Neural Networks - intro

Part 1 - XOR

1. Using the XOR dataset below, train (400 epochs) a neural network (NN) using 2, 3, 4, and 5 hidden layers (where each layer has only 2 neurons). For each n layers, store the resulting accuracy 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?

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

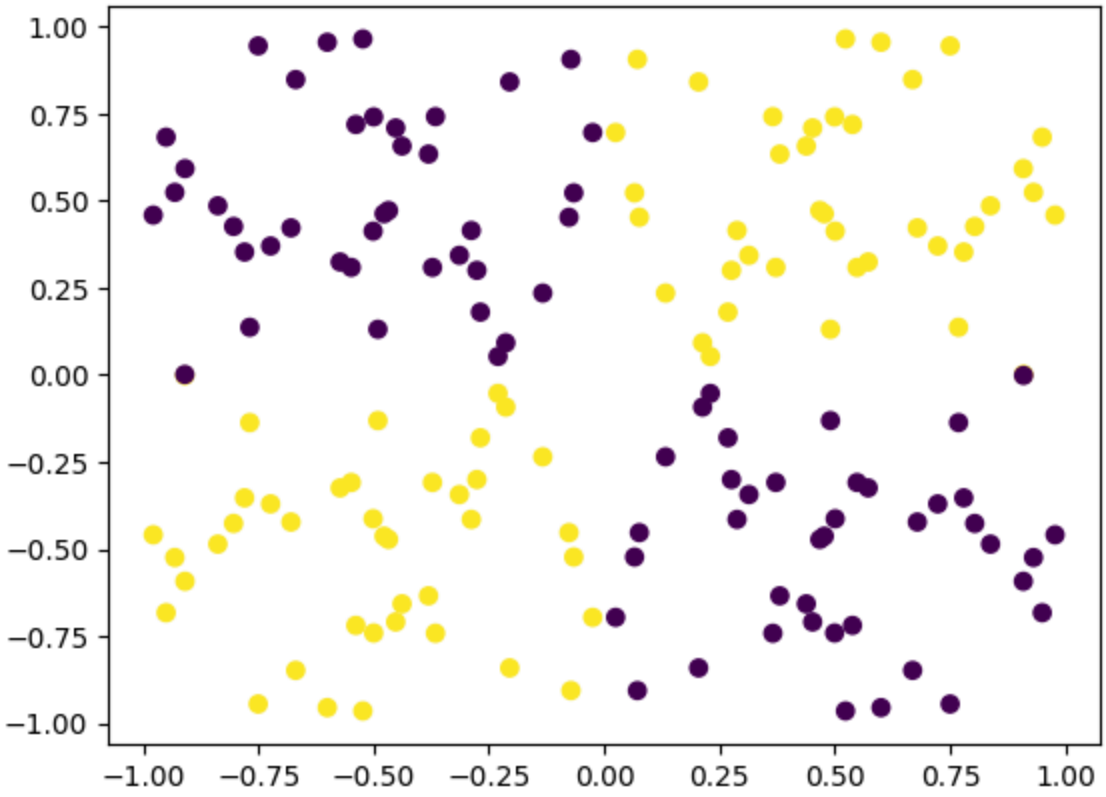
In [1]:
```
from keras.models import Sequential
from keras.layers import Dense
from keras.optimizers import SGD  #Stochastic Gradient Descent

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

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

In [2]:
```
n = 40
xx = np.random.random((n,1))
yy = np.random.random((n,1))
```

In [3]:
```
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 [4]:
```
plt.scatter(*zip(*X), c=y)
```

Out[4]:
```
<matplotlib.collections.PathCollection at 0x29660e8b2d0>
```



Test for Optimal Configuration

Only running 100 epochs due to computer memory issues.

