683
Epoch 280/300
115/115 [==============================] - 0s 840us/step - loss: 1.1824 - accuracy:
0.4177
```

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Epoch 281/300
115/115 [==============================] - 0s 867us/step - loss: 1.1660 - accuracy:
0.4361
Epoch 282/300
115/115 [==============================] - 0s 955us/step - loss: 1.1477 - accuracy:
0.4273
Epoch 283/300
115/115 [==============================] - 0s 914us/step - loss: 1.0676 - accuracy:
0.4904
Epoch 284/300
115/115 [==============================] - 0s 896us/step - loss: 0.9268 - accuracy:
0.6287
Epoch 285/300
115/115 [==============================] - 0s 866us/step - loss: 0.8143 - accuracy:
0.7102
Epoch 286/300
115/115 [==============================] - 0s 869us/step - loss: 0.8320 - accuracy:
0.6953
Epoch 287/300
115/115 [==============================] - 0s 860us/step - loss: 0.7776 - accuracy:
0.7268
Epoch 288/300
115/115 [==============================] - 0s 860us/step - loss: 0.8559 - accuracy:
0.6891
Epoch 289/300
115/115 [==============================] - 0s 831us/step - loss: 0.8742 - accuracy:
0.6594
Epoch 290/300
115/115 [==============================] - 0s 849us/step - loss: 0.8221 - accuracy:
0.7023
Epoch 291/300
115/115 [==============================] - 0s 901us/step - loss: 0.8463 - accuracy:
0.6883
Epoch 292/300
115/115 [==============================] - 0s 901us/step - loss: 0.8348 - accuracy:
0.6953
Epoch 293/300
115/115 [==============================] - 0s 866us/step - loss: 0.8062 - accuracy:
0.7058
Epoch 294/300
115/115 [==============================] - 0s 831us/step - loss: 0.7732 - accuracy:
0.7145
Epoch 295/300
115/115 [==============================] - 0s 901us/step - loss: 0.8867 - accuracy:
0.6751
Epoch 296/300
115/115 [==============================] - 0s 875us/step - loss: 0.8083 - accuracy:
0.7049
Epoch 297/300
115/115 [==============================] - 0s 844us/step - loss: 0.7411 - accuracy:
0.7452
Epoch 298/300
115/115 [==============================] - 0s 852us/step - loss: 0.8246 - accuracy:
0.6935
Epoch 299/300
115/115 [==============================] - 0s 832us/step - loss: 0.8452 - accuracy:
0.6900
Epoch 300/300
115/115 [==============================] - 0s 844us/step - loss: 0.9078 - accuracy:
0.6489
```

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36/36 [==============================] - 0s 912us/step - loss: 0.7595 - accuracy: 0.7
040
Epoch 1/300
115/115 [==============================] - 0s 763us/step - loss: 1.3243 - accuracy:
0.4343
Epoch 2/300
115/115 [==============================] - 0s 804us/step - loss: 1.1685 - accuracy:
0.5000
Epoch 3/300
115/115 [==============================] - 0s 813us/step - loss: 1.1691 - accuracy:
0.4370
Epoch 4/300
115/115 [==============================] - 0s 834us/step - loss: 1.1484 - accuracy:
0.4947
Epoch 5/300
115/115 [==============================] - 0s 897us/step - loss: 1.1400 - accuracy:
0.5201
Epoch 6/300
115/115 [==============================] - 0s 875us/step - loss: 1.1320 - accuracy:
0.5254
Epoch 7/300
115/115 [==============================] - 0s 866us/step - loss: 1.1265 - accuracy:
0.5271
Epoch 8/300
115/115 [==============================] - 0s 866us/step - loss: 1.1268 - accuracy:
0.5175
Epoch 9/300
115/115 [==============================] - 0s 910us/step - loss: 1.1230 - accuracy:
0.5306
Epoch 10/300
115/115 [==============================] - 0s 875us/step - loss: 1.1218 - accuracy:
0.5123
Epoch 11/300
115/115 [==============================] - 0s 954us/step - loss: 1.1084 - accuracy:
0.5403
Epoch 12/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1153 - accuracy: 0.5
236
Epoch 13/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1051 - accuracy: 0.5
420
Epoch 14/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1099 - accuracy: 0.5
324
Epoch 15/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0918 - accuracy: 0.5
394
Epoch 16/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0864 - accuracy: 0.5
473
Epoch 17/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0738 - accuracy: 0.5
543
Epoch 18/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0841 - accuracy: 0.5
333
Epoch 19/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0811 - accuracy: 0.5
342
Epoch 20/300
```

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115/115 [==============================] - 0s 1ms/step - loss: 1.0693 - accuracy: 0.5
525
Epoch 21/300
115/115 [==============================] - 0s 954us/step - loss: 1.0656 - accuracy:
0.5438
Epoch 22/300
115/115 [==============================] - 0s 919us/step - loss: 1.0378 - accuracy:
0.5595
Epoch 23/300
115/115 [==============================] - 0s 901us/step - loss: 1.0664 - accuracy:
0.5324
Epoch 24/300
115/115 [==============================] - 0s 929us/step - loss: 1.0200 - accuracy:
0.5569
Epoch 25/300
115/115 [==============================] - 0s 901us/step - loss: 1.0145 - accuracy:
0.5762
Epoch 26/300
115/115 [==============================] - 0s 866us/step - loss: 1.0552 - accuracy:
0.5674
Epoch 27/300
115/115 [==============================] - 0s 860us/step - loss: 1.0536 - accuracy:
0.5552
Epoch 28/300
115/115 [==============================] - 0s 857us/step - loss: 1.0247 - accuracy:
0.5648
Epoch 29/300
115/115 [==============================] - 0s 848us/step - loss: 1.0174 - accuracy:
0.5884
Epoch 30/300
115/115 [==============================] - 0s 850us/step - loss: 0.9901 - accuracy:
0.5954
Epoch 31/300
115/115 [==============================] - 0s 853us/step - loss: 0.9614 - accuracy:
0.6025
Epoch 32/300
115/115 [==============================] - 0s 910us/step - loss: 0.9395 - accuracy:
0.6103
Epoch 33/300
115/115 [==============================] - 0s 916us/step - loss: 0.9881 - accuracy:
0.6121
Epoch 34/300
115/115 [==============================] - 0s 866us/step - loss: 1.0038 - accuracy:
0.5797
Epoch 35/300
115/115 [==============================] - 0s 857us/step - loss: 0.9986 - accuracy:
0.5937
Epoch 36/300
115/115 [==============================] - 0s 857us/step - loss: 0.9626 - accuracy:
0.6060
Epoch 37/300
115/115 [==============================] - 0s 857us/step - loss: 0.9550 - accuracy:
0.6182
Epoch 38/300
115/115 [==============================] - 0s 847us/step - loss: 0.9681 - accuracy:
0.6007
Epoch 39/300
115/115 [==============================] - 0s 839us/step - loss: 0.9711 - accuracy:
0.5981
Epoch 40/300
```

```
115/115 [==============================] - 0s 857us/step - loss: 0.9769 - accuracy:
0.6138
Epoch 41/300
115/115 [==============================] - 0s 851us/step - loss: 1.0181 - accuracy:
0.5560
Epoch 42/300
115/115 [==============================] - 0s 875us/step - loss: 0.9800 - accuracy:
0.5919
Epoch 43/300
115/115 [==============================] - 0s 879us/step - loss: 0.8720 - accuracy:
0.6690
Epoch 44/300
115/115 [==============================] - 0s 884us/step - loss: 0.9391 - accuracy:
0.6130
Epoch 45/300
115/115 [==============================] - 0s 857us/step - loss: 0.9158 - accuracy:
0.6366
Epoch 46/300
115/115 [==============================] - 0s 849us/step - loss: 0.9376 - accuracy:
0.6287
Epoch 47/300
115/115 [==============================] - 0s 849us/step - loss: 0.9077 - accuracy:
0.6366
Epoch 48/300
115/115 [==============================] - 0s 840us/step - loss: 0.8901 - accuracy:
0.6392
Epoch 49/300
115/115 [==============================] - 0s 848us/step - loss: 0.9003 - accuracy:
0.6410
Epoch 50/300
115/115 [==============================] - 0s 857us/step - loss: 0.8777 - accuracy:
0.6427
Epoch 51/300
115/115 [==============================] - 0s 910us/step - loss: 0.8925 - accuracy:
0.6313
Epoch 52/300
115/115 [==============================] - 0s 910us/step - loss: 0.8824 - accuracy:
0.6384
Epoch 53/300
115/115 [==============================] - 0s 915us/step - loss: 0.9623 - accuracy:
0.6077
Epoch 54/300
115/115 [==============================] - 0s 850us/step - loss: 0.9878 - accuracy:
0.5902
Epoch 55/300
115/115 [==============================] - 0s 853us/step - loss: 0.8451 - accuracy:
0.6699
Epoch 56/300
115/115 [==============================] - 0s 871us/step - loss: 0.8610 - accuracy:
0.6786
Epoch 57/300
115/115 [==============================] - 0s 902us/step - loss: 0.9063 - accuracy:
0.6375
Epoch 58/300
115/115 [==============================] - 0s 884us/step - loss: 0.8896 - accuracy:
0.6594
Epoch 59/300
115/115 [==============================] - 0s 861us/step - loss: 0.8450 - accuracy:
0.6611
Epoch 60/300
```

```
115/115 [==============================] - 0s 849us/step - loss: 0.8400 - accuracy:
0.6743
Epoch 61/300
115/115 [==============================] - 0s 849us/step - loss: 0.7736 - accuracy:
0.7285
Epoch 62/300
115/115 [==============================] - 0s 884us/step - loss: 0.8555 - accuracy:
0.6532
Epoch 63/300
115/115 [==============================] - 0s 930us/step - loss: 0.8781 - accuracy:
0.6585
Epoch 64/300
115/115 [==============================] - 0s 905us/step - loss: 0.8314 - accuracy:
0.6690
Epoch 65/300
115/115 [==============================] - 0s 896us/step - loss: 0.8224 - accuracy:
0.6786
Epoch 66/300
115/115 [==============================] - 0s 857us/step - loss: 0.8259 - accuracy:
0.6602
Epoch 67/300
115/115 [==============================] - 0s 846us/step - loss: 0.8381 - accuracy:
0.6690
Epoch 68/300
115/115 [==============================] - 0s 857us/step - loss: 0.8462 - accuracy:
0.6585
Epoch 69/300
115/115 [==============================] - 0s 875us/step - loss: 0.7920 - accuracy:
0.7014
Epoch 70/300
115/115 [==============================] - 0s 877us/step - loss: 0.8066 - accuracy:
0.6567
Epoch 71/300
115/115 [==============================] - 0s 853us/step - loss: 0.8786 - accuracy:
0.6384
Epoch 72/300
115/115 [==============================] - 0s 860us/step - loss: 0.8438 - accuracy:
0.6699
Epoch 73/300
115/115 [==============================] - 0s 923us/step - loss: 0.7659 - accuracy:
0.6979
Epoch 74/300
115/115 [==============================] - 0s 876us/step - loss: 0.8832 - accuracy:
0.6366
Epoch 75/300
115/115 [==============================] - 0s 873us/step - loss: 0.8413 - accuracy:
0.6646
Epoch 76/300
115/115 [==============================] - 0s 882us/step - loss: 0.8619 - accuracy:
0.6532
Epoch 77/300
115/115 [==============================] - 0s 903us/step - loss: 0.8050 - accuracy:
0.6926
Epoch 78/300
115/115 [==============================] - 0s 851us/step - loss: 0.8704 - accuracy:
0.6480
Epoch 79/300
115/115 [==============================] - 0s 850us/step - loss: 0.8038 - accuracy:
0.6690
Epoch 80/300
```

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115/115 [==============================] - 0s 859us/step - loss: 0.8150 - accuracy:
0.6716
Epoch 81/300
115/115 [==============================] - 0s 926us/step - loss: 0.7929 - accuracy:
0.6918
Epoch 82/300
115/115 [==============================] - 0s 907us/step - loss: 0.7962 - accuracy:
0.6655
Epoch 83/300
115/115 [==============================] - 0s 897us/step - loss: 0.7814 - accuracy:
0.6909
Epoch 84/300
115/115 [==============================] - 0s 857us/step - loss: 0.8158 - accuracy:
0.6839
Epoch 85/300
115/115 [==============================] - 0s 857us/step - loss: 0.8942 - accuracy:
0.6384
Epoch 86/300
115/115 [==============================] - 0s 896us/step - loss: 0.7695 - accuracy:
0.6953
Epoch 87/300
115/115 [==============================] - 0s 901us/step - loss: 0.7893 - accuracy:
0.6856
Epoch 88/300
115/115 [==============================] - 0s 901us/step - loss: 0.8090 - accuracy:
0.6944
Epoch 89/300
115/115 [==============================] - 0s 907us/step - loss: 0.7845 - accuracy:
0.7005
Epoch 90/300
115/115 [==============================] - 0s 919us/step - loss: 0.7217 - accuracy:
0.7137
Epoch 91/300
115/115 [==============================] - 0s 866us/step - loss: 0.7779 - accuracy:
0.6970
Epoch 92/300
115/115 [==============================] - 0s 876us/step - loss: 0.7646 - accuracy:
0.7058
Epoch 93/300
115/115 [==============================] - 0s 895us/step - loss: 0.7224 - accuracy:
0.7110
Epoch 94/300
115/115 [==============================] - 0s 919us/step - loss: 0.7270 - accuracy:
0.7154
Epoch 95/300
115/115 [==============================] - 0s 898us/step - loss: 0.7094 - accuracy:
0.7303
Epoch 96/300
115/115 [==============================] - 0s 901us/step - loss: 0.8332 - accuracy:
0.6725
Epoch 97/300
115/115 [==============================] - 0s 861us/step - loss: 0.7572 - accuracy:
0.6944
Epoch 98/300
115/115 [==============================] - 0s 844us/step - loss: 0.7337 - accuracy:
0.7049
Epoch 99/300
115/115 [==============================] - 0s 842us/step - loss: 0.7507 - accuracy:
0.7032
Epoch 100/300
```

```
115/115 [==============================] - 0s 849us/step - loss: 0.7291 - accuracy:
0.7084
Epoch 101/300
115/115 [==============================] - 0s 859us/step - loss: 0.6912 - accuracy:
0.6979
Epoch 102/300
115/115 [==============================] - 0s 910us/step - loss: 0.7737 - accuracy:
0.6988
Epoch 103/300
115/115 [==============================] - 0s 901us/step - loss: 0.7248 - accuracy:
0.7067
Epoch 104/300
115/115 [==============================] - 0s 857us/step - loss: 0.7048 - accuracy:
0.7259
Epoch 105/300
115/115 [==============================] - 0s 882us/step - loss: 0.6968 - accuracy:
0.7250
Epoch 106/300
115/115 [==============================] - 0s 901us/step - loss: 0.7423 - accuracy:
0.6970
Epoch 107/300
115/115 [==============================] - 0s 901us/step - loss: 0.6582 - accuracy:
0.7268
Epoch 108/300
115/115 [==============================] - 0s 910us/step - loss: 0.7662 - accuracy:
0.7040
Epoch 109/300
115/115 [==============================] - 0s 866us/step - loss: 0.8854 - accuracy:
0.6716
Epoch 110/300
115/115 [==============================] - 0s 878us/step - loss: 0.7376 - accuracy:
0.7180
Epoch 111/300
115/115 [==============================] - 0s 898us/step - loss: 0.7886 - accuracy:
0.6637
Epoch 112/300
115/115 [==============================] - 0s 927us/step - loss: 0.6871 - accuracy:
0.7093
Epoch 113/300
115/115 [==============================] - 0s 857us/step - loss: 0.6625 - accuracy:
0.7469
Epoch 114/300
115/115 [==============================] - 0s 849us/step - loss: 0.7359 - accuracy:
0.6988
Epoch 115/300
115/115 [==============================] - 0s 849us/step - loss: 0.7021 - accuracy:
0.7215
Epoch 116/300
115/115 [==============================] - 0s 849us/step - loss: 0.6423 - accuracy:
0.7469
Epoch 117/300
115/115 [==============================] - 0s 837us/step - loss: 0.7429 - accuracy:
0.7032
Epoch 118/300
115/115 [==============================] - 0s 855us/step - loss: 0.6822 - accuracy:
0.7320
Epoch 119/300
115/115 [==============================] - 0s 847us/step - loss: 0.6854 - accuracy:
0.7233
Epoch 120/300
```

```
115/115 [==============================] - 0s 849us/step - loss: 0.6217 - accuracy:
0.7671
Epoch 121/300
115/115 [==============================] - 0s 910us/step - loss: 0.7525 - accuracy:
0.7005
Epoch 122/300
115/115 [==============================] - 0s 884us/step - loss: 0.7726 - accuracy:
0.6988
Epoch 123/300
115/115 [==============================] - 0s 850us/step - loss: 0.7350 - accuracy:
0.6821
Epoch 124/300
115/115 [==============================] - 0s 857us/step - loss: 0.7161 - accuracy:
0.6891
Epoch 125/300
115/115 [==============================] - 0s 840us/step - loss: 0.6829 - accuracy:
0.7294
Epoch 126/300
115/115 [==============================] - 0s 849us/step - loss: 0.6902 - accuracy:
0.7058
Epoch 127/300
115/115 [==============================] - 0s 849us/step - loss: 0.6432 - accuracy:
0.7373
Epoch 128/300
115/115 [==============================] - 0s 857us/step - loss: 0.7363 - accuracy:
0.7207
Epoch 129/300
115/115 [==============================] - 0s 892us/step - loss: 0.7175 - accuracy:
0.7215
Epoch 130/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7524 - accuracy: 0.6
926
Epoch 131/300
115/115 [==============================] - 0s 932us/step - loss: 0.6998 - accuracy:
0.7250
Epoch 132/300
115/115 [==============================] - 0s 922us/step - loss: 0.7557 - accuracy:
0.7014
Epoch 133/300
115/115 [==============================] - 0s 932us/step - loss: 0.6522 - accuracy:
0.7408
Epoch 134/300
115/115 [==============================] - 0s 910us/step - loss: 0.7002 - accuracy:
0.7259
Epoch 135/300
115/115 [==============================] - 0s 866us/step - loss: 0.6512 - accuracy:
0.7478
Epoch 136/300
115/115 [==============================] - 0s 857us/step - loss: 0.7488 - accuracy:
0.6996
Epoch 137/300
115/115 [==============================] - 0s 854us/step - loss: 0.7482 - accuracy:
0.7040
Epoch 138/300
115/115 [==============================] - 0s 866us/step - loss: 0.6615 - accuracy:
0.7417
Epoch 139/300
115/115 [==============================] - 0s 857us/step - loss: 0.6985 - accuracy:
0.7163
Epoch 140/300
```

```
115/115 [==============================] - 0s 857us/step - loss: 0.7391 - accuracy:
0.7005
Epoch 141/300
115/115 [==============================] - 0s 927us/step - loss: 0.6261 - accuracy:
0.7715
Epoch 142/300
115/115 [==============================] - 0s 915us/step - loss: 0.6403 - accuracy:
0.7426
Epoch 143/300
115/115 [==============================] - 0s 875us/step - loss: 0.5736 - accuracy:
0.7846
Epoch 144/300
115/115 [==============================] - 0s 857us/step - loss: 0.7867 - accuracy:
0.6786
Epoch 145/300
115/115 [==============================] - 0s 861us/step - loss: 0.6524 - accuracy:
0.7356
Epoch 146/300
115/115 [==============================] - 0s 865us/step - loss: 0.5925 - accuracy:
0.7802
Epoch 147/300
115/115 [==============================] - 0s 866us/step - loss: 0.6057 - accuracy:
0.7750
Epoch 148/300
115/115 [==============================] - 0s 857us/step - loss: 0.6072 - accuracy:
0.7539
Epoch 149/300
115/115 [==============================] - 0s 849us/step - loss: 0.6361 - accuracy:
0.7347
Epoch 150/300
115/115 [==============================] - 0s 881us/step - loss: 0.6034 - accuracy:
0.7618
Epoch 151/300
115/115 [==============================] - 0s 903us/step - loss: 0.6163 - accuracy:
0.7732
Epoch 152/300
115/115 [==============================] - 0s 894us/step - loss: 0.6894 - accuracy:
0.7277
Epoch 153/300
115/115 [==============================] - 0s 883us/step - loss: 0.6325 - accuracy:
0.7513
Epoch 154/300
115/115 [==============================] - 0s 862us/step - loss: 0.5437 - accuracy:
0.8065
Epoch 155/300
115/115 [==============================] - 0s 893us/step - loss: 0.6003 - accuracy:
0.7732
Epoch 156/300
115/115 [==============================] - 0s 917us/step - loss: 0.7376 - accuracy:
0.6953
Epoch 157/300
115/115 [==============================] - 0s 863us/step - loss: 0.8036 - accuracy:
0.6830
Epoch 158/300
115/115 [==============================] - 0s 857us/step - loss: 0.6450 - accuracy:
0.7338
Epoch 159/300
115/115 [==============================] - 0s 850us/step - loss: 0.6901 - accuracy:
0.7312
Epoch 160/300
```

```
115/115 [==============================] - 0s 910us/step - loss: 0.6791 - accuracy:
0.7294
Epoch 161/300
115/115 [==============================] - 0s 918us/step - loss: 0.6226 - accuracy:
0.7723
Epoch 162/300
115/115 [==============================] - 0s 901us/step - loss: 0.6000 - accuracy:
0.7452
Epoch 163/300
115/115 [==============================] - 0s 902us/step - loss: 0.6268 - accuracy:
0.7434
Epoch 164/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5633 - accuracy: 0.7
776
Epoch 165/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7901 - accuracy: 0.6
953
Epoch 166/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6580 - accuracy: 0.7
259
Epoch 167/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6812 - accuracy: 0.7
242
Epoch 168/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6215 - accuracy: 0.7
566
Epoch 169/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6346 - accuracy: 0.7
469
Epoch 170/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6517 - accuracy: 0.7
364
Epoch 171/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6494 - accuracy: 0.7
487
Epoch 172/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6622 - accuracy: 0.7
461
Epoch 173/300
115/115 [==============================] - 0s 983us/step - loss: 0.5936 - accuracy:
0.7531
Epoch 174/300
115/115 [==============================] - 0s 962us/step - loss: 0.5941 - accuracy:
0.7741
Epoch 175/300
115/115 [==============================] - 0s 945us/step - loss: 0.5583 - accuracy:
0.7890
Epoch 176/300
115/115 [==============================] - 0s 901us/step - loss: 0.6026 - accuracy:
0.7627
Epoch 177/300
115/115 [==============================] - 0s 937us/step - loss: 0.5855 - accuracy:
0.7820
Epoch 178/300
115/115 [==============================] - 0s 921us/step - loss: 0.6352 - accuracy:
0.7478
Epoch 179/300
115/115 [==============================] - 0s 901us/step - loss: 0.6415 - accuracy:
0.7426
Epoch 180/300
```

```
115/115 [==============================] - 0s 921us/step - loss: 0.5774 - accuracy:
0.7785
Epoch 181/300
115/115 [==============================] - 0s 866us/step - loss: 0.6347 - accuracy:
0.7557
Epoch 182/300
115/115 [==============================] - 0s 858us/step - loss: 0.5641 - accuracy:
0.7741
Epoch 183/300
115/115 [==============================] - 0s 857us/step - loss: 0.6094 - accuracy:
0.7653
Epoch 184/300
115/115 [==============================] - 0s 857us/step - loss: 0.5773 - accuracy:
0.7890
Epoch 185/300
115/115 [==============================] - 0s 866us/step - loss: 0.6218 - accuracy:
0.7557
Epoch 186/300
115/115 [==============================] - 0s 875us/step - loss: 0.5169 - accuracy:
0.8082
Epoch 187/300
115/115 [==============================] - 0s 860us/step - loss: 0.6750 - accuracy:
0.7215
Epoch 188/300
115/115 [==============================] - 0s 857us/step - loss: 0.6403 - accuracy:
0.7461
Epoch 189/300
115/115 [==============================] - 0s 852us/step - loss: 0.5671 - accuracy:
0.7767
Epoch 190/300
115/115 [==============================] - 0s 855us/step - loss: 0.6129 - accuracy:
0.7557
Epoch 191/300
115/115 [==============================] - 0s 866us/step - loss: 0.6131 - accuracy:
0.7688
Epoch 192/300
115/115 [==============================] - 0s 855us/step - loss: 0.5953 - accuracy:
0.7653
Epoch 193/300
115/115 [==============================] - 0s 855us/step - loss: 0.5445 - accuracy:
0.7872
Epoch 194/300
115/115 [==============================] - 0s 849us/step - loss: 0.5952 - accuracy:
0.7706
Epoch 195/300
115/115 [==============================] - 0s 862us/step - loss: 0.6059 - accuracy:
0.7548
Epoch 196/300
115/115 [==============================] - 0s 867us/step - loss: 0.5641 - accuracy:
0.7942
Epoch 197/300
115/115 [==============================] - 0s 865us/step - loss: 0.6154 - accuracy:
0.7592
Epoch 198/300
115/115 [==============================] - 0s 875us/step - loss: 0.6444 - accuracy:
0.7417
Epoch 199/300
115/115 [==============================] - 0s 938us/step - loss: 0.6727 - accuracy:
0.7285
Epoch 200/300
```

```
115/115 [==============================] - 0s 922us/step - loss: 0.5579 - accuracy:
0.7898
Epoch 201/300
115/115 [==============================] - 0s 922us/step - loss: 0.5911 - accuracy:
0.7609
Epoch 202/300
115/115 [==============================] - 0s 968us/step - loss: 0.5748 - accuracy:
0.7706
Epoch 203/300
115/115 [==============================] - 0s 986us/step - loss: 0.6761 - accuracy:
0.7312
Epoch 204/300
115/115 [==============================] - 0s 945us/step - loss: 0.6037 - accuracy:
0.7785
Epoch 205/300
115/115 [==============================] - 0s 919us/step - loss: 0.5758 - accuracy:
0.7750
Epoch 206/300
115/115 [==============================] - 0s 989us/step - loss: 0.5989 - accuracy:
0.7793
Epoch 207/300
115/115 [==============================] - 0s 984us/step - loss: 0.5526 - accuracy:
0.7785
Epoch 208/300
115/115 [==============================] - 0s 945us/step - loss: 0.6164 - accuracy:
0.7741
Epoch 209/300
115/115 [==============================] - 0s 927us/step - loss: 0.5784 - accuracy:
0.7820
Epoch 210/300
115/115 [==============================] - 0s 919us/step - loss: 0.5346 - accuracy:
0.8012
Epoch 211/300
115/115 [==============================] - 0s 905us/step - loss: 0.5361 - accuracy:
0.7977
Epoch 212/300
115/115 [==============================] - 0s 923us/step - loss: 0.5182 - accuracy:
0.8056
Epoch 213/300
115/115 [==============================] - 0s 867us/step - loss: 0.6060 - accuracy:
0.7793
Epoch 214/300
115/115 [==============================] - 0s 863us/step - loss: 0.5155 - accuracy:
0.7977
Epoch 215/300
115/115 [==============================] - 0s 867us/step - loss: 0.6115 - accuracy:
0.7732
Epoch 216/300
115/115 [==============================] - 0s 862us/step - loss: 0.5524 - accuracy:
0.7951
Epoch 217/300
115/115 [==============================] - 0s 920us/step - loss: 0.6343 - accuracy:
0.7452
Epoch 218/300
115/115 [==============================] - 0s 927us/step - loss: 0.5122 - accuracy:
0.8082
Epoch 219/300
115/115 [==============================] - 0s 901us/step - loss: 0.4746 - accuracy:
0.8170
Epoch 220/300
```

```
115/115 [==============================] - 0s 924us/step - loss: 0.4950 - accuracy:
0.8091
Epoch 221/300
115/115 [==============================] - 0s 960us/step - loss: 0.4843 - accuracy:
0.8222
Epoch 222/300
115/115 [==============================] - 0s 956us/step - loss: 0.5904 - accuracy:
0.7601
Epoch 223/300
115/115 [==============================] - 0s 956us/step - loss: 0.5830 - accuracy:
0.7609
Epoch 224/300
115/115 [==============================] - 0s 946us/step - loss: 0.5819 - accuracy:
0.7680
Epoch 225/300
115/115 [==============================] - 0s 962us/step - loss: 0.5428 - accuracy:
0.7960
Epoch 226/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5111 - accuracy: 0.8
030
Epoch 227/300
115/115 [==============================] - 0s 974us/step - loss: 0.5253 - accuracy:
0.8021
Epoch 228/300
115/115 [==============================] - 0s 927us/step - loss: 0.5224 - accuracy:
0.8056
Epoch 229/300
115/115 [==============================] - 0s 910us/step - loss: 0.5019 - accuracy:
0.7907
Epoch 230/300
115/115 [==============================] - 0s 930us/step - loss: 0.4365 - accuracy:
0.8319
Epoch 231/300
115/115 [==============================] - 0s 919us/step - loss: 0.5154 - accuracy:
0.8039
Epoch 232/300
115/115 [==============================] - 0s 916us/step - loss: 0.5707 - accuracy:
0.7828
Epoch 233/300
115/115 [==============================] - 0s 926us/step - loss: 0.5580 - accuracy:
0.7802
Epoch 234/300
115/115 [==============================] - 0s 936us/step - loss: 0.4928 - accuracy:
0.8065
Epoch 235/300
115/115 [==============================] - 0s 910us/step - loss: 0.6088 - accuracy:
0.7566
Epoch 236/300
115/115 [==============================] - 0s 940us/step - loss: 0.6471 - accuracy:
0.7531
Epoch 237/300
115/115 [==============================] - 0s 924us/step - loss: 0.5339 - accuracy:
0.8065
Epoch 238/300
115/115 [==============================] - 0s 920us/step - loss: 0.4944 - accuracy:
0.8100
Epoch 239/300
115/115 [==============================] - 0s 880us/step - loss: 0.5700 - accuracy:
0.7732
Epoch 240/300
```

```
115/115 [==============================] - 0s 908us/step - loss: 0.6002 - accuracy:
0.7496
Epoch 241/300
115/115 [==============================] - 0s 910us/step - loss: 0.4911 - accuracy:
0.8179
Epoch 242/300
115/115 [==============================] - 0s 923us/step - loss: 0.4085 - accuracy:
0.8634
Epoch 243/300
115/115 [==============================] - 0s 946us/step - loss: 0.6098 - accuracy:
0.7636
Epoch 244/300
115/115 [==============================] - 0s 937us/step - loss: 0.5082 - accuracy:
0.7977
Epoch 245/300
115/115 [==============================] - 0s 972us/step - loss: 0.4662 - accuracy:
0.8301
Epoch 246/300
115/115 [==============================] - 0s 917us/step - loss: 0.5318 - accuracy:
0.8021
Epoch 247/300
115/115 [==============================] - 0s 925us/step - loss: 0.5377 - accuracy:
0.7881
Epoch 248/300
115/115 [==============================] - 0s 919us/step - loss: 0.6142 - accuracy:
0.7644
Epoch 249/300
115/115 [==============================] - 0s 907us/step - loss: 0.5217 - accuracy:
0.7995
Epoch 250/300
115/115 [==============================] - 0s 890us/step - loss: 0.5280 - accuracy:
0.7960
Epoch 251/300
115/115 [==============================] - 0s 857us/step - loss: 0.6771 - accuracy:
0.7434
Epoch 252/300
115/115 [==============================] - 0s 883us/step - loss: 0.4662 - accuracy:
0.8363
Epoch 253/300
115/115 [==============================] - 0s 866us/step - loss: 0.5533 - accuracy:
0.7898
Epoch 254/300
115/115 [==============================] - 0s 848us/step - loss: 0.6506 - accuracy:
0.7294
Epoch 255/300
115/115 [==============================] - 0s 863us/step - loss: 0.5736 - accuracy:
0.7811
Epoch 256/300
115/115 [==============================] - 0s 954us/step - loss: 0.5308 - accuracy:
0.7968
Epoch 257/300
115/115 [==============================] - 0s 971us/step - loss: 0.5333 - accuracy:
0.7820
Epoch 258/300
115/115 [==============================] - 0s 913us/step - loss: 0.5623 - accuracy:
0.7863
Epoch 259/300
115/115 [==============================] - 0s 927us/step - loss: 0.5308 - accuracy:
0.7776
Epoch 260/300
```