In [5]:
```
num_layers = [1,2,3,4,5]
neurons = [2, 3, 4]
sgd = SGD(learning_rate=0.1)

def XOR(num_layers, neurons, epochs=100):
    model = Sequential()
    model.add(Dense(neurons, input_dim=2, activation='tanh'))
    for _ in range(num_layers -1):
        model.add(Dense(neurons, activation = 'tanh'))
    model.add(Dense(1, activation='sigmoid'))
    model.compile(loss='binary_crossentropy', optimizer='sgd', metrics=['accuracy'])
    model.fit(X, y, batch_size = 10, epochs=100)
    scores = model.evaluate(X, y)
    return scores[1]

res = {}

for n in neurons:
    scores = []
    for num_layer in num_layers:
        score = XOR(num_layer, n)
        scores.append(score)
    res[n] = scores
```

```
Epoch 1/100
```

```
C:\Users\rober\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\dense.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5028 - loss: 0.6992
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 878us/step - accuracy: 0.5691 - loss: 0.6895
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.6057 - loss: 0.6862
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4962 - loss: 0.7098
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 825us/step - accuracy: 0.6287 - loss: 0.6893
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.6542 - loss: 0.6826
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6905 - loss: 0.6786
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 703us/step - accuracy: 0.6359 - loss: 0.6843
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.6288 - loss: 0.6894
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6388 - loss: 0.6883
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6621 - loss: 0.6853
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5895 - loss: 0.6941
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 700us/step - accuracy: 0.7190 - loss: 0.6776
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.6672 - loss: 0.6789
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.7443 - loss: 0.6694
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 995us/step - accuracy: 0.6795 - loss: 0.6803
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5858 - loss: 0.6905
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6719 - loss: 0.6764
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6886 - loss: 0.6739
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6597 - loss: 0.6756
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 644us/step - accuracy: 0.6739 - loss: 0.6786
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 716us/step - accuracy: 0.6433 - loss: 0.6708
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 810us/step - accuracy: 0.6955 - loss: 0.6667
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 702us/step - accuracy: 0.6072 - loss: 0.6786
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.7187 - loss: 0.6625
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 870us/step - accuracy: 0.6841 - loss: 0.6635
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7150 - loss: 0.6667
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6944 - loss: 0.6667
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 707us/step - accuracy: 0.6113 - loss: 0.6790
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6905 - loss: 0.6646
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.6955 - loss: 0.6638
Epoch 32/100
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 744us/step - accuracy: 0.7162 - loss: 0.6597
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 721us/step - accuracy: 0.6697 - loss: 0.6697
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.6768 - loss: 0.6615
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 693us/step - accuracy: 0.6552 - loss: 0.6669
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.7020 - loss: 0.6585
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6711 - loss: 0.6613
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 677us/step - accuracy: 0.6807 - loss: 0.6618
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 634us/step - accuracy: 0.6108 - loss: 0.6746
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6956 - loss: 0.6533
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.6748 - loss: 0.6582
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 828us/step - accuracy: 0.6566 - loss: 0.6678
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 621us/step - accuracy: 0.6482 - loss: 0.6628
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.6884 - loss: 0.6545
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6950 - loss: 0.6507
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6959 - loss: 0.6618
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 745us/step - accuracy: 0.7441 - loss: 0.6460
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 745us/step - accuracy: 0.7023 - loss: 0.6554
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 899us/step - accuracy: 0.6811 - loss: 0.6534
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 699us/step - accuracy: 0.7277 - loss: 0.6473
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 770us/step - accuracy: 0.7027 - loss: 0.6529
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7173 - loss: 0.6431
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6382 - loss: 0.6614
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6921 - loss: 0.6512
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7336 - loss: 0.6424
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 775us/step - accuracy: 0.6962 - loss: 0.6470
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6884 - loss: 0.6497
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7094 - loss: 0.6474
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.7309 - loss: 0.6427
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 870us/step - accuracy: 0.6848 - loss: 0.6462
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 874us/step - accuracy: 0.7374 - loss: 0.6285
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 664us/step - accuracy: 0.7168 - loss: 0.6419
Epoch 63/100
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.7242 - loss: 0.6376
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.7416 - loss: 0.6385
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 679us/step - accuracy: 0.6462 - loss: 0.6512
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6793 - loss: 0.6379
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.7369 - loss: 0.6345
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 835us/step - accuracy: 0.7329 - loss: 0.6349
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7377 - loss: 0.6314
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.7288 - loss: 0.6326
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 709us/step - accuracy: 0.7065 - loss: 0.6372
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.7301 - loss: 0.6349
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 755us/step - accuracy: 0.7431 - loss: 0.6299
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 776us/step - accuracy: 0.7315 - loss: 0.6328
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 728us/step - accuracy: 0.7021 - loss: 0.6404
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.7068 - loss: 0.6385
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.7100 - loss: 0.6380
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 688us/step - accuracy: 0.7762 - loss: 0.6199
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.7149 - loss: 0.6278
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 745us/step - accuracy: 0.7844 - loss: 0.6208
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6757 - loss: 0.6382
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 810us/step - accuracy: 0.7572 - loss: 0.6115
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.7927 - loss: 0.6176
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7163 - loss: 0.6317
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7248 - loss: 0.6252