```
115/115 [==============================] - 0s 906us/step - loss: 0.5879 - accuracy:
0.7741
Epoch 261/300
115/115 [==============================] - 0s 936us/step - loss: 0.4328 - accuracy:
0.8380
Epoch 262/300
115/115 [==============================] - 0s 881us/step - loss: 0.6485 - accuracy:
0.7391
Epoch 263/300
115/115 [==============================] - 0s 884us/step - loss: 0.5303 - accuracy:
0.8056
Epoch 264/300
115/115 [==============================] - 0s 871us/step - loss: 0.5007 - accuracy:
0.7960
Epoch 265/300
115/115 [==============================] - 0s 906us/step - loss: 0.4361 - accuracy:
0.8389
Epoch 266/300
115/115 [==============================] - 0s 857us/step - loss: 0.5783 - accuracy:
0.7828
Epoch 267/300
115/115 [==============================] - 0s 867us/step - loss: 0.5362 - accuracy:
0.7828
Epoch 268/300
115/115 [==============================] - 0s 884us/step - loss: 0.5407 - accuracy:
0.7881
Epoch 269/300
115/115 [==============================] - 0s 954us/step - loss: 0.5153 - accuracy:
0.8144
Epoch 270/300
115/115 [==============================] - 0s 917us/step - loss: 0.5352 - accuracy:
0.7776
Epoch 271/300
115/115 [==============================] - 0s 936us/step - loss: 0.5251 - accuracy:
0.7811
Epoch 272/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5278 - accuracy: 0.7
890
Epoch 273/300
115/115 [==============================] - 0s 938us/step - loss: 0.4998 - accuracy:
0.8047
Epoch 274/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5014 - accuracy: 0.8
074
Epoch 275/300
115/115 [==============================] - 0s 1ms/step - loss: 0.4490 - accuracy: 0.8
301
Epoch 276/300
115/115 [==============================] - 0s 971us/step - loss: 0.5020 - accuracy:
0.8047
Epoch 277/300
115/115 [==============================] - 0s 918us/step - loss: 0.4878 - accuracy:
0.8030
Epoch 278/300
115/115 [==============================] - 0s 927us/step - loss: 0.4685 - accuracy:
0.8214
Epoch 279/300
115/115 [==============================] - 0s 923us/step - loss: 0.4207 - accuracy:
0.8625
Epoch 280/300
```

```
115/115 [==============================] - 0s 954us/step - loss: 0.5123 - accuracy:
0.8152
Epoch 281/300
115/115 [==============================] - 0s 958us/step - loss: 0.5317 - accuracy:
0.8004
Epoch 282/300
115/115 [==============================] - 0s 945us/step - loss: 0.5587 - accuracy:
0.8074
Epoch 283/300
115/115 [==============================] - 0s 921us/step - loss: 0.5078 - accuracy:
0.8205
Epoch 284/300
115/115 [==============================] - 0s 926us/step - loss: 0.5345 - accuracy:
0.7995
Epoch 285/300
115/115 [==============================] - 0s 910us/step - loss: 0.5209 - accuracy:
0.7986
Epoch 286/300
115/115 [==============================] - 0s 920us/step - loss: 0.4381 - accuracy:
0.8494
Epoch 287/300
115/115 [==============================] - 0s 901us/step - loss: 0.5453 - accuracy:
0.7951
Epoch 288/300
115/115 [==============================] - 0s 943us/step - loss: 0.5624 - accuracy:
0.7697
Epoch 289/300
115/115 [==============================] - 0s 919us/step - loss: 0.6609 - accuracy:
0.7478
Epoch 290/300
115/115 [==============================] - 0s 910us/step - loss: 0.5524 - accuracy:
0.7776
Epoch 291/300
115/115 [==============================] - 0s 919us/step - loss: 0.5959 - accuracy:
0.7881
Epoch 292/300
115/115 [==============================] - 0s 910us/step - loss: 0.5469 - accuracy:
0.7890
Epoch 293/300
115/115 [==============================] - 0s 919us/step - loss: 0.5416 - accuracy:
0.7863
Epoch 294/300
115/115 [==============================] - 0s 897us/step - loss: 0.4865 - accuracy:
0.8222
Epoch 295/300
115/115 [==============================] - 0s 923us/step - loss: 0.3614 - accuracy:
0.8757
Epoch 296/300
115/115 [==============================] - 0s 910us/step - loss: 0.4242 - accuracy:
0.8371
Epoch 297/300
115/115 [==============================] - 0s 915us/step - loss: 0.4617 - accuracy:
0.8292
Epoch 298/300
115/115 [==============================] - 0s 877us/step - loss: 0.5900 - accuracy:
0.7662
Epoch 299/300
115/115 [==============================] - 0s 919us/step - loss: 0.4364 - accuracy:
0.8415
Epoch 300/300
```

```
115/115 [==============================] - 0s 954us/step - loss: 0.5122 - accuracy:
0.8152
36/36 [==============================] - 0s 900us/step - loss: 0.5734 - accuracy: 0.7
172
Epoch 1/300
115/115 [==============================] - 0s 752us/step - loss: 1.3179 - accuracy:
0.3651
Epoch 2/300
115/115 [==============================] - 0s 822us/step - loss: 1.1867 - accuracy:
0.3949
Epoch 3/300
115/115 [==============================] - 0s 831us/step - loss: 1.1637 - accuracy:
0.4816
Epoch 4/300
115/115 [==============================] - 0s 846us/step - loss: 1.1473 - accuracy:
0.4930
Epoch 5/300
115/115 [==============================] - 0s 855us/step - loss: 1.1399 - accuracy:
0.5026
Epoch 6/300
115/115 [==============================] - 0s 946us/step - loss: 1.1331 - accuracy:
0.5070
Epoch 7/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1340 - accuracy: 0.5
009
Epoch 8/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1323 - accuracy: 0.5
088
Epoch 9/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1252 - accuracy: 0.5
009
Epoch 10/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1248 - accuracy: 0.5
053
Epoch 11/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1179 - accuracy: 0.5
026
Epoch 12/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1191 - accuracy: 0.5
018
Epoch 13/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1178 - accuracy: 0.5
166
Epoch 14/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1124 - accuracy: 0.5
053
Epoch 15/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1151 - accuracy: 0.5
096
Epoch 16/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1039 - accuracy: 0.5
201
Epoch 17/300
115/115 [==============================] - 0s 997us/step - loss: 1.0897 - accuracy:
0.5201
Epoch 18/300
115/115 [==============================] - 0s 997us/step - loss: 1.0841 - accuracy:
0.5193
Epoch 19/300
115/115 [==============================] - 0s 954us/step - loss: 1.0833 - accuracy:
```

```
0.5298
Epoch 20/300
115/115 [==============================] - 0s 970us/step - loss: 1.0767 - accuracy:
0.5420
Epoch 21/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0701 - accuracy: 0.5
473
Epoch 22/300
115/115 [==============================] - 0s 989us/step - loss: 1.0687 - accuracy:
0.5543
Epoch 23/300
115/115 [==============================] - 0s 971us/step - loss: 1.0694 - accuracy:
0.5394
Epoch 24/300
115/115 [==============================] - 0s 954us/step - loss: 1.0554 - accuracy:
0.5490
Epoch 25/300
115/115 [==============================] - 0s 927us/step - loss: 1.0430 - accuracy:
0.5736
Epoch 26/300
115/115 [==============================] - 0s 938us/step - loss: 1.0345 - accuracy:
 0.5709
Epoch 27/300
115/115 [==============================] - 0s 910us/step - loss: 1.0294 - accuracy:
 0.5674
Epoch 28/300
115/115 [==============================] - 0s 922us/step - loss: 1.0313 - accuracy:
 0.5578
Epoch 29/300
115/115 [==============================] - 0s 879us/step - loss: 1.0254 - accuracy:
 0.5692
Epoch 30/300
115/115 [==============================] - 0s 905us/step - loss: 1.0163 - accuracy:
 0.5727
Epoch 31/300
115/115 [==============================] - 0s 884us/step - loss: 1.0292 - accuracy:
 0.5692
Epoch 32/300
115/115 [==============================] - 0s 884us/step - loss: 0.9871 - accuracy:
 0.5989
Epoch 33/300
115/115 [==============================] - 0s 884us/step - loss: 1.0354 - accuracy:
 0.5482
Epoch 34/300
115/115 [==============================] - 0s 900us/step - loss: 0.9810 - accuracy:
 0.5946
Epoch 35/300
115/115 [==============================] - 0s 936us/step - loss: 0.9901 - accuracy:
 0.5709
Epoch 36/300
115/115 [==============================] - 0s 901us/step - loss: 0.9807 - accuracy:
 0.5744
Epoch 37/300
115/115 [==============================] - 0s 884us/step - loss: 0.9865 - accuracy:
 0.5849
Epoch 38/300
115/115 [==============================] - 0s 884us/step - loss: 1.0335 - accuracy:
 0.5473
Epoch 39/300
115/115 [==============================] - 0s 875us/step - loss: 0.9677 - accuracy:
```

```
       0.5876
       Epoch 40/300
       115/115 [==============================] - 0s 899us/step - loss: 0.9761 - accuracy:
        0.5954
       Epoch 41/300
       115/115 [==============================] - 0s 884us/step - loss: 0.9772 - accuracy:
        0.5744
       Epoch 42/300
       115/115 [==============================] - 0s 875us/step - loss: 1.0084 - accuracy:
        0.5560
       Epoch 43/300
       115/115 [==============================] - 0s 888us/step - loss: 0.9950 - accuracy:
        0.5683
       Epoch 44/300
       115/115 [==============================] - 0s 884us/step - loss: 0.9273 - accuracy:
        0.6095
       Epoch 45/300
       115/115 [==============================] - 0s 894us/step - loss: 0.9897 - accuracy:
        0.5806
       Epoch 46/300
       115/115 [==============================] - 0s 903us/step - loss: 0.9427 - accuracy:
        0.5718
       Epoch 47/300
       115/115 [==============================] - 0s 901us/step - loss: 0.9600 - accuracy:
        0.5972
       Epoch 48/300
       115/115 [==============================] - 0s 901us/step - loss: 0.9132 - accuracy:
        0.6287
       Epoch 49/300
       115/115 [==============================] - 0s 875us/step - loss: 0.9149 - accuracy:
        0.6349
       Epoch 50/300
       115/115 [==============================] - 0s 901us/step - loss: 0.8735 - accuracy:
        0.6427
       Epoch 51/300
       115/115 [==============================] - 0s 875us/step - loss: 0.9451 - accuracy:
        0.5902
       Epoch 52/300
       115/115 [==============================] - 0s 892us/step - loss: 0.9752 - accuracy:
        0.5639
       Epoch 53/300
       115/115 [==============================] - 0s 875us/step - loss: 0.8957 - accuracy:
        0.6366
       Epoch 54/300
       115/115 [==============================] - 0s 910us/step - loss: 0.8836 - accuracy:
        0.6217
       Epoch 55/300
       115/115 [==============================] - 0s 923us/step - loss: 0.8567 - accuracy:
        0.6497
       Epoch 56/300
       115/115 [==============================] - 0s 910us/step - loss: 0.9661 - accuracy:
        0.5692
       Epoch 57/300
       115/115 [==============================] - 0s 902us/step - loss: 0.8964 - accuracy:
        0.6147
       Epoch 58/300
       115/115 [==============================] - 0s 898us/step - loss: 1.0054 - accuracy:
        0.5639
       Epoch 59/300
       115/115 [==============================] - 0s 889us/step - loss: 0.9025 - accuracy:
```

```
  0.6270
Epoch 60/300
115/115 [==============================] - 0s 875us/step - loss: 0.9514 - accuracy:
  0.5814
Epoch 61/300
115/115 [==============================] - 0s 884us/step - loss: 1.0129 - accuracy:
  0.5271
Epoch 62/300
115/115 [==============================] - 0s 898us/step - loss: 0.9736 - accuracy:
  0.5937
Epoch 63/300
115/115 [==============================] - 0s 879us/step - loss: 0.9738 - accuracy:
  0.5902
Epoch 64/300
115/115 [==============================] - 0s 895us/step - loss: 0.9678 - accuracy:
  0.5683
Epoch 65/300
115/115 [==============================] - 0s 879us/step - loss: 1.0052 - accuracy:
  0.5350
Epoch 66/300
115/115 [==============================] - 0s 884us/step - loss: 0.9570 - accuracy:
  0.5989
Epoch 67/300
115/115 [==============================] - 0s 954us/step - loss: 0.9198 - accuracy:
  0.6095
Epoch 68/300
115/115 [==============================] - 0s 987us/step - loss: 1.0103 - accuracy:
  0.5701
Epoch 69/300
115/115 [==============================] - 0s 931us/step - loss: 0.9436 - accuracy:
  0.6025
Epoch 70/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9846 - accuracy: 0.5
876
Epoch 71/300
115/115 [==============================] - 0s 980us/step - loss: 0.9357 - accuracy:
  0.5884
Epoch 72/300
115/115 [==============================] - 0s 945us/step - loss: 0.8882 - accuracy:
  0.6454
Epoch 73/300
115/115 [==============================] - 0s 927us/step - loss: 0.9725 - accuracy:
  0.5578
Epoch 74/300
115/115 [==============================] - 0s 931us/step - loss: 1.0069 - accuracy:
  0.5832
Epoch 75/300
115/115 [==============================] - 0s 884us/step - loss: 0.9100 - accuracy:
  0.6103
Epoch 76/300
115/115 [==============================] - 0s 989us/step - loss: 0.8869 - accuracy:
  0.6375
Epoch 77/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9463 - accuracy: 0.5
858
Epoch 78/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9017 - accuracy: 0.6
147
Epoch 79/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9342 - accuracy: 0.6
```

```
033
Epoch 80/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9168 - accuracy: 0.6
033
Epoch 81/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8827 - accuracy: 0.6
060
Epoch 82/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9453 - accuracy: 0.6
007
Epoch 83/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8674 - accuracy: 0.6
392
Epoch 84/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8849 - accuracy: 0.6
524
Epoch 85/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9275 - accuracy: 0.6
235
Epoch 86/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9423 - accuracy: 0.5
762
Epoch 87/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9414 - accuracy: 0.5
911
Epoch 88/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9398 - accuracy: 0.5
788
Epoch 89/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8802 - accuracy: 0.6
305
Epoch 90/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8461 - accuracy: 0.6
515
Epoch 91/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9094 - accuracy: 0.6
103
Epoch 92/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8700 - accuracy: 0.6
384
Epoch 93/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9157 - accuracy: 0.6
278
Epoch 94/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8758 - accuracy: 0.6
226
Epoch 95/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9125 - accuracy: 0.5
972
Epoch 96/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8405 - accuracy: 0.6
445
Epoch 97/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8873 - accuracy: 0.6
191
Epoch 98/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8785 - accuracy: 0.6
182
Epoch 99/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9840 - accuracy: 0.6
```

```
051
Epoch 100/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9552 - accuracy: 0.6
051
Epoch 101/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0439 - accuracy: 0.5
630
Epoch 102/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9529 - accuracy: 0.6
025
Epoch 103/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9106 - accuracy: 0.6
270
Epoch 104/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9459 - accuracy: 0.5
998
Epoch 105/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8645 - accuracy: 0.6
454
Epoch 106/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7983 - accuracy: 0.6
743
Epoch 107/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8212 - accuracy: 0.6
515
Epoch 108/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7921 - accuracy: 0.6
996
Epoch 109/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7921 - accuracy: 0.6
883
Epoch 110/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8652 - accuracy: 0.6
567
Epoch 111/300
115/115 [==============================] - 0s 989us/step - loss: 0.8179 - accuracy:
 0.6690
Epoch 112/300
115/115 [==============================] - 0s 971us/step - loss: 0.8570 - accuracy:
 0.6375
Epoch 113/300
115/115 [==============================] - 0s 927us/step - loss: 0.9140 - accuracy:
 0.6217
Epoch 114/300
115/115 [==============================] - 0s 927us/step - loss: 0.8805 - accuracy:
 0.6471
Epoch 115/300
115/115 [==============================] - 0s 927us/step - loss: 0.8416 - accuracy:
 0.6594
Epoch 116/300
115/115 [==============================] - 0s 986us/step - loss: 0.8574 - accuracy:
 0.6489
Epoch 117/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9079 - accuracy: 0.6
252
Epoch 118/300
115/115 [==============================] - 0s 969us/step - loss: 0.8191 - accuracy:
 0.6620
Epoch 119/300
115/115 [==============================] - 0s 965us/step - loss: 0.7761 - accuracy:
```

```
     0.6961
Epoch 120/300
115/115 [==============================] - 0s 980us/step - loss: 0.8164 - accuracy:
 0.6839
Epoch 121/300
115/115 [==============================] - 0s 999us/step - loss: 0.7377 - accuracy:
 0.6979
Epoch 122/300
115/115 [==============================] - 0s 980us/step - loss: 0.8088 - accuracy:
 0.6524
Epoch 123/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8456 - accuracy: 0.6
550
Epoch 124/300
115/115 [==============================] - 0s 960us/step - loss: 0.8224 - accuracy:
 0.6769
Epoch 125/300
115/115 [==============================] - 0s 914us/step - loss: 0.8113 - accuracy:
 0.6725
Epoch 126/300
115/115 [==============================] - 0s 927us/step - loss: 0.8614 - accuracy:
 0.6235
Epoch 127/300
115/115 [==============================] - 0s 935us/step - loss: 0.7695 - accuracy:
 0.7189
Epoch 128/300
115/115 [==============================] - 0s 892us/step - loss: 0.8923 - accuracy:
 0.6208
Epoch 129/300
115/115 [==============================] - 0s 875us/step - loss: 0.8450 - accuracy:
 0.6497
Epoch 130/300
115/115 [==============================] - 0s 873us/step - loss: 0.8964 - accuracy:
 0.6629
Epoch 131/300
115/115 [==============================] - 0s 951us/step - loss: 0.8777 - accuracy:
 0.6471
Epoch 132/300
115/115 [==============================] - 0s 936us/step - loss: 0.8361 - accuracy:
 0.6576
Epoch 133/300
115/115 [==============================] - 0s 943us/step - loss: 0.7878 - accuracy:
 0.6821
Epoch 134/300
115/115 [==============================] - 0s 936us/step - loss: 0.8520 - accuracy:
 0.6567
Epoch 135/300
115/115 [==============================] - 0s 945us/step - loss: 0.7755 - accuracy:
 0.6935
Epoch 136/300
115/115 [==============================] - 0s 884us/step - loss: 0.8468 - accuracy:
 0.6462
Epoch 137/300
115/115 [==============================] - 0s 882us/step - loss: 0.9096 - accuracy:
 0.6375
Epoch 138/300
115/115 [==============================] - 0s 884us/step - loss: 0.7983 - accuracy:
 0.6769
Epoch 139/300
115/115 [==============================] - 0s 927us/step - loss: 0.7580 - accuracy:
```

```
 0.6979
Epoch 140/300
115/115 [==============================] - 0s 910us/step - loss: 0.8283 - accuracy:
 0.6497
Epoch 141/300
115/115 [==============================] - 0s 884us/step - loss: 0.7887 - accuracy:
 0.6839
Epoch 142/300
115/115 [==============================] - 0s 960us/step - loss: 0.8226 - accuracy:
 0.6462
Epoch 143/300
115/115 [==============================] - 0s 932us/step - loss: 0.7790 - accuracy:
 0.6891
Epoch 144/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7967 - accuracy: 0.6
874
Epoch 145/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7311 - accuracy: 0.7
294
Epoch 146/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7809 - accuracy: 0.6
944
Epoch 147/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8153 - accuracy: 0.6
620
Epoch 148/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8107 - accuracy: 0.6
489
Epoch 149/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7287 - accuracy: 0.7
154
Epoch 150/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7640 - accuracy: 0.6
909
Epoch 151/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8566 - accuracy: 0.6
436
Epoch 152/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8112 - accuracy: 0.6
673
Epoch 153/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7499 - accuracy: 0.7
014
Epoch 154/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7588 - accuracy: 0.7
084
Epoch 155/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8743 - accuracy: 0.6
559
Epoch 156/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7710 - accuracy: 0.6
786
Epoch 157/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8017 - accuracy: 0.6
567
Epoch 158/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8195 - accuracy: 0.6
734
Epoch 159/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9061 - accuracy: 0.6
```

```
103
Epoch 160/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9689 - accuracy: 0.5
595
Epoch 161/300
115/115 [==============================] - 0s 980us/step - loss: 0.8562 - accuracy:
 0.6252
Epoch 162/300
115/115 [==============================] - 0s 927us/step - loss: 0.7860 - accuracy:
 0.6751
Epoch 163/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7303 - accuracy: 0.6
804
Epoch 164/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7524 - accuracy: 0.7
067
Epoch 165/300
115/115 [==============================] - 0s 997us/step - loss: 0.6727 - accuracy:
 0.7285
Epoch 166/300
115/115 [==============================] - 0s 997us/step - loss: 0.7139 - accuracy:
 0.7320
Epoch 167/300
115/115 [==============================] - 0s 936us/step - loss: 0.7034 - accuracy:
 0.7075
Epoch 168/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8516 - accuracy: 0.6
331
Epoch 169/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7318 - accuracy: 0.7
154
Epoch 170/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7061 - accuracy: 0.7
154
Epoch 171/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7977 - accuracy: 0.6
646
Epoch 172/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7267 - accuracy: 0.7
215
Epoch 173/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8325 - accuracy: 0.6
681
Epoch 174/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7660 - accuracy: 0.6
751
Epoch 175/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6952 - accuracy: 0.7
364
Epoch 176/300
115/115 [==============================] - 0s 991us/step - loss: 0.6864 - accuracy:
 0.7329
Epoch 177/300
115/115 [==============================] - 0s 962us/step - loss: 0.8078 - accuracy:
 0.6734
Epoch 178/300
115/115 [==============================] - 0s 960us/step - loss: 0.7542 - accuracy:
 0.7163
Epoch 179/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7007 - accuracy: 0.7
```

```
128
Epoch 180/300
115/115 [==============================] - 0s 971us/step - loss: 0.7952 - accuracy:
 0.6743
Epoch 181/300
115/115 [==============================] - 0s 954us/step - loss: 0.7674 - accuracy:
 0.6883
Epoch 182/300
115/115 [==============================] - 0s 979us/step - loss: 0.6631 - accuracy:
 0.7566
Epoch 183/300
115/115 [==============================] - 0s 989us/step - loss: 0.7366 - accuracy:
 0.6830
Epoch 184/300
115/115 [==============================] - 0s 954us/step - loss: 0.6919 - accuracy:
 0.7347
Epoch 185/300
115/115 [==============================] - 0s 919us/step - loss: 0.8617 - accuracy:
 0.6559
Epoch 186/300
115/115 [==============================] - 0s 927us/step - loss: 0.7096 - accuracy:
 0.7049
Epoch 187/300
115/115 [==============================] - 0s 910us/step - loss: 0.7255 - accuracy:
 0.7198
Epoch 188/300
115/115 [==============================] - 0s 884us/step - loss: 0.7360 - accuracy:
 0.7049
Epoch 189/300
115/115 [==============================] - 0s 919us/step - loss: 0.7703 - accuracy:
 0.6988
Epoch 190/300
115/115 [==============================] - 0s 910us/step - loss: 0.8112 - accuracy:
 0.6655
Epoch 191/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7396 - accuracy: 0.7
268
Epoch 192/300
115/115 [==============================] - 0s 986us/step - loss: 0.8732 - accuracy:
 0.6261
Epoch 193/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7384 - accuracy: 0.7
145
Epoch 194/300
115/115 [==============================] - 0s 997us/step - loss: 0.7061 - accuracy:
 0.7093
Epoch 195/300
115/115 [==============================] - 0s 943us/step - loss: 0.9080 - accuracy:
 0.6243
Epoch 196/300
115/115 [==============================] - 0s 936us/step - loss: 0.8808 - accuracy:
 0.6349
Epoch 197/300
115/115 [==============================] - 0s 962us/step - loss: 0.8191 - accuracy:
 0.6883
Epoch 198/300
115/115 [==============================] - 0s 954us/step - loss: 0.7161 - accuracy:
 0.7119
Epoch 199/300
115/115 [==============================] - 0s 927us/step - loss: 0.7567 - accuracy:
```

```
 0.6953
Epoch 200/300
115/115 [==============================] - 0s 971us/step - loss: 0.6873 - accuracy:
 0.7356
Epoch 201/300
115/115 [==============================] - 0s 968us/step - loss: 0.6816 - accuracy:
 0.7364
Epoch 202/300
115/115 [==============================] - 0s 927us/step - loss: 0.7196 - accuracy:
 0.7023
Epoch 203/300
115/115 [==============================] - 0s 918us/step - loss: 0.6714 - accuracy:
 0.7548
Epoch 204/300
115/115 [==============================] - 0s 919us/step - loss: 0.6819 - accuracy:
 0.7320
Epoch 205/300
115/115 [==============================] - 0s 910us/step - loss: 0.8420 - accuracy:
 0.6515
Epoch 206/300
115/115 [==============================] - 0s 988us/step - loss: 0.7032 - accuracy:
 0.7417
Epoch 207/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6582 - accuracy: 0.7
592
Epoch 208/300
115/115 [==============================] - 0s 955us/step - loss: 0.7151 - accuracy:
 0.7075
Epoch 209/300
115/115 [==============================] - 0s 963us/step - loss: 0.7527 - accuracy:
 0.6813
Epoch 210/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6733 - accuracy: 0.7
548
Epoch 211/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7105 - accuracy: 0.7
242
Epoch 212/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7543 - accuracy: 0.7
049
Epoch 213/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6853 - accuracy: 0.7
408
Epoch 214/300
115/115 [==============================] - 0s 956us/step - loss: 0.7109 - accuracy:
 0.7242
Epoch 215/300
115/115 [==============================] - 0s 933us/step - loss: 0.6581 - accuracy:
 0.7504
Epoch 216/300
115/115 [==============================] - 0s 945us/step - loss: 0.7377 - accuracy:
 0.6900
Epoch 217/300
115/115 [==============================] - 0s 980us/step - loss: 0.6822 - accuracy:
 0.7154
Epoch 218/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7072 - accuracy: 0.7
443
Epoch 219/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6482 - accuracy: 0.7
```

```
522
Epoch 220/300
115/115 [==============================] - 0s 971us/step - loss: 0.7387 - accuracy:
 0.7058
Epoch 221/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8884 - accuracy: 0.6
375
Epoch 222/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7189 - accuracy: 0.7
180
Epoch 223/300
115/115 [==============================] - 0s 999us/step - loss: 0.6678 - accuracy:
 0.7408
Epoch 224/300
115/115 [==============================] - 0s 980us/step - loss: 0.6388 - accuracy:
 0.7531
Epoch 225/300
115/115 [==============================] - 0s 944us/step - loss: 0.7027 - accuracy:
 0.7285
Epoch 226/300
115/115 [==============================] - 0s 927us/step - loss: 0.6598 - accuracy:
 0.7049
Epoch 227/300
115/115 [==============================] - 0s 949us/step - loss: 0.7559 - accuracy:
 0.7084
Epoch 228/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9052 - accuracy: 0.6
208
Epoch 229/300
115/115 [==============================] - 0s 936us/step - loss: 0.7840 - accuracy:
 0.6769
Epoch 230/300
115/115 [==============================] - 0s 962us/step - loss: 0.8160 - accuracy:
 0.6480
Epoch 231/300
115/115 [==============================] - 0s 936us/step - loss: 0.7271 - accuracy:
 0.7224
Epoch 232/300
115/115 [==============================] - 0s 918us/step - loss: 0.8515 - accuracy:
 0.6208
Epoch 233/300
115/115 [==============================] - 0s 936us/step - loss: 1.0255 - accuracy:
 0.5035
Epoch 234/300
115/115 [==============================] - 0s 941us/step - loss: 0.7966 - accuracy:
 0.7172
Epoch 235/300
115/115 [==============================] - 0s 971us/step - loss: 0.7927 - accuracy:
 0.7093
Epoch 236/300
115/115 [==============================] - 0s 952us/step - loss: 0.6896 - accuracy:
 0.7215
Epoch 237/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6354 - accuracy: 0.7
618
Epoch 238/300
115/115 [==============================] - 0s 960us/step - loss: 0.6785 - accuracy:
 0.7382
Epoch 239/300
115/115 [==============================] - 0s 954us/step - loss: 0.6083 - accuracy:
```

```
       0.7680
     Epoch 240/300
     115/115 [==============================] - 0s 940us/step - loss: 0.6699 - accuracy:
       0.7496
     Epoch 241/300
     115/115 [==============================] - 0s 937us/step - loss: 0.6459 - accuracy:
       0.7469
     Epoch 242/300
     115/115 [==============================] - 0s 924us/step - loss: 0.7423 - accuracy:
       0.7014
     Epoch 243/300
     115/115 [==============================] - 0s 944us/step - loss: 0.6491 - accuracy:
       0.7469
     Epoch 244/300
     115/115 [==============================] - 0s 1ms/step - loss: 0.8246 - accuracy: 0.6
     734
     Epoch 245/300
     115/115 [==============================] - 0s 989us/step - loss: 0.6353 - accuracy:
       0.7609
     Epoch 246/300
     115/115 [==============================] - 0s 1ms/step - loss: 0.5994 - accuracy: 0.7
     785
     Epoch 247/300
     115/115 [==============================] - 0s 936us/step - loss: 0.6395 - accuracy:
       0.7680
     Epoch 248/300
     115/115 [==============================] - 0s 962us/step - loss: 0.5507 - accuracy:
       0.7925
     Epoch 249/300
     115/115 [==============================] - 0s 1ms/step - loss: 0.5878 - accuracy: 0.7
     644
     Epoch 250/300
     115/115 [==============================] - 0s 1ms/step - loss: 0.5643 - accuracy: 0.7
     662
     Epoch 251/300
     115/115 [==============================] - 0s 989us/step - loss: 0.6469 - accuracy:
       0.7443
     Epoch 252/300
     115/115 [==============================] - 0s 962us/step - loss: 0.5687 - accuracy:
       0.7758
     Epoch 253/300
     115/115 [==============================] - 0s 967us/step - loss: 0.5955 - accuracy:
       0.7750
     Epoch 254/300
     115/115 [==============================] - 0s 961us/step - loss: 0.7308 - accuracy:
       0.7128
     Epoch 255/300
     115/115 [==============================] - 0s 1ms/step - loss: 0.6310 - accuracy: 0.7
     636
     Epoch 256/300
     115/115 [==============================] - 0s 952us/step - loss: 0.6056 - accuracy:
       0.7513
     Epoch 257/300
     115/115 [==============================] - 0s 919us/step - loss: 0.6280 - accuracy:
       0.7653
     Epoch 258/300
     115/115 [==============================] - 0s 971us/step - loss: 0.6267 - accuracy:
       0.7644
     Epoch 259/300
     115/115 [==============================] - 0s 1ms/step - loss: 0.5889 - accuracy: 0.7
```