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7497 - loss: 0.6130
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 663us/step - accuracy: 0.7080 - loss: 0.6296
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 655us/step - accuracy: 0.7446 - loss: 0.6231
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.7197 - loss: 0.6283
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 651us/step - accuracy: 0.7821 - loss: 0.6070
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.7796 - loss: 0.6053
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7311 - loss: 0.6160
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 847us/step - accuracy: 0.7743 - loss: 0.6108
Epoch 94/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 993us/step - accuracy: 0.7761 - loss: 0.6199
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.7414 - loss: 0.6153
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.7924 - loss: 0.6035
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7770 - loss: 0.6117
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7450 - loss: 0.6135
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7909 - loss: 0.5993
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 679us/step - accuracy: 0.7665 - loss: 0.6081
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7067 - loss: 0.6348
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5105 - loss: 0.6941
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.4902 - loss: 0.6932
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5273 - loss: 0.6919
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5355 - loss: 0.6925
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.5074 - loss: 0.6924
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5287 - loss: 0.6927
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5539 - loss: 0.6904
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4452 - loss: 0.6968
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.4869 - loss: 0.6951
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.4683 - loss: 0.6957
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4525 - loss: 0.6944
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5083 - loss: 0.6928
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5521 - loss: 0.6917
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5163 - loss: 0.6933
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4830 - loss: 0.6936
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5470 - loss: 0.6924
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5171 - loss: 0.6937
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4933 - loss: 0.6948
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 679us/step - accuracy: 0.4964 - loss: 0.6942
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.4731 - loss: 0.6928
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 711us/step - accuracy: 0.5396 - loss: 0.6922
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5555 - loss: 0.6926
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 698us/step - accuracy: 0.4333 - loss: 0.6956
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 820us/step - accuracy: 0.4886 - loss: 0.6949
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Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5084 - loss: 0.6936
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 856us/step - accuracy: 0.5736 - loss: 0.6913
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 768us/step - accuracy: 0.5711 - loss: 0.6917
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5800 - loss: 0.6927
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 774us/step - accuracy: 0.5602 - loss: 0.6935
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5392 - loss: 0.6925
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5156 - loss: 0.6935
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 757us/step - accuracy: 0.4942 - loss: 0.6932
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.5336 - loss: 0.6942
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5144 - loss: 0.6940
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5361 - loss: 0.6938
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 972us/step - accuracy: 0.4850 - loss: 0.6951
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5224 - loss: 0.6931
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 805us/step - accuracy: 0.5220 - loss: 0.6930
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 841us/step - accuracy: 0.5527 - loss: 0.6941
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.5355 - loss: 0.6926
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.5397 - loss: 0.6929
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 906us/step - accuracy: 0.5349 - loss: 0.6927
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.4920 - loss: 0.6943
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 930us/step - accuracy: 0.4159 - loss: 0.6968
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 836us/step - accuracy: 0.5022 - loss: 0.6939
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.6003 - loss: 0.6908
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 662us/step - accuracy: 0.5401 - loss: 0.6936
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.5105 - loss: 0.6931
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 729us/step - accuracy: 0.5075 - loss: 0.6948
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 716us/step - accuracy: 0.5512 - loss: 0.6920
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 676us/step - accuracy: 0.4449 - loss: 0.6954
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 700us/step - accuracy: 0.5320 - loss: 0.6925
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5467 - loss: 0.6932
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 795us/step - accuracy: 0.5215 - loss: 0.6935
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 871us/step - accuracy: 0.5536 - loss: 0.6927
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Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5086 - loss: 0.6948
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5873 - loss: 0.6922
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 996us/step - accuracy: 0.5256 - loss: 0.6922
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5118 - loss: 0.6923
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.5664 - loss: 0.6923
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 661us/step - accuracy: 0.5703 - loss: 0.6922
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5655 - loss: 0.6925
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 941us/step - accuracy: 0.5019 - loss: 0.6943
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5800 - loss: 0.6915
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5061 - loss: 0.6941
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5931 - loss: 0.6918
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6038 - loss: 0.6917
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.5014 - loss: 0.6926
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 938us/step - accuracy: 0.5099 - loss: 0.6937
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.5197 - loss: 0.6944
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 938us/step - accuracy: 0.4854 - loss: 0.6950
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5974 - loss: 0.6918
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5493 - loss: 0.6929
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 957us/step - accuracy: 0.4887 - loss: 0.6952
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6014 - loss: 0.6925
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 899us/step - accuracy: 0.5637 - loss: 0.6926
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 820us/step - accuracy: 0.5346 - loss: 0.6940
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5526 - loss: 0.6926
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 909us/step - accuracy: 0.5227 - loss: 0.6949