```
960
Epoch 260/300
115/115 [==============================] - 0s 960us/step - loss: 0.6422 - accuracy:
 0.7574
Epoch 261/300
115/115 [==============================] - 0s 930us/step - loss: 0.6525 - accuracy:
 0.7504
Epoch 262/300
115/115 [==============================] - 0s 919us/step - loss: 0.6346 - accuracy:
 0.7715
Epoch 263/300
115/115 [==============================] - 0s 929us/step - loss: 0.6428 - accuracy:
 0.7609
Epoch 264/300
115/115 [==============================] - 0s 954us/step - loss: 0.6593 - accuracy:
 0.7242
Epoch 265/300
115/115 [==============================] - 0s 884us/step - loss: 0.5865 - accuracy:
 0.7662
Epoch 266/300
115/115 [==============================] - 0s 872us/step - loss: 0.6508 - accuracy:
 0.7461
Epoch 267/300
115/115 [==============================] - 0s 901us/step - loss: 0.7432 - accuracy:
 0.7102
Epoch 268/300
115/115 [==============================] - 0s 910us/step - loss: 0.7268 - accuracy:
 0.7005
Epoch 269/300
115/115 [==============================] - 0s 910us/step - loss: 0.5620 - accuracy:
 0.7898
Epoch 270/300
115/115 [==============================] - 0s 925us/step - loss: 0.6768 - accuracy:
 0.7320
Epoch 271/300
115/115 [==============================] - 0s 927us/step - loss: 0.5116 - accuracy:
 0.8047
Epoch 272/300
115/115 [==============================] - 0s 919us/step - loss: 0.6102 - accuracy:
 0.7636
Epoch 273/300
115/115 [==============================] - 0s 925us/step - loss: 0.6249 - accuracy:
 0.7618
Epoch 274/300
115/115 [==============================] - 0s 910us/step - loss: 0.6052 - accuracy:
 0.7671
Epoch 275/300
115/115 [==============================] - 0s 877us/step - loss: 0.4861 - accuracy:
 0.8170
Epoch 276/300
115/115 [==============================] - 0s 901us/step - loss: 0.5814 - accuracy:
 0.7671
Epoch 277/300
115/115 [==============================] - 0s 901us/step - loss: 0.6633 - accuracy:
 0.7513
Epoch 278/300
115/115 [==============================] - 0s 942us/step - loss: 0.5843 - accuracy:
 0.7820
Epoch 279/300
115/115 [==============================] - 0s 920us/step - loss: 0.7496 - accuracy:
```

```
 0.7137
Epoch 280/300
115/115 [==============================] - 0s 873us/step - loss: 0.5465 - accuracy:
 0.7890
Epoch 281/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5964 - accuracy: 0.7
793
Epoch 282/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5272 - accuracy: 0.8
021
Epoch 283/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6438 - accuracy: 0.7
504
Epoch 284/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6067 - accuracy: 0.7
688
Epoch 285/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6623 - accuracy: 0.7
294
Epoch 286/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5601 - accuracy: 0.7
881
Epoch 287/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5035 - accuracy: 0.8
161
Epoch 288/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5506 - accuracy: 0.7
837
Epoch 289/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5186 - accuracy: 0.8
205
Epoch 290/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6561 - accuracy: 0.7
461
Epoch 291/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5975 - accuracy: 0.7
618
Epoch 292/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5535 - accuracy: 0.7
951
Epoch 293/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5808 - accuracy: 0.7
820
Epoch 294/300
115/115 [==============================] - 0s 991us/step - loss: 0.5036 - accuracy:
 0.8039
Epoch 295/300
115/115 [==============================] - 0s 976us/step - loss: 0.5153 - accuracy:
 0.8082
Epoch 296/300
115/115 [==============================] - 0s 996us/step - loss: 0.6318 - accuracy:
 0.7592
Epoch 297/300
115/115 [==============================] - 0s 969us/step - loss: 0.7655 - accuracy:
 0.7093
Epoch 298/300
115/115 [==============================] - 0s 954us/step - loss: 0.6579 - accuracy:
 0.7592
Epoch 299/300
115/115 [==============================] - 0s 997us/step - loss: 0.6210 - accuracy:
```

```
                         0.7671
        Epoch 300/300
        115/115 [==============================] - 0s 1ms/step - loss: 0.6567 - accuracy: 0.7
        434
        36/36 [==============================] - 0s 881us/step - loss: 0.6589 - accuracy: 0.6
        778
        Epoch 1/300
        115/115 [==============================] - 0s 861us/step - loss: 1.3876 - accuracy:
         0.4440
        Epoch 2/300
        115/115 [==============================] - 0s 955us/step - loss: 1.1806 - accuracy:
         0.5061
        Epoch 3/300
        115/115 [==============================] - 0s 942us/step - loss: 1.1544 - accuracy:
         0.5088
        Epoch 4/300
        115/115 [==============================] - 0s 952us/step - loss: 1.1461 - accuracy:
         0.5175
        Epoch 5/300
        115/115 [==============================] - 0s 990us/step - loss: 1.1507 - accuracy:
         0.4877
        Epoch 6/300
        115/115 [==============================] - 0s 971us/step - loss: 1.1351 - accuracy:
         0.5201
        Epoch 7/300
        115/115 [==============================] - 0s 983us/step - loss: 1.1313 - accuracy:
         0.5070
        Epoch 8/300
        115/115 [==============================] - 0s 994us/step - loss: 1.1242 - accuracy:
         0.5149
        Epoch 9/300
        115/115 [==============================] - 0s 979us/step - loss: 1.1506 - accuracy:
         0.4702
        Epoch 10/300
        115/115 [==============================] - 0s 967us/step - loss: 1.1256 - accuracy:
         0.5280
        Epoch 11/300
        115/115 [==============================] - 0s 966us/step - loss: 1.1211 - accuracy:
         0.5123
        Epoch 12/300
        115/115 [==============================] - 0s 989us/step - loss: 1.1204 - accuracy:
         0.5184
        Epoch 13/300
        115/115 [==============================] - 0s 971us/step - loss: 1.1129 - accuracy:
         0.5210
        Epoch 14/300
        115/115 [==============================] - 0s 982us/step - loss: 1.1157 - accuracy:
         0.5123
        Epoch 15/300
        115/115 [==============================] - 0s 962us/step - loss: 1.1165 - accuracy:
         0.5009
        Epoch 16/300
        115/115 [==============================] - 0s 1ms/step - loss: 1.1087 - accuracy: 0.5
        044
        Epoch 17/300
        115/115 [==============================] - 0s 1ms/step - loss: 1.1030 - accuracy: 0.5
        271
        Epoch 18/300
        115/115 [==============================] - 0s 1ms/step - loss: 1.0927 - accuracy: 0.5
        420
```

```
Epoch 19/300
115/115 [==============================] - 0s 977us/step - loss: 1.0816 - accuracy:
 0.5429
Epoch 20/300
115/115 [==============================] - 0s 963us/step - loss: 1.0699 - accuracy:
 0.5517
Epoch 21/300
115/115 [==============================] - 0s 980us/step - loss: 1.1039 - accuracy:
 0.5114
Epoch 22/300
115/115 [==============================] - 0s 981us/step - loss: 1.0935 - accuracy:
 0.5228
Epoch 23/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0751 - accuracy: 0.5
429
Epoch 24/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0433 - accuracy: 0.5
718
Epoch 25/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0384 - accuracy: 0.5
578
Epoch 26/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0390 - accuracy: 0.5
490
Epoch 27/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0080 - accuracy: 0.5
788
Epoch 28/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0417 - accuracy: 0.5
683
Epoch 29/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0207 - accuracy: 0.5
534
Epoch 30/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0089 - accuracy: 0.5
753
Epoch 31/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0276 - accuracy: 0.5
482
Epoch 32/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9899 - accuracy: 0.5
779
Epoch 33/300
115/115 [==============================] - 0s 989us/step - loss: 0.9887 - accuracy:
 0.6025
Epoch 34/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9887 - accuracy: 0.5
998
Epoch 35/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0105 - accuracy: 0.5
753
Epoch 36/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9785 - accuracy: 0.6
025
Epoch 37/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0330 - accuracy: 0.5
517
Epoch 38/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9795 - accuracy: 0.5
814
```

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Epoch 39/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9498 - accuracy: 0.6
007
Epoch 40/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9819 - accuracy: 0.5
867
Epoch 41/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9695 - accuracy: 0.6
016
Epoch 42/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9769 - accuracy: 0.5
762
Epoch 43/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9541 - accuracy: 0.6
130
Epoch 44/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9206 - accuracy: 0.6
095
Epoch 45/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0626 - accuracy: 0.5
595
Epoch 46/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9747 - accuracy: 0.5
946
Epoch 47/300
115/115 [==============================] - 0s 971us/step - loss: 0.8920 - accuracy:
 0.6462
Epoch 48/300
115/115 [==============================] - 0s 962us/step - loss: 0.9630 - accuracy:
 0.5963
Epoch 49/300
115/115 [==============================] - 0s 971us/step - loss: 0.9286 - accuracy:
 0.6200
Epoch 50/300
115/115 [==============================] - 0s 947us/step - loss: 0.9201 - accuracy:
 0.6278
Epoch 51/300
115/115 [==============================] - 0s 919us/step - loss: 0.9272 - accuracy:
 0.6165
Epoch 52/300
115/115 [==============================] - 0s 965us/step - loss: 0.9296 - accuracy:
 0.6156
Epoch 53/300
115/115 [==============================] - 0s 910us/step - loss: 0.8981 - accuracy:
 0.6471
Epoch 54/300
115/115 [==============================] - 0s 927us/step - loss: 0.8895 - accuracy:
 0.6419
Epoch 55/300
115/115 [==============================] - 0s 997us/step - loss: 0.9204 - accuracy:
 0.6226
Epoch 56/300
115/115 [==============================] - 0s 963us/step - loss: 0.8922 - accuracy:
 0.6200
Epoch 57/300
115/115 [==============================] - 0s 945us/step - loss: 0.8572 - accuracy:
 0.6594
Epoch 58/300
115/115 [==============================] - 0s 945us/step - loss: 0.8631 - accuracy:
 0.6331
```

```
Epoch 59/300
115/115 [==============================] - 0s 954us/step - loss: 0.9273 - accuracy:
 0.6138
Epoch 60/300
115/115 [==============================] - 0s 954us/step - loss: 0.8723 - accuracy:
 0.6384
Epoch 61/300
115/115 [==============================] - 0s 974us/step - loss: 0.8341 - accuracy:
 0.6743
Epoch 62/300
115/115 [==============================] - 0s 928us/step - loss: 0.9373 - accuracy:
 0.6086
Epoch 63/300
115/115 [==============================] - 0s 932us/step - loss: 0.9144 - accuracy:
 0.5946
Epoch 64/300
115/115 [==============================] - 0s 936us/step - loss: 0.8593 - accuracy:
 0.6401
Epoch 65/300
115/115 [==============================] - 0s 919us/step - loss: 0.8875 - accuracy:
 0.6313
Epoch 66/300
115/115 [==============================] - 0s 919us/step - loss: 0.8440 - accuracy:
 0.6611
Epoch 67/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8902 - accuracy: 0.6
357
Epoch 68/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8300 - accuracy: 0.6
848
Epoch 69/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8293 - accuracy: 0.6
637
Epoch 70/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9014 - accuracy: 0.6
060
Epoch 71/300
115/115 [==============================] - 0s 980us/step - loss: 0.8425 - accuracy:
 0.6445
Epoch 72/300
115/115 [==============================] - 0s 982us/step - loss: 0.8467 - accuracy:
 0.6594
Epoch 73/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8566 - accuracy: 0.6
419
Epoch 74/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8572 - accuracy: 0.6
392
Epoch 75/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8395 - accuracy: 0.6
734
Epoch 76/300
115/115 [==============================] - 0s 987us/step - loss: 0.8689 - accuracy:
 0.6313
Epoch 77/300
115/115 [==============================] - 0s 978us/step - loss: 0.7860 - accuracy:
 0.6778
Epoch 78/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8496 - accuracy: 0.6
497
```

```
Epoch 79/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8148 - accuracy: 0.6
821
Epoch 80/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8003 - accuracy: 0.6
830
Epoch 81/300
115/115 [==============================] - 0s 997us/step - loss: 0.7764 - accuracy:
 0.6848
Epoch 82/300
115/115 [==============================] - 0s 962us/step - loss: 0.8121 - accuracy:
 0.6839
Epoch 83/300
115/115 [==============================] - 0s 971us/step - loss: 0.8209 - accuracy:
 0.6602
Epoch 84/300
115/115 [==============================] - 0s 995us/step - loss: 0.7893 - accuracy:
 0.6751
Epoch 85/300
115/115 [==============================] - 0s 980us/step - loss: 0.7809 - accuracy:
 0.6664
Epoch 86/300
115/115 [==============================] - 0s 980us/step - loss: 0.7714 - accuracy:
 0.6646
Epoch 87/300
115/115 [==============================] - 0s 936us/step - loss: 0.7408 - accuracy:
 0.6953
Epoch 88/300
115/115 [==============================] - 0s 969us/step - loss: 0.7989 - accuracy:
 0.6891
Epoch 89/300
115/115 [==============================] - 0s 965us/step - loss: 0.8163 - accuracy:
 0.6708
Epoch 90/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8943 - accuracy: 0.6
305
Epoch 91/300
115/115 [==============================] - 0s 966us/step - loss: 0.8595 - accuracy:
 0.6559
Epoch 92/300
115/115 [==============================] - 0s 942us/step - loss: 0.8678 - accuracy:
 0.6331
Epoch 93/300
115/115 [==============================] - 0s 919us/step - loss: 0.7652 - accuracy:
 0.6970
Epoch 94/300
115/115 [==============================] - 0s 973us/step - loss: 0.8462 - accuracy:
 0.6576
Epoch 95/300
115/115 [==============================] - 0s 946us/step - loss: 0.8282 - accuracy:
 0.6760
Epoch 96/300
115/115 [==============================] - 0s 926us/step - loss: 0.8045 - accuracy:
 0.6716
Epoch 97/300
115/115 [==============================] - 0s 927us/step - loss: 0.8060 - accuracy:
 0.6734
Epoch 98/300
115/115 [==============================] - 0s 919us/step - loss: 0.8533 - accuracy:
 0.6532
```

```
Epoch 99/300
115/115 [==============================] - 0s 989us/step - loss: 0.8931 - accuracy:
 0.6261
Epoch 100/300
115/115 [==============================] - 0s 962us/step - loss: 0.9423 - accuracy:
 0.5902
Epoch 101/300
115/115 [==============================] - 0s 936us/step - loss: 0.9301 - accuracy:
 0.6156
Epoch 102/300
115/115 [==============================] - 0s 928us/step - loss: 0.8464 - accuracy:
 0.6287
Epoch 103/300
115/115 [==============================] - 0s 986us/step - loss: 0.7414 - accuracy:
 0.7242
Epoch 104/300
115/115 [==============================] - 0s 998us/step - loss: 0.7815 - accuracy:
 0.6856
Epoch 105/300
115/115 [==============================] - 0s 964us/step - loss: 0.8320 - accuracy:
 0.6637
Epoch 106/300
115/115 [==============================] - 0s 971us/step - loss: 0.7564 - accuracy:
 0.6988
Epoch 107/300
115/115 [==============================] - 0s 936us/step - loss: 0.7872 - accuracy:
 0.6725
Epoch 108/300
115/115 [==============================] - 0s 943us/step - loss: 0.7907 - accuracy:
 0.6821
Epoch 109/300
115/115 [==============================] - 0s 954us/step - loss: 0.8313 - accuracy:
 0.6664
Epoch 110/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7227 - accuracy: 0.7
154
Epoch 111/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7528 - accuracy: 0.6
813
Epoch 112/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9201 - accuracy: 0.6
366
Epoch 113/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8073 - accuracy: 0.6
664
Epoch 114/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7937 - accuracy: 0.6
743
Epoch 115/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7549 - accuracy: 0.6
909
Epoch 116/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8554 - accuracy: 0.6
559
Epoch 117/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9008 - accuracy: 0.6
243
Epoch 118/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8332 - accuracy: 0.6
602
```

```
Epoch 119/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8271 - accuracy: 0.6
576
Epoch 120/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8855 - accuracy: 0.6
313
Epoch 121/300
115/115 [==============================] - 0s 980us/step - loss: 0.9419 - accuracy:
 0.5937
Epoch 122/300
115/115 [==============================] - 0s 957us/step - loss: 0.8052 - accuracy:
 0.6795
Epoch 123/300
115/115 [==============================] - 0s 974us/step - loss: 0.7879 - accuracy:
 0.6856
Epoch 124/300
115/115 [==============================] - 0s 976us/step - loss: 0.7680 - accuracy:
 0.7049
Epoch 125/300
115/115 [==============================] - 0s 971us/step - loss: 0.7290 - accuracy:
 0.7233
Epoch 126/300
115/115 [==============================] - 0s 980us/step - loss: 0.7430 - accuracy:
 0.6988
Epoch 127/300
115/115 [==============================] - 0s 975us/step - loss: 0.7193 - accuracy:
 0.7285
Epoch 128/300
115/115 [==============================] - 0s 971us/step - loss: 0.7856 - accuracy:
 0.7049
Epoch 129/300
115/115 [==============================] - 0s 936us/step - loss: 0.8563 - accuracy:
 0.6296
Epoch 130/300
115/115 [==============================] - 0s 927us/step - loss: 0.8678 - accuracy:
 0.6532
Epoch 131/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8826 - accuracy: 0.6
357
Epoch 132/300
115/115 [==============================] - 0s 989us/step - loss: 0.8236 - accuracy:
 0.6786
Epoch 133/300
115/115 [==============================] - 0s 966us/step - loss: 0.8885 - accuracy:
 0.6313
Epoch 134/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8194 - accuracy: 0.6
673
Epoch 135/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8078 - accuracy: 0.6
778
Epoch 136/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7778 - accuracy: 0.6
909
Epoch 137/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7824 - accuracy: 0.6
909
Epoch 138/300
115/115 [==============================] - 0s 984us/step - loss: 0.8790 - accuracy:
 0.6410
```

```
Epoch 139/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8181 - accuracy: 0.6
532
Epoch 140/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7968 - accuracy: 0.6
804
Epoch 141/300
115/115 [==============================] - 0s 2ms/step - loss: 0.8265 - accuracy: 0.6
821
Epoch 142/300
115/115 [==============================] - 0s 2ms/step - loss: 1.0084 - accuracy: 0.5
744
Epoch 143/300
115/115 [==============================] - 0s 2ms/step - loss: 0.9924 - accuracy: 0.6
147
Epoch 144/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9874 - accuracy: 0.5
744
Epoch 145/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8871 - accuracy: 0.6
497
Epoch 146/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9808 - accuracy: 0.5
753
Epoch 147/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8880 - accuracy: 0.6
349
Epoch 148/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8684 - accuracy: 0.6
699
Epoch 149/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9568 - accuracy: 0.6
086
Epoch 150/300
115/115 [==============================] - 0s 995us/step - loss: 1.0885 - accuracy:
 0.4842
Epoch 151/300
115/115 [==============================] - 0s 981us/step - loss: 0.8923 - accuracy:
 0.6112
Epoch 152/300
115/115 [==============================] - 0s 963us/step - loss: 0.8578 - accuracy:
 0.6436
Epoch 153/300
115/115 [==============================] - 0s 938us/step - loss: 0.9102 - accuracy:
 0.6296
Epoch 154/300
115/115 [==============================] - 0s 999us/step - loss: 0.9011 - accuracy:
 0.6436
Epoch 155/300
115/115 [==============================] - 0s 989us/step - loss: 0.9061 - accuracy:
 0.6497
Epoch 156/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8334 - accuracy: 0.6
813
Epoch 157/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9001 - accuracy: 0.6
252
Epoch 158/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9226 - accuracy: 0.6
007
```

```
Epoch 159/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8902 - accuracy: 0.6
576
Epoch 160/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8703 - accuracy: 0.6
594
Epoch 161/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8343 - accuracy: 0.6
786
Epoch 162/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8439 - accuracy: 0.6
681
Epoch 163/300
115/115 [==============================] - 0s 1ms/step - loss: 1.2107 - accuracy: 0.4
851
Epoch 164/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1687 - accuracy: 0.4
737
Epoch 165/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1594 - accuracy: 0.4
851
Epoch 166/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1512 - accuracy: 0.4
895
Epoch 167/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1536 - accuracy: 0.4
860
Epoch 168/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1522 - accuracy: 0.4
877
Epoch 169/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1546 - accuracy: 0.4
790
Epoch 170/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1529 - accuracy: 0.4
834
Epoch 171/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1429 - accuracy: 0.4
956
Epoch 172/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0924 - accuracy: 0.5
000
Epoch 173/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9740 - accuracy: 0.5
779
Epoch 174/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9040 - accuracy: 0.6
375
Epoch 175/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9748 - accuracy: 0.5
727
Epoch 176/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9526 - accuracy: 0.5
797
Epoch 177/300
115/115 [==============================] - 0s 989us/step - loss: 0.9570 - accuracy:
 0.5998
Epoch 178/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7297 - accuracy: 0.7
198
```

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Epoch 179/300
115/115 [==============================] - 0s 980us/step - loss: 0.7167 - accuracy:
 0.7224
Epoch 180/300
115/115 [==============================] - 0s 962us/step - loss: 0.7229 - accuracy:
 0.7014
Epoch 181/300
115/115 [==============================] - 0s 948us/step - loss: 0.7749 - accuracy:
 0.6760
Epoch 182/300
115/115 [==============================] - 0s 910us/step - loss: 0.7816 - accuracy:
 0.6699
Epoch 183/300
115/115 [==============================] - 0s 927us/step - loss: 0.7992 - accuracy:
 0.6681
Epoch 184/300
115/115 [==============================] - 0s 927us/step - loss: 0.7486 - accuracy:
 0.7005
Epoch 185/300
115/115 [==============================] - 0s 927us/step - loss: 0.7585 - accuracy:
 0.6996
Epoch 186/300
115/115 [==============================] - 0s 997us/step - loss: 0.8197 - accuracy:
 0.6541
Epoch 187/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8346 - accuracy: 0.6
506
Epoch 188/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7536 - accuracy: 0.6
996
Epoch 189/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8075 - accuracy: 0.6
778
Epoch 190/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7774 - accuracy: 0.6
926
Epoch 191/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8507 - accuracy: 0.6
778
Epoch 192/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7467 - accuracy: 0.6
961
Epoch 193/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7544 - accuracy: 0.7
233
Epoch 194/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8451 - accuracy: 0.6
690
Epoch 195/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8205 - accuracy: 0.6
725
Epoch 196/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6977 - accuracy: 0.7
268
Epoch 197/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7503 - accuracy: 0.7
128
Epoch 198/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7671 - accuracy: 0.7
032
```

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Epoch 199/300
115/115 [==============================] - 0s 963us/step - loss: 0.7373 - accuracy:
 0.6996
Epoch 200/300
115/115 [==============================] - 0s 945us/step - loss: 0.8019 - accuracy:
 0.6716
Epoch 201/300
115/115 [==============================] - 0s 996us/step - loss: 0.8452 - accuracy:
 0.6427
Epoch 202/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7561 - accuracy: 0.6
559
Epoch 203/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7249 - accuracy: 0.6
848
Epoch 204/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7148 - accuracy: 0.7
023
Epoch 205/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7134 - accuracy: 0.7
268
Epoch 206/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8232 - accuracy: 0.6
637
Epoch 207/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8028 - accuracy: 0.6
716
Epoch 208/300
115/115 [==============================] - 0s 2ms/step - loss: 0.6650 - accuracy: 0.7
285
Epoch 209/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7016 - accuracy: 0.7
250
Epoch 210/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7333 - accuracy: 0.7
215
Epoch 211/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7157 - accuracy: 0.7
005
Epoch 212/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8368 - accuracy: 0.6
961
Epoch 213/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7135 - accuracy: 0.7
391
Epoch 214/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7803 - accuracy: 0.7
032
Epoch 215/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7537 - accuracy: 0.6
961
Epoch 216/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7837 - accuracy: 0.7
014
Epoch 217/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7199 - accuracy: 0.7
285
Epoch 218/300
115/115 [==============================] - 0s 973us/step - loss: 0.7965 - accuracy:
 0.6760
```

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Epoch 219/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7891 - accuracy: 0.6
471
Epoch 220/300
115/115 [==============================] - 0s 956us/step - loss: 0.6557 - accuracy:
 0.7618
Epoch 221/300
115/115 [==============================] - 0s 964us/step - loss: 0.7079 - accuracy:
 0.7154
Epoch 222/300
115/115 [==============================] - 0s 954us/step - loss: 0.7313 - accuracy:
 0.7242
Epoch 223/300
115/115 [==============================] - 0s 990us/step - loss: 0.8816 - accuracy:
 0.6375
Epoch 224/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7685 - accuracy: 0.6
769
Epoch 225/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7396 - accuracy: 0.7
075
Epoch 226/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7409 - accuracy: 0.7
058
Epoch 227/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7500 - accuracy: 0.6
996
Epoch 228/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7833 - accuracy: 0.6
874
Epoch 229/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8153 - accuracy: 0.6
708
Epoch 230/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6973 - accuracy: 0.7
233
Epoch 231/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6546 - accuracy: 0.7
338
Epoch 232/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6419 - accuracy: 0.7
557
Epoch 233/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7834 - accuracy: 0.6
813
Epoch 234/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7174 - accuracy: 0.7
294
Epoch 235/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7201 - accuracy: 0.7
110
Epoch 236/300
115/115 [==============================] - 0s 2ms/step - loss: 0.6935 - accuracy: 0.7
347
Epoch 237/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7511 - accuracy: 0.7
233
Epoch 238/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7691 - accuracy: 0.6
944
```

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Epoch 239/300
115/115 [==============================] - 0s 2ms/step - loss: 0.7624 - accuracy: 0.7
032
Epoch 240/300
115/115 [==============================] - 0s 2ms/step - loss: 0.6581 - accuracy: 0.7
417
Epoch 241/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8203 - accuracy: 0.6
532
Epoch 242/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7816 - accuracy: 0.6
918
Epoch 243/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6786 - accuracy: 0.7
636
Epoch 244/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7580 - accuracy: 0.7
145
Epoch 245/300
115/115 [==============================] - 0s 988us/step - loss: 0.7436 - accuracy:
 0.7198
Epoch 246/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7351 - accuracy: 0.7
312
Epoch 247/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7390 - accuracy: 0.6
725
Epoch 248/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6950 - accuracy: 0.7
233
Epoch 249/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7283 - accuracy: 0.7
049
Epoch 250/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7001 - accuracy: 0.7
084
Epoch 251/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6544 - accuracy: 0.7
426
Epoch 252/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6425 - accuracy: 0.7
627
Epoch 253/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6702 - accuracy: 0.7
417
Epoch 254/300
115/115 [==============================] - 0s 997us/step - loss: 0.7355 - accuracy:
 0.6988
Epoch 255/300
115/115 [==============================] - 0s 985us/step - loss: 0.7562 - accuracy:
 0.6734
Epoch 256/300
115/115 [==============================] - 0s 962us/step - loss: 0.7603 - accuracy:
 0.7040
Epoch 257/300
115/115 [==============================] - 0s 954us/step - loss: 0.7118 - accuracy:
 0.7461
Epoch 258/300
115/115 [==============================] - 0s 961us/step - loss: 0.5969 - accuracy:
 0.7820
```