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 689us/step - accuracy: 0.5790 - loss: 0.6923
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 871us/step - accuracy: 0.5739 - loss: 0.6928
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 903us/step - accuracy: 0.5945 - loss: 0.6924
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 902us/step - accuracy: 0.5965 - loss: 0.6925
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5822 - loss: 0.6925
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.4496 - loss: 0.6967
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 758us/step - accuracy: 0.5696 - loss: 0.6930
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Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5689 - loss: 0.6943
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5922 - loss: 0.6920
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.5077 - loss: 0.6948
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5615 - loss: 0.6932
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.6078 - loss: 0.6931
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5311 - loss: 0.6938
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 656us/step - accuracy: 0.6166 - loss: 0.6927
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 767us/step - accuracy: 0.5070 - loss: 0.6942
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5785 - loss: 0.6940
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5544 - loss: 0.6933
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.5889 - loss: 0.6934
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.6039 - loss: 0.6929
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5581 - loss: 0.6928
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5977 - loss: 0.6929
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6573 - loss: 0.6916
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 828us/step - accuracy: 0.4841 - loss: 0.7166
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5396 - loss: 0.7023
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5092 - loss: 0.7121
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.5439 - loss: 0.7018
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6109 - loss: 0.6849
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.5439 - loss: 0.7101
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 879us/step - accuracy: 0.5511 - loss: 0.7109
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6539 - loss: 0.6845
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5968 - loss: 0.7003
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5735 - loss: 0.7042
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6399 - loss: 0.6893
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6372 - loss: 0.6904
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 636us/step - accuracy: 0.6733 - loss: 0.6759
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6070 - loss: 0.6971
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5920 - loss: 0.6976
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6371 - loss: 0.6835
Epoch 17/100
```

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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5920 - loss: 0.6966
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6009 - loss: 0.6970
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6425 - loss: 0.6840
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.6851 - loss: 0.6700
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5878 - loss: 0.6959
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 680us/step - accuracy: 0.6522 - loss: 0.6829
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 752us/step - accuracy: 0.5895 - loss: 0.6941
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5930 - loss: 0.6917
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6308 - loss: 0.6812
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6393 - loss: 0.6812
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6143 - loss: 0.6922
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.6290 - loss: 0.6831
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5935 - loss: 0.6941
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 676us/step - accuracy: 0.6287 - loss: 0.6787
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6566 - loss: 0.6747
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5602 - loss: 0.6944
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6487 - loss: 0.6725
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6044 - loss: 0.6917
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 702us/step - accuracy: 0.6756 - loss: 0.6638
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5365 - loss: 0.6989
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6319 - loss: 0.6721
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6128 - loss: 0.6801
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5895 - loss: 0.6931
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.6310 - loss: 0.6734
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5790 - loss: 0.6811
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6199 - loss: 0.6734
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6169 - loss: 0.6822
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6053 - loss: 0.6814
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 603us/step - accuracy: 0.6050 - loss: 0.6749
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6282 - loss: 0.6754
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6600 - loss: 0.6696
Epoch 48/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6354 - loss: 0.6704
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6508 - loss: 0.6675
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6724 - loss: 0.6599
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6063 - loss: 0.6809
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6737 - loss: 0.6603
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6204 - loss: 0.6723
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5999 - loss: 0.6821
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6293 - loss: 0.6801
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6086 - loss: 0.6749
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5877 - loss: 0.6780
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 634us/step - accuracy: 0.6042 - loss: 0.6742
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6890 - loss: 0.6511
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6497 - loss: 0.6672
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6197 - loss: 0.6748
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6949 - loss: 0.6571
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6890 - loss: 0.6565
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6073 - loss: 0.6771
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.6747 - loss: 0.6644
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6837 - loss: 0.6504
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6710 - loss: 0.6602
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6712 - loss: 0.6537
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 836us/step - accuracy: 0.6941 - loss: 0.6549
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5994 - loss: 0.6844
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7551 - loss: 0.6348
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.7360 - loss: 0.6435
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6330 - loss: 0.6637
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6875 - loss: 0.6556
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6004 - loss: 0.6820
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 634us/step - accuracy: 0.7229 - loss: 0.6381
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6547 - loss: 0.6706
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6465 - loss: 0.6610
Epoch 79/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6772 - loss: 0.6535
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.6902 - loss: 0.6444
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7063 - loss: 0.6460
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6631 - loss: 0.6586
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6731 - loss: 0.6441
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6654 - loss: 0.6578
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 755us/step - accuracy: 0.6892 - loss: 0.6481
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6605 - loss: 0.6597
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6131 - loss: 0.6619
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.6834 - loss: 0.6496
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6801 - loss: 0.6492
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.6773 - loss: 0.6437
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6633 - loss: 0.6535
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7008 - loss: 0.6364
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 828us/step - accuracy: 0.7251 - loss: 0.6214
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.6682 - loss: 0.6481
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6280 - loss: 0.6605
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6634 - loss: 0.6380
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.6778 - loss: 0.6483
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6763 - loss: 0.6421
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.7010 - loss: 0.6363
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7138 - loss: 0.6257
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4758 - loss: 0.7087
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4714 - loss: 0.7123
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5268 - loss: 0.6954
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.5380 - loss: 0.7015
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5125 - loss: 0.6949
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4802 - loss: 0.7015
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4808 - loss: 0.6980
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4819 - loss: 0.6984
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4542 - loss: 0.7034
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.5273 - loss: 0.6833
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Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4206 - loss: 0.7067
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4963 - loss: 0.6871
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4857 - loss: 0.6864
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.4842 - loss: 0.6847
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4762 - loss: 0.6889
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4766 - loss: 0.6929
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5271 - loss: 0.6803
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.4856 - loss: 0.6885
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4367 - loss: 0.6946
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.4426 - loss: 0.6946
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5313 - loss: 0.6812
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5707 - loss: 0.6627
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5158 - loss: 0.6752
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4875 - loss: 0.6776
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4630 - loss: 0.6876
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4726 - loss: 0.6746
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4971 - loss: 0.6785
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.4994 - loss: 0.6816
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5357 - loss: 0.6624
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 875us/step - accuracy: 0.5663 - loss: 0.6519
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4927 - loss: 0.6686
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.4812 - loss: 0.6727
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5120 - loss: 0.6756
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5021 - loss: 0.6728
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5271 - loss: 0.6657
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5397 - loss: 0.6547
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5543 - loss: 0.6539
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5666 - loss: 0.6456
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.4835 - loss: 0.6604
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4548 - loss: 0.6742
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5161 - loss: 0.6585
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Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5352 - loss: 0.6483
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5303 - loss: 0.6413
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.5120 - loss: 0.6480
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4728 - loss: 0.6604
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4867 - loss: 0.6578
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5531 - loss: 0.6390
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4822 - loss: 0.6479
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4928 - loss: 0.6546
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5187 - loss: 0.6352
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 768us/step - accuracy: 0.4944 - loss: 0.6408
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4867 - loss: 0.6643
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5152 - loss: 0.6309
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5871 - loss: 0.6260
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 859us/step - accuracy: 0.4882 - loss: 0.6410
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5271 - loss: 0.6404
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5031 - loss: 0.6451
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4804 - loss: 0.6381
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4937 - loss: 0.6270
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4633 - loss: 0.6348
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5368 - loss: 0.6192
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5424 - loss: 0.6146
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5438 - loss: 0.6062
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.5502 - loss: 0.6166
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5085 - loss: 0.6163
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4701 - loss: 0.6331
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 828us/step - accuracy: 0.4448 - loss: 0.6285
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.4615 - loss: 0.6249
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5458 - loss: 0.5942
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4610 - loss: 0.6186
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.5468 - loss: 0.5892
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5311 - loss: 0.5984
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Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5232 - loss: 0.5813
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5232 - loss: 0.5818
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4801 - loss: 0.6190
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5049 - loss: 0.6024
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.4588 - loss: 0.6138
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.4914 - loss: 0.6024
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5127 - loss: 0.5898
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5286 - loss: 0.5594
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 767us/step - accuracy: 0.4869 - loss: 0.5982
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5112 - loss: 0.5852
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.4822 - loss: 0.5848
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5041 - loss: 0.5815
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5099 - loss: 0.5790
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4488 - loss: 0.5929
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5058 - loss: 0.5719
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 809us/step - accuracy: 0.5718 - loss: 0.5317
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5211 - loss: 0.5610
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4993 - loss: 0.5685
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 704us/step - accuracy: 0.5560 - loss: 0.5376
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4679 - loss: 0.5824
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5691 - loss: 0.5252
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4747 - loss: 0.5727
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4626 - loss: 0.5781
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5288 - loss: 0.5533
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4772 - loss: 0.5661
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 752us/step - accuracy: 0.5270 - loss: 0.5472
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5164 - loss: 0.5300
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4840 - loss: 0.5651
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4676 - loss: 0.5669
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4271 - loss: 0.5822
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5037 - loss: 0.6964
Epoch 2/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5445 - loss: 0.6906
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5288 - loss: 0.6931
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 941us/step - accuracy: 0.6105 - loss: 0.6931
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.5633 - loss: 0.6898
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5901 - loss: 0.6927
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6028 - loss: 0.6933
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5185 - loss: 0.6952
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 877us/step - accuracy: 0.5387 - loss: 0.6944
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6312 - loss: 0.6886
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5451 - loss: 0.6992
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.6054 - loss: 0.6945
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6255 - loss: 0.6930
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5967 - loss: 0.6922
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.6629 - loss: 0.6928
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6031 - loss: 0.6959
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6367 - loss: 0.6929
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 835us/step - accuracy: 0.5818 - loss: 0.6960
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6241 - loss: 0.6947
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7101 - loss: 0.6877
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6438 - loss: 0.6925
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 870us/step - accuracy: 0.5896 - loss: 0.6952
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5813 - loss: 0.6966
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7277 - loss: 0.6892
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6640 - loss: 0.6900
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7057 - loss: 0.6876
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6094 - loss: 0.6953
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6633 - loss: 0.6906
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6267 - loss: 0.6943
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7508 - loss: 0.6867
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6001 - loss: 0.6922
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.6077 - loss: 0.6953
Epoch 33/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6217 - loss: 0.6930
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 702us/step - accuracy: 0.6356 - loss: 0.6936
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6019 - loss: 0.6952
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6958 - loss: 0.6908
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.6323 - loss: 0.6942
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5906 - loss: 0.6977
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6569 - loss: 0.6921
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6584 - loss: 0.6960
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6734 - loss: 0.6908
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6371 - loss: 0.6933
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6399 - loss: 0.6925
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.6896 - loss: 0.6894
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7211 - loss: 0.6881
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6403 - loss: 0.6938
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 602us/step - accuracy: 0.6714 - loss: 0.6911
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6793 - loss: 0.6913
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6669 - loss: 0.6915
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6026 - loss: 0.6912
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.6764 - loss: 0.6925
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6269 - loss: 0.6930
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 844us/step - accuracy: 0.6663 - loss: 0.6890
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6713 - loss: 0.6904
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.7566 - loss: 0.6872
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7263 - loss: 0.6887
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 967us/step - accuracy: 0.6748 - loss: 0.6908
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6761 - loss: 0.6923
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7290 - loss: 0.6884
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7018 - loss: 0.6896
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.6748 - loss: 0.6909
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6687 - loss: 0.6923
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7052 - loss: 0.6898
Epoch 64/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6821 - loss: 0.6894
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6886 - loss: 0.6883
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6403 - loss: 0.6954
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6764 - loss: 0.6858
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6886 - loss: 0.6901
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6942 - loss: 0.6909
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7427 - loss: 0.6838
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.7128 - loss: 0.6877
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.7156 - loss: 0.6875
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7045 - loss: 0.6868
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 968us/step - accuracy: 0.6774 - loss: 0.6905
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6637 - loss: 0.6880
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6658 - loss: 0.6901
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.6516 - loss: 0.6903
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6161 - loss: 0.6939
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7200 - loss: 0.6862
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.6908 - loss: 0.6903
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6736 - loss: 0.6881
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7431 - loss: 0.6821
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7642 - loss: 0.6846
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7195 - loss: 0.6863
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6601 - loss: 0.6883
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 900us/step - accuracy: 0.6674 - loss: 0.6890
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6424 - loss: 0.6891
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6391 - loss: 0.6884
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.7088 - loss: 0.6872
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7142 - loss: 0.6827
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6614 - loss: 0.6878
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6827 - loss: 0.6888
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 684us/step - accuracy: 0.7089 - loss: 0.6858
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6021 - loss: 0.6910
Epoch 95/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6810 - loss: 0.6850
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7165 - loss: 0.6834
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.6698 - loss: 0.6867
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.7216 - loss: 0.6794
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6676 - loss: 0.6830
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6866 - loss: 0.6835
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7657 - loss: 0.6793
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5363 - loss: 0.6955
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.5568 - loss: 0.6933
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4836 - loss: 0.7160
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5613 - loss: 0.7035
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 824us/step - accuracy: 0.5751 - loss: 0.6915
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5115 - loss: 0.7016
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5027 - loss: 0.7002
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.4940 - loss: 0.7021
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5169 - loss: 0.7063
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.4740 - loss: 0.7153
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5125 - loss: 0.7157
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5638 - loss: 0.7002
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5132 - loss: 0.7096
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 907us/step - accuracy: 0.5161 - loss: 0.7065
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5880 - loss: 0.6856
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5122 - loss: 0.7102
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5634 - loss: 0.6858
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5361 - loss: 0.6940
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.5077 - loss: 0.6949
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6241 - loss: 0.6748
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5296 - loss: 0.7035
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5309 - loss: 0.7015
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5235 - loss: 0.6995
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5934 - loss: 0.6812
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5311 - loss: 0.6952
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Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5372 - loss: 0.6953
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5457 - loss: 0.6933
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.5679 - loss: 0.6932
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5579 - loss: 0.6914
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5489 - loss: 0.6909
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5835 - loss: 0.6929
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5880 - loss: 0.6798
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5189 - loss: 0.6897
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5616 - loss: 0.6902
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 765us/step - accuracy: 0.5324 - loss: 0.6937
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5384 - loss: 0.6923
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5714 - loss: 0.6924
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5819 - loss: 0.6822
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5239 - loss: 0.6913
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5673 - loss: 0.6882
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4863 - loss: 0.6978
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5429 - loss: 0.6928
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5375 - loss: 0.6881
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5207 - loss: 0.6914
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5878 - loss: 0.6784
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5555 - loss: 0.6880
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5752 - loss: 0.6758
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5480 - loss: 0.6898
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5837 - loss: 0.6749
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5744 - loss: 0.6840
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 767us/step - accuracy: 0.5677 - loss: 0.6802
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5224 - loss: 0.6877
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4697 - loss: 0.6884
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5374 - loss: 0.6770
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5211 - loss: 0.6780
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5248 - loss: 0.6893
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Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5453 - loss: 0.6855
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5044 - loss: 0.6861
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5359 - loss: 0.6820
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5585 - loss: 0.6739
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 636us/step - accuracy: 0.5595 - loss: 0.6796
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5892 - loss: 0.6683
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5509 - loss: 0.6742
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5797 - loss: 0.6673
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5660 - loss: 0.6708
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 794us/step - accuracy: 0.5508 - loss: 0.6796
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5767 - loss: 0.6691
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 703us/step - accuracy: 0.5842 - loss: 0.6630
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5221 - loss: 0.6799
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5570 - loss: 0.6722
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5560 - loss: 0.6652
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5492 - loss: 0.6628
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5065 - loss: 0.6730
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5130 - loss: 0.6686
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 634us/step - accuracy: 0.4976 - loss: 0.6703
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5046 - loss: 0.6720
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5187 - loss: 0.6683
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5055 - loss: 0.6685
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5379 - loss: 0.6724
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4834 - loss: 0.6713
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4886 - loss: 0.6683
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5098 - loss: 0.6636
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4799 - loss: 0.6755
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 704us/step - accuracy: 0.4393 - loss: 0.6695
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4824 - loss: 0.6720
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4745 - loss: 0.6669
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5023 - loss: 0.6691
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Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5242 - loss: 0.6654
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5202 - loss: 0.6642
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 602us/step - accuracy: 0.5467 - loss: 0.6584
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4751 - loss: 0.6709
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5904 - loss: 0.6550
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4737 - loss: 0.6710
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 703us/step - accuracy: 0.5561 - loss: 0.6580
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5462 - loss: 0.6554
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5229 - loss: 0.6621
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5501 - loss: 0.6476
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5345 - loss: 0.6498
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5897 - loss: 0.6533
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4948 - loss: 0.6652
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5827 - loss: 0.6578
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5522 - loss: 0.7463
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5098 - loss: 0.7892
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4893 - loss: 0.7664
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5465 - loss: 0.7340
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 745us/step - accuracy: 0.4804 - loss: 0.7480
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5995 - loss: 0.6887
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5172 - loss: 0.7243
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5094 - loss: 0.7601
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.5670 - loss: 0.7199
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 941us/step - accuracy: 0.5903 - loss: 0.6894
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5586 - loss: 0.7298
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6201 - loss: 0.7117
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6008 - loss: 0.7009
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.5916 - loss: 0.6939
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5995 - loss: 0.7015
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5425 - loss: 0.7326
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5860 - loss: 0.7055
Epoch 18/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5554 - loss: 0.7202
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.5907 - loss: 0.6975
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.5233 - loss: 0.7187
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5475 - loss: 0.7078
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5679 - loss: 0.7164
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5215 - loss: 0.7116
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5766 - loss: 0.7054
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5899 - loss: 0.6769
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5162 - loss: 0.7016
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 602us/step - accuracy: 0.5361 - loss: 0.7044
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5593 - loss: 0.6934
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.5749 - loss: 0.6812
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5407 - loss: 0.6932
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6264 - loss: 0.6673
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5241 - loss: 0.6901
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5445 - loss: 0.6909
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5371 - loss: 0.6894
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.5088 - loss: 0.6785
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5847 - loss: 0.6695
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5705 - loss: 0.6766
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.6119 - loss: 0.6648
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.5617 - loss: 0.6730
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5192 - loss: 0.6753
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5287 - loss: 0.6730
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.5117 - loss: 0.6784
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5559 - loss: 0.6711
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5403 - loss: 0.6758
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.6107 - loss: 0.6603
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5768 - loss: 0.6690
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5579 - loss: 0.6619
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5249 - loss: 0.6672
Epoch 49/100
```

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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5992 - loss: 0.6591
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5730 - loss: 0.6651
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5541 - loss: 0.6594
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5337 - loss: 0.6681
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.6222 - loss: 0.6473
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6271 - loss: 0.6566
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6536 - loss: 0.6495
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6206 - loss: 0.6474
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6407 - loss: 0.6432
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.6194 - loss: 0.6459
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5654 - loss: 0.6576
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6277 - loss: 0.6526
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6687 - loss: 0.6464
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6948 - loss: 0.6420
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6529 - loss: 0.6413
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6652 - loss: 0.6437
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.6170 - loss: 0.6489
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6857 - loss: 0.6374
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.7433 - loss: 0.6313
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.6954 - loss: 0.6378
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7137 - loss: 0.6317
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.7444 - loss: 0.6318
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.7314 - loss: 0.6355
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7684 - loss: 0.6305
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 689us/step - accuracy: 0.7719 - loss: 0.6346
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8232 - loss: 0.6202
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7856 - loss: 0.6302
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 767us/step - accuracy: 0.8390 - loss: 0.6173
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8183 - loss: 0.6220
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8673 - loss: 0.6055
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8052 - loss: 0.6172
Epoch 80/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.8021 - loss: 0.6112
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.8264 - loss: 0.6105
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.8486 - loss: 0.6106
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8373 - loss: 0.6069
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8778 - loss: 0.5994
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.8426 - loss: 0.6081
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8115 - loss: 0.6066
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8724 - loss: 0.5946
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.8060 - loss: 0.6114
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8676 - loss: 0.5864
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8533 - loss: 0.5805
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8424 - loss: 0.5920
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8467 - loss: 0.5869
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8263 - loss: 0.5799
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.8775 - loss: 0.5783