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Epoch 259/300
115/115 [==============================] - 0s 919us/step - loss: 0.7002 - accuracy:
 0.7434
Epoch 260/300
115/115 [==============================] - 0s 943us/step - loss: 0.7043 - accuracy:
 0.7198
Epoch 261/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7710 - accuracy: 0.6
865
Epoch 262/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6207 - accuracy: 0.7
539
Epoch 263/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6507 - accuracy: 0.7
531
Epoch 264/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7090 - accuracy: 0.7
137
Epoch 265/300
115/115 [==============================] - 0s 978us/step - loss: 0.6272 - accuracy:
 0.7609
Epoch 266/300
115/115 [==============================] - 0s 974us/step - loss: 0.6145 - accuracy:
 0.7741
Epoch 267/300
115/115 [==============================] - 0s 971us/step - loss: 0.6962 - accuracy:
 0.7242
Epoch 268/300
115/115 [==============================] - 0s 982us/step - loss: 0.6451 - accuracy:
 0.7706
Epoch 269/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7085 - accuracy: 0.7
215
Epoch 270/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7325 - accuracy: 0.6
856
Epoch 271/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6783 - accuracy: 0.7
531
Epoch 272/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7126 - accuracy: 0.7
487
Epoch 273/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6420 - accuracy: 0.7
583
Epoch 274/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8328 - accuracy: 0.6
673
Epoch 275/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8518 - accuracy: 0.6
419
Epoch 276/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7939 - accuracy: 0.6
734
Epoch 277/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7561 - accuracy: 0.6
830
Epoch 278/300
115/115 [==============================] - 0s 954us/step - loss: 0.8176 - accuracy:
 0.6804
```

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Epoch 279/300
115/115 [==============================] - 0s 945us/step - loss: 0.8099 - accuracy:
  0.6489
Epoch 280/300
115/115 [==============================] - 0s 971us/step - loss: 0.7228 - accuracy:
  0.6883
Epoch 281/300
115/115 [==============================] - 0s 919us/step - loss: 0.5683 - accuracy:
  0.7995
Epoch 282/300
115/115 [==============================] - 0s 897us/step - loss: 0.6950 - accuracy:
  0.7408
Epoch 283/300
115/115 [==============================] - 0s 919us/step - loss: 0.8305 - accuracy:
  0.7102
Epoch 284/300
115/115 [==============================] - 0s 901us/step - loss: 0.6637 - accuracy:
  0.7653
Epoch 285/300
115/115 [==============================] - 0s 927us/step - loss: 0.6317 - accuracy:
  0.7846
Epoch 286/300
115/115 [==============================] - 0s 989us/step - loss: 0.6807 - accuracy:
  0.7592
Epoch 287/300
115/115 [==============================] - 0s 962us/step - loss: 0.5667 - accuracy:
  0.7863
Epoch 288/300
115/115 [==============================] - 0s 962us/step - loss: 0.5945 - accuracy:
  0.7907
Epoch 289/300
115/115 [==============================] - 0s 927us/step - loss: 0.5893 - accuracy:
  0.7916
Epoch 290/300
115/115 [==============================] - 0s 954us/step - loss: 0.6583 - accuracy:
  0.7434
Epoch 291/300
115/115 [==============================] - 0s 919us/step - loss: 0.6845 - accuracy:
  0.7382
Epoch 292/300
115/115 [==============================] - 0s 919us/step - loss: 0.7065 - accuracy:
  0.7172
Epoch 293/300
115/115 [==============================] - 0s 942us/step - loss: 0.7105 - accuracy:
  0.7215
Epoch 294/300
115/115 [==============================] - 0s 927us/step - loss: 0.5686 - accuracy:
  0.7951
Epoch 295/300
115/115 [==============================] - 0s 919us/step - loss: 0.6021 - accuracy:
  0.7811
Epoch 296/300
115/115 [==============================] - 0s 965us/step - loss: 0.6912 - accuracy:
  0.7005
Epoch 297/300
115/115 [==============================] - 0s 936us/step - loss: 0.5771 - accuracy:
  0.7811
Epoch 298/300
115/115 [==============================] - 0s 919us/step - loss: 0.7217 - accuracy:
  0.7093
```

```
Epoch 299/300
115/115 [==============================] - 0s 919us/step - loss: 0.7365 - accuracy:
 0.6970
Epoch 300/300
115/115 [==============================] - 0s 910us/step - loss: 0.7349 - accuracy:
 0.6935
36/36 [==============================] - 0s 818us/step - loss: 0.5226 - accuracy: 0.7
671
Epoch 1/300
115/115 [==============================] - 0s 1ms/step - loss: 1.2735 - accuracy: 0.4
676
Epoch 2/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1530 - accuracy: 0.5
018
Epoch 3/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1225 - accuracy: 0.5
219
Epoch 4/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1111 - accuracy: 0.5
175
Epoch 5/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1067 - accuracy: 0.5
105
Epoch 6/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0999 - accuracy: 0.5
464
Epoch 7/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0976 - accuracy: 0.5
385
Epoch 8/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0876 - accuracy: 0.5
342
Epoch 9/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0798 - accuracy: 0.5
254
Epoch 10/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0834 - accuracy: 0.5
385
Epoch 11/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0953 - accuracy: 0.5
166
Epoch 12/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1017 - accuracy: 0.5
342
Epoch 13/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0896 - accuracy: 0.5
333
Epoch 14/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1587 - accuracy: 0.4
877
Epoch 15/300
115/115 [==============================] - 0s 1ms/step - loss: 1.1147 - accuracy: 0.4
982
Epoch 16/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0599 - accuracy: 0.5
254
Epoch 17/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0456 - accuracy: 0.5
490
Epoch 18/300
```

```
115/115 [==============================] - 0s 999us/step - loss: 1.0197 - accuracy:
 0.5919
Epoch 19/300
115/115 [==============================] - 0s 993us/step - loss: 1.0313 - accuracy:
 0.5604
Epoch 20/300
115/115 [==============================] - 0s 997us/step - loss: 1.0258 - accuracy:
 0.5657
Epoch 21/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0130 - accuracy: 0.5
867
Epoch 22/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0112 - accuracy: 0.5
622
Epoch 23/300
115/115 [==============================] - 0s 954us/step - loss: 1.0191 - accuracy:
 0.5648
Epoch 24/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0113 - accuracy: 0.5
587
Epoch 25/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0003 - accuracy: 0.5
753
Epoch 26/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9665 - accuracy: 0.5
972
Epoch 27/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9756 - accuracy: 0.5
867
Epoch 28/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9560 - accuracy: 0.5
937
Epoch 29/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9805 - accuracy: 0.5
788
Epoch 30/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9401 - accuracy: 0.6
025
Epoch 31/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9634 - accuracy: 0.6
095
Epoch 32/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9795 - accuracy: 0.5
893
Epoch 33/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9328 - accuracy: 0.6
130
Epoch 34/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9380 - accuracy: 0.6
042
Epoch 35/300
115/115 [==============================] - 0s 2ms/step - loss: 0.9288 - accuracy: 0.6
252
Epoch 36/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9924 - accuracy: 0.5
823
Epoch 37/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9535 - accuracy: 0.5
928
Epoch 38/300
```

```
115/115 [==============================] - 0s 1ms/step - loss: 0.9451 - accuracy: 0.6
033
Epoch 39/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9755 - accuracy: 0.5
954
Epoch 40/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9667 - accuracy: 0.5
893
Epoch 41/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9370 - accuracy: 0.6
112
Epoch 42/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9497 - accuracy: 0.5
972
Epoch 43/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8779 - accuracy: 0.6
366
Epoch 44/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8697 - accuracy: 0.6
454
Epoch 45/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8745 - accuracy: 0.6
366
Epoch 46/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8366 - accuracy: 0.6
602
Epoch 47/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8373 - accuracy: 0.6
454
Epoch 48/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9159 - accuracy: 0.6
200
Epoch 49/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8636 - accuracy: 0.6
349
Epoch 50/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8350 - accuracy: 0.6
856
Epoch 51/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8592 - accuracy: 0.6
436
Epoch 52/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8264 - accuracy: 0.6
681
Epoch 53/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9116 - accuracy: 0.6
147
Epoch 54/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8543 - accuracy: 0.6
524
Epoch 55/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8328 - accuracy: 0.6
567
Epoch 56/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8357 - accuracy: 0.6
567
Epoch 57/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8310 - accuracy: 0.6
559
Epoch 58/300
```

```
115/115 [==============================] - 0s 1ms/step - loss: 0.8628 - accuracy: 0.6
349
Epoch 59/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8519 - accuracy: 0.6
243
Epoch 60/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8101 - accuracy: 0.6
804
Epoch 61/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7925 - accuracy: 0.6
865
Epoch 62/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8297 - accuracy: 0.6
602
Epoch 63/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7813 - accuracy: 0.6
848
Epoch 64/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8534 - accuracy: 0.6
506
Epoch 65/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7991 - accuracy: 0.6
821
Epoch 66/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7900 - accuracy: 0.6
891
Epoch 67/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7882 - accuracy: 0.6
900
Epoch 68/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8007 - accuracy: 0.6
778
Epoch 69/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7548 - accuracy: 0.7
102
Epoch 70/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7862 - accuracy: 0.6
848
Epoch 71/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8180 - accuracy: 0.6
786
Epoch 72/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7773 - accuracy: 0.6
751
Epoch 73/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8517 - accuracy: 0.6
313
Epoch 74/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8199 - accuracy: 0.6
567
Epoch 75/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7834 - accuracy: 0.6
786
Epoch 76/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8056 - accuracy: 0.6
769
Epoch 77/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7827 - accuracy: 0.6
891
Epoch 78/300
```

```
115/115 [==============================] - 0s 1ms/step - loss: 0.7514 - accuracy: 0.7
032
Epoch 79/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8331 - accuracy: 0.6
611
Epoch 80/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7654 - accuracy: 0.6
979
Epoch 81/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7823 - accuracy: 0.7
023
Epoch 82/300
115/115 [==============================] - 0s 979us/step - loss: 0.7765 - accuracy:
 0.6883
Epoch 83/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8107 - accuracy: 0.6
743
Epoch 84/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7894 - accuracy: 0.6
970
Epoch 85/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7383 - accuracy: 0.7
102
Epoch 86/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7800 - accuracy: 0.6
848
Epoch 87/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7738 - accuracy: 0.6
874
Epoch 88/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7321 - accuracy: 0.7
233
Epoch 89/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8049 - accuracy: 0.6
594
Epoch 90/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7812 - accuracy: 0.6
813
Epoch 91/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7366 - accuracy: 0.7
102
Epoch 92/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7514 - accuracy: 0.6
961
Epoch 93/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7161 - accuracy: 0.7
032
Epoch 94/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8652 - accuracy: 0.6
611
Epoch 95/300
115/115 [==============================] - 0s 2ms/step - loss: 0.8349 - accuracy: 0.6
620
Epoch 96/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7248 - accuracy: 0.7
110
Epoch 97/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8057 - accuracy: 0.6
550
Epoch 98/300
```

```
115/115 [==============================] - 0s 1ms/step - loss: 0.6240 - accuracy: 0.7
644
Epoch 99/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7580 - accuracy: 0.7
110
Epoch 100/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8214 - accuracy: 0.6
708
Epoch 101/300
115/115 [==============================] - 0s 996us/step - loss: 0.7667 - accuracy:
 0.6856
Epoch 102/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7746 - accuracy: 0.6
804
Epoch 103/300
115/115 [==============================] - 0s 999us/step - loss: 0.8250 - accuracy:
 0.6804
Epoch 104/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8566 - accuracy: 0.6
559
Epoch 105/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8511 - accuracy: 0.6
629
Epoch 106/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7932 - accuracy: 0.6
900
Epoch 107/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7580 - accuracy: 0.7
058
Epoch 108/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7593 - accuracy: 0.7
084
Epoch 109/300
115/115 [==============================] - 0s 1ms/step - loss: 0.9000 - accuracy: 0.6
322
Epoch 110/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8916 - accuracy: 0.6
313
Epoch 111/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7811 - accuracy: 0.6
804
Epoch 112/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8598 - accuracy: 0.6
489
Epoch 113/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7021 - accuracy: 0.7
189
Epoch 114/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7106 - accuracy: 0.7
224
Epoch 115/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7046 - accuracy: 0.7
207
Epoch 116/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7331 - accuracy: 0.7
093
Epoch 117/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6697 - accuracy: 0.7
364
Epoch 118/300
```

```
115/115 [==============================] - 0s 1ms/step - loss: 0.7306 - accuracy: 0.6
988
Epoch 119/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7558 - accuracy: 0.6
926
Epoch 120/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6366 - accuracy: 0.7
408
Epoch 121/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8278 - accuracy: 0.6
778
Epoch 122/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7165 - accuracy: 0.7
320
Epoch 123/300
115/115 [==============================] - 0s 987us/step - loss: 0.7186 - accuracy:
 0.7032
Epoch 124/300
115/115 [==============================] - 0s 989us/step - loss: 0.8908 - accuracy:
 0.6392
Epoch 125/300
115/115 [==============================] - 0s 998us/step - loss: 0.7344 - accuracy:
 0.7137
Epoch 126/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7602 - accuracy: 0.6
944
Epoch 127/300
115/115 [==============================] - 0s 997us/step - loss: 0.7758 - accuracy:
 0.6760
Epoch 128/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7784 - accuracy: 0.6
856
Epoch 129/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7142 - accuracy: 0.7
102
Epoch 130/300
115/115 [==============================] - 0s 1ms/step - loss: 0.8297 - accuracy: 0.6
524
Epoch 131/300
115/115 [==============================] - 0s 997us/step - loss: 0.6968 - accuracy:
 0.7259
Epoch 132/300
115/115 [==============================] - 0s 997us/step - loss: 0.6794 - accuracy:
 0.7224
Epoch 133/300
115/115 [==============================] - 0s 998us/step - loss: 0.7374 - accuracy:
 0.7110
Epoch 134/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6504 - accuracy: 0.7
399
Epoch 135/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7755 - accuracy: 0.6
988
Epoch 136/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6711 - accuracy: 0.7
399
Epoch 137/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5986 - accuracy: 0.7
767
Epoch 138/300
```

```
115/115 [==============================] - 0s 991us/step - loss: 0.6996 - accuracy:
 0.7163
Epoch 139/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6626 - accuracy: 0.7
399
Epoch 140/300
115/115 [==============================] - 0s 967us/step - loss: 0.6452 - accuracy:
 0.7487
Epoch 141/300
115/115 [==============================] - 0s 962us/step - loss: 0.7023 - accuracy:
 0.7250
Epoch 142/300
115/115 [==============================] - 0s 971us/step - loss: 0.6572 - accuracy:
 0.7399
Epoch 143/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0110 - accuracy: 0.6
121
Epoch 144/300
115/115 [==============================] - 0s 1ms/step - loss: 1.0070 - accuracy: 0.5
727
Epoch 145/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7290 - accuracy: 0.7
172
Epoch 146/300
115/115 [==============================] - 0s 989us/step - loss: 0.7213 - accuracy:
 0.7032
Epoch 147/300
115/115 [==============================] - 0s 962us/step - loss: 0.6802 - accuracy:
 0.7285
Epoch 148/300
115/115 [==============================] - 0s 961us/step - loss: 0.7178 - accuracy:
 0.6996
Epoch 149/300
115/115 [==============================] - 0s 962us/step - loss: 0.7577 - accuracy:
 0.7067
Epoch 150/300
115/115 [==============================] - 0s 954us/step - loss: 0.7024 - accuracy:
 0.7224
Epoch 151/300
115/115 [==============================] - 0s 954us/step - loss: 0.6374 - accuracy:
 0.7391
Epoch 152/300
115/115 [==============================] - 0s 954us/step - loss: 0.6208 - accuracy:
 0.7522
Epoch 153/300
115/115 [==============================] - 0s 962us/step - loss: 0.6047 - accuracy:
 0.7680
Epoch 154/300
115/115 [==============================] - 0s 980us/step - loss: 0.6844 - accuracy:
 0.7215
Epoch 155/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6908 - accuracy: 0.7
312
Epoch 156/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5817 - accuracy: 0.7
557
Epoch 157/300
115/115 [==============================] - 0s 962us/step - loss: 0.6379 - accuracy:
 0.7478
Epoch 158/300
```

```
115/115 [==============================] - 0s 972us/step - loss: 0.6104 - accuracy:
 0.7583
Epoch 159/300
115/115 [==============================] - 0s 967us/step - loss: 0.9589 - accuracy:
 0.6112
Epoch 160/300
115/115 [==============================] - 0s 997us/step - loss: 0.7801 - accuracy:
 0.6541
Epoch 161/300
115/115 [==============================] - 0s 997us/step - loss: 0.7573 - accuracy:
 0.6874
Epoch 162/300
115/115 [==============================] - 0s 954us/step - loss: 0.7770 - accuracy:
 0.6778
Epoch 163/300
115/115 [==============================] - 0s 950us/step - loss: 0.6939 - accuracy:
 0.7198
Epoch 164/300
115/115 [==============================] - 0s 981us/step - loss: 0.7402 - accuracy:
 0.6900
Epoch 165/300
115/115 [==============================] - 0s 989us/step - loss: 0.7401 - accuracy:
 0.7137
Epoch 166/300
115/115 [==============================] - 0s 954us/step - loss: 0.7119 - accuracy:
 0.7032
Epoch 167/300
115/115 [==============================] - 0s 987us/step - loss: 0.7657 - accuracy:
 0.7067
Epoch 168/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7254 - accuracy: 0.7
382
Epoch 169/300
115/115 [==============================] - 0s 987us/step - loss: 0.6720 - accuracy:
 0.7250
Epoch 170/300
115/115 [==============================] - 0s 945us/step - loss: 0.6558 - accuracy:
 0.7137
Epoch 171/300
115/115 [==============================] - 0s 970us/step - loss: 0.6619 - accuracy:
 0.7408
Epoch 172/300
115/115 [==============================] - 0s 987us/step - loss: 0.6515 - accuracy:
 0.7636
Epoch 173/300
115/115 [==============================] - 0s 992us/step - loss: 0.5819 - accuracy:
 0.7802
Epoch 174/300
115/115 [==============================] - 0s 977us/step - loss: 0.6545 - accuracy:
 0.7426
Epoch 175/300
115/115 [==============================] - 0s 952us/step - loss: 0.6660 - accuracy:
 0.7426
Epoch 176/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6441 - accuracy: 0.7
539
Epoch 177/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5471 - accuracy: 0.7
968
Epoch 178/300
```

```
115/115 [==============================] - 0s 1ms/step - loss: 0.6525 - accuracy: 0.7
285
Epoch 179/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6370 - accuracy: 0.7
364
Epoch 180/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6157 - accuracy: 0.7
680
Epoch 181/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6167 - accuracy: 0.7
715
Epoch 182/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6167 - accuracy: 0.7
601
Epoch 183/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7318 - accuracy: 0.7
102
Epoch 184/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6952 - accuracy: 0.7
128
Epoch 185/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6333 - accuracy: 0.7
224
Epoch 186/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7261 - accuracy: 0.7
137
Epoch 187/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5718 - accuracy: 0.7
916
Epoch 188/300
115/115 [==============================] - 0s 980us/step - loss: 0.6206 - accuracy:
 0.7452
Epoch 189/300
115/115 [==============================] - 0s 991us/step - loss: 0.6108 - accuracy:
 0.7513
Epoch 190/300
115/115 [==============================] - 0s 997us/step - loss: 0.5582 - accuracy:
 0.7863
Epoch 191/300
115/115 [==============================] - 0s 989us/step - loss: 0.7471 - accuracy:
 0.7294
Epoch 192/300
115/115 [==============================] - 0s 988us/step - loss: 0.6569 - accuracy:
 0.7242
Epoch 193/300
115/115 [==============================] - 0s 981us/step - loss: 0.6379 - accuracy:
 0.7583
Epoch 194/300
115/115 [==============================] - 0s 962us/step - loss: 0.7346 - accuracy:
 0.7364
Epoch 195/300
115/115 [==============================] - 0s 975us/step - loss: 0.6032 - accuracy:
 0.7662
Epoch 196/300
115/115 [==============================] - 0s 998us/step - loss: 0.6103 - accuracy:
 0.7539
Epoch 197/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6078 - accuracy: 0.7
583
Epoch 198/300
```

```
115/115 [==============================] - 0s 989us/step - loss: 0.6220 - accuracy:
 0.7399
Epoch 199/300
115/115 [==============================] - 0s 989us/step - loss: 0.6775 - accuracy:
 0.7426
Epoch 200/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6741 - accuracy: 0.7
487
Epoch 201/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6625 - accuracy: 0.7
426
Epoch 202/300
115/115 [==============================] - 0s 1ms/step - loss: 0.7107 - accuracy: 0.7
180
Epoch 203/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6659 - accuracy: 0.7
364
Epoch 204/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6249 - accuracy: 0.7
382
Epoch 205/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6951 - accuracy: 0.7
049
Epoch 206/300
115/115 [==============================] - 0s 996us/step - loss: 0.6905 - accuracy:
 0.7154
Epoch 207/300
115/115 [==============================] - 0s 993us/step - loss: 0.6588 - accuracy:
 0.7487
Epoch 208/300
115/115 [==============================] - 0s 980us/step - loss: 0.6638 - accuracy:
 0.7408
Epoch 209/300
115/115 [==============================] - 0s 989us/step - loss: 0.5790 - accuracy:
 0.7531
Epoch 210/300
115/115 [==============================] - 0s 989us/step - loss: 0.5753 - accuracy:
 0.7802
Epoch 211/300
115/115 [==============================] - 0s 980us/step - loss: 0.7651 - accuracy:
 0.6804
Epoch 212/300
115/115 [==============================] - 0s 950us/step - loss: 0.6373 - accuracy:
 0.7443
Epoch 213/300
115/115 [==============================] - 0s 962us/step - loss: 0.5955 - accuracy:
 0.7662
Epoch 214/300
115/115 [==============================] - 0s 980us/step - loss: 0.6461 - accuracy:
 0.7531
Epoch 215/300
115/115 [==============================] - 0s 971us/step - loss: 0.6657 - accuracy:
 0.7452
Epoch 216/300
115/115 [==============================] - 0s 962us/step - loss: 0.6659 - accuracy:
 0.7513
Epoch 217/300
115/115 [==============================] - 0s 966us/step - loss: 0.6199 - accuracy:
 0.7583
Epoch 218/300
```

```
115/115 [==============================] - 0s 954us/step - loss: 0.6948 - accuracy:
 0.7268
Epoch 219/300
115/115 [==============================] - 0s 980us/step - loss: 0.5360 - accuracy:
 0.8030
Epoch 220/300
115/115 [==============================] - 0s 966us/step - loss: 0.7130 - accuracy:
 0.7128
Epoch 221/300
115/115 [==============================] - 0s 954us/step - loss: 0.6584 - accuracy:
 0.7399
Epoch 222/300
115/115 [==============================] - 0s 974us/step - loss: 0.7122 - accuracy:
 0.7434
Epoch 223/300
115/115 [==============================] - 0s 998us/step - loss: 0.6749 - accuracy:
 0.7487
Epoch 224/300
115/115 [==============================] - 0s 962us/step - loss: 0.7088 - accuracy:
 0.7268
Epoch 225/300
115/115 [==============================] - 0s 953us/step - loss: 0.7823 - accuracy:
 0.6979
Epoch 226/300
115/115 [==============================] - 0s 970us/step - loss: 0.6612 - accuracy:
 0.7382
Epoch 227/300
115/115 [==============================] - 0s 998us/step - loss: 0.5483 - accuracy:
 0.7951
Epoch 228/300
115/115 [==============================] - 0s 954us/step - loss: 0.5367 - accuracy:
 0.7872
Epoch 229/300
115/115 [==============================] - 0s 927us/step - loss: 0.6871 - accuracy:
 0.7531
Epoch 230/300
115/115 [==============================] - 0s 980us/step - loss: 0.5541 - accuracy:
 0.7942
Epoch 231/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6140 - accuracy: 0.7
636
Epoch 232/300
115/115 [==============================] - 0s 955us/step - loss: 0.6927 - accuracy:
 0.7102
Epoch 233/300
115/115 [==============================] - 0s 943us/step - loss: 0.5323 - accuracy:
 0.7960
Epoch 234/300
115/115 [==============================] - 0s 977us/step - loss: 0.5556 - accuracy:
 0.7995
Epoch 235/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6037 - accuracy: 0.7
522
Epoch 236/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6079 - accuracy: 0.7
706
Epoch 237/300
115/115 [==============================] - 0s 959us/step - loss: 0.5122 - accuracy:
 0.7907
Epoch 238/300
```

```
115/115 [==============================] - 0s 954us/step - loss: 0.4825 - accuracy:
 0.8170
Epoch 239/300
115/115 [==============================] - 0s 971us/step - loss: 0.7093 - accuracy:
 0.7461
Epoch 240/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5739 - accuracy: 0.7
697
Epoch 241/300
115/115 [==============================] - 0s 973us/step - loss: 0.5873 - accuracy:
 0.7662
Epoch 242/300
115/115 [==============================] - 0s 949us/step - loss: 0.5281 - accuracy:
 0.7977
Epoch 243/300
115/115 [==============================] - 0s 971us/step - loss: 0.5371 - accuracy:
 0.7933
Epoch 244/300
115/115 [==============================] - 0s 984us/step - loss: 0.5565 - accuracy:
 0.7820
Epoch 245/300
115/115 [==============================] - 0s 993us/step - loss: 0.5205 - accuracy:
 0.8021
Epoch 246/300
115/115 [==============================] - 0s 984us/step - loss: 0.6159 - accuracy:
 0.7688
Epoch 247/300
115/115 [==============================] - 0s 1ms/step - loss: 0.4841 - accuracy: 0.8
205
Epoch 248/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5425 - accuracy: 0.7
977
Epoch 249/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6180 - accuracy: 0.7
671
Epoch 250/300
115/115 [==============================] - 0s 990us/step - loss: 0.5256 - accuracy:
 0.8030
Epoch 251/300
115/115 [==============================] - 0s 963us/step - loss: 0.5369 - accuracy:
 0.8012
Epoch 252/300
115/115 [==============================] - 0s 962us/step - loss: 0.5492 - accuracy:
 0.7995
Epoch 253/300
115/115 [==============================] - 0s 964us/step - loss: 0.6091 - accuracy:
 0.7802
Epoch 254/300
115/115 [==============================] - 0s 977us/step - loss: 0.6322 - accuracy:
 0.7644
Epoch 255/300
115/115 [==============================] - 0s 962us/step - loss: 0.6284 - accuracy:
 0.7574
Epoch 256/300
115/115 [==============================] - 0s 997us/step - loss: 0.5990 - accuracy:
 0.7644
Epoch 257/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5519 - accuracy: 0.7
881
Epoch 258/300
```

```
115/115 [==============================] - 0s 1ms/step - loss: 0.5595 - accuracy: 0.7
925
Epoch 259/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5645 - accuracy: 0.7
793
Epoch 260/300
115/115 [==============================] - 0s 997us/step - loss: 0.5491 - accuracy:
 0.7907
Epoch 261/300
115/115 [==============================] - 0s 971us/step - loss: 0.5512 - accuracy:
 0.7741
Epoch 262/300
115/115 [==============================] - 0s 965us/step - loss: 0.5475 - accuracy:
 0.7872
Epoch 263/300
115/115 [==============================] - 0s 954us/step - loss: 0.5839 - accuracy:
 0.7750
Epoch 264/300
115/115 [==============================] - 0s 997us/step - loss: 0.5146 - accuracy:
 0.8109
Epoch 265/300
115/115 [==============================] - 0s 980us/step - loss: 0.5052 - accuracy:
 0.8214
Epoch 266/300
115/115 [==============================] - 0s 954us/step - loss: 0.4825 - accuracy:
 0.8301
Epoch 267/300
115/115 [==============================] - 0s 997us/step - loss: 0.5146 - accuracy:
 0.8065
Epoch 268/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5845 - accuracy: 0.7
767
Epoch 269/300
115/115 [==============================] - 0s 961us/step - loss: 0.6620 - accuracy:
 0.7548
Epoch 270/300
115/115 [==============================] - 0s 980us/step - loss: 0.4819 - accuracy:
 0.8249
Epoch 271/300
115/115 [==============================] - 0s 973us/step - loss: 0.5070 - accuracy:
 0.8126
Epoch 272/300
115/115 [==============================] - 0s 957us/step - loss: 0.5161 - accuracy:
 0.8065
Epoch 273/300
115/115 [==============================] - 0s 962us/step - loss: 0.7329 - accuracy:
 0.7014
Epoch 274/300
115/115 [==============================] - 0s 954us/step - loss: 0.6256 - accuracy:
 0.7373
Epoch 275/300
115/115 [==============================] - 0s 988us/step - loss: 0.5319 - accuracy:
 0.7715
Epoch 276/300
115/115 [==============================] - 0s 988us/step - loss: 0.6344 - accuracy:
 0.7609
Epoch 277/300
115/115 [==============================] - 0s 966us/step - loss: 0.5583 - accuracy:
 0.7907
Epoch 278/300
```

```
115/115 [==============================] - 0s 997us/step - loss: 0.5309 - accuracy:
 0.7986
Epoch 279/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5503 - accuracy: 0.7
811
Epoch 280/300
115/115 [==============================] - 0s 980us/step - loss: 0.5534 - accuracy:
 0.7785
Epoch 281/300
115/115 [==============================] - 0s 954us/step - loss: 0.5652 - accuracy:
 0.7881
Epoch 282/300
115/115 [==============================] - 0s 971us/step - loss: 0.6818 - accuracy:
 0.7145
Epoch 283/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6284 - accuracy: 0.7
741
Epoch 284/300
115/115 [==============================] - 0s 988us/step - loss: 0.6462 - accuracy:
 0.7583
Epoch 285/300
115/115 [==============================] - 0s 988us/step - loss: 0.6402 - accuracy:
 0.7548
Epoch 286/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5680 - accuracy: 0.7
890
Epoch 287/300
115/115 [==============================] - 0s 999us/step - loss: 0.6072 - accuracy:
 0.7574
Epoch 288/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5891 - accuracy: 0.7
802
Epoch 289/300
115/115 [==============================] - 0s 982us/step - loss: 0.5133 - accuracy:
 0.8021
Epoch 290/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5224 - accuracy: 0.8
047
Epoch 291/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5721 - accuracy: 0.7
916
Epoch 292/300
115/115 [==============================] - 0s 1ms/step - loss: 0.5875 - accuracy: 0.7
697
Epoch 293/300
115/115 [==============================] - 0s 1ms/step - loss: 0.6011 - accuracy: 0.7
828
Epoch 294/300
115/115 [==============================] - 0s 989us/step - loss: 0.5629 - accuracy:
 0.8012
Epoch 295/300
115/115 [==============================] - 0s 957us/step - loss: 0.6416 - accuracy:
 0.7452
Epoch 296/300
115/115 [==============================] - 0s 929us/step - loss: 0.6763 - accuracy:
 0.7469
Epoch 297/300
115/115 [==============================] - 0s 927us/step - loss: 0.5938 - accuracy:
 0.7741
Epoch 298/300
```

```
115/115 [==============================] - 0s 952us/step - loss: 0.5183 - accuracy:
 0.8047
Epoch 299/300
115/115 [==============================] - 0s 936us/step - loss: 0.5891 - accuracy:
 0.7688
Epoch 300/300
115/115 [==============================] - 0s 962us/step - loss: 0.4812 - accuracy:
 0.8161
36/36 [==============================] - 0s 887us/step - loss: 1.8473 - accuracy: 0.2
636
```

In [376…
```python
columns = list(zip(*scores))
loss = columns[0]

plt.scatter(num_layers, loss, c = "purple")
plt.title('Loss by # of Hidden Layers (1-5)')
plt.xlabel("# of Hidden Layers")
plt.ylabel('Loss')
```
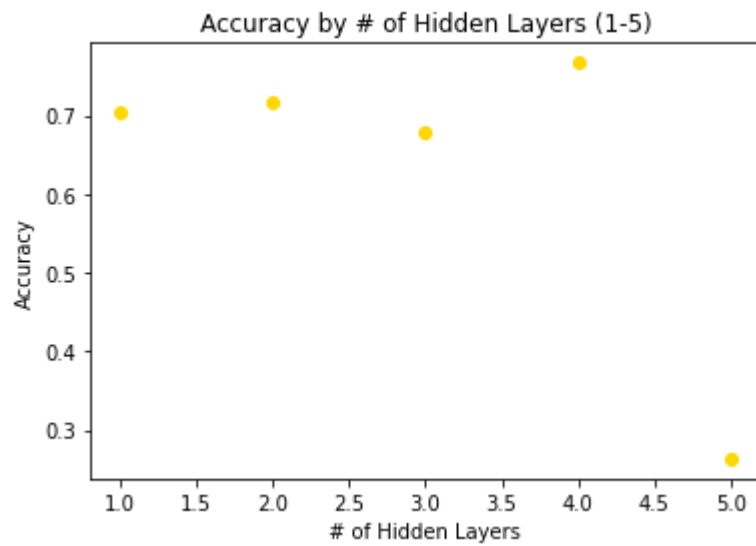
Out[376]:
```
Text(0, 0.5, 'Loss')
```
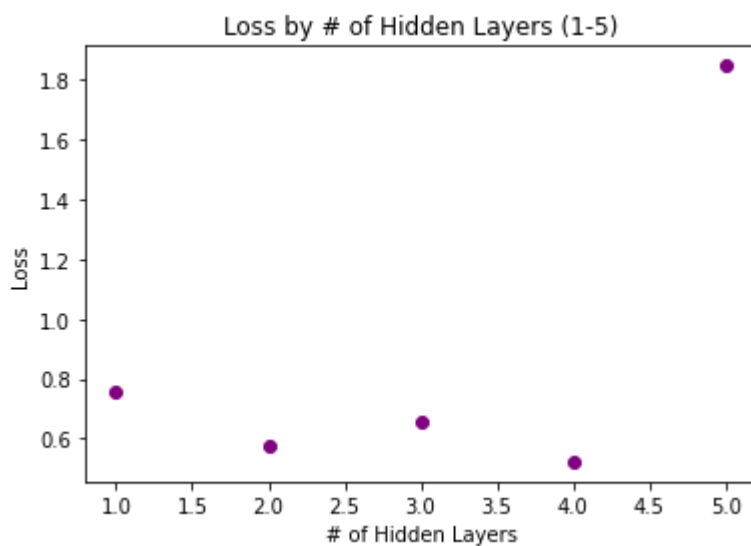

In [377…
```python
accuracy = columns[1]

plt.scatter(num_layers, accuracy, c = "gold")
plt.title('Accuracy by # of Hidden Layers (1-5)')
plt.xlabel("# of Hidden Layers")
plt.ylabel('Accuracy')
```

Out[377]:
```
Text(0, 0.5, 'Accuracy')
```

Accuracy by # of Hidden Layers (1-5)

Four hidden layers with 20 neurons each had the highest accuracy and lowest loss.

In [ ]: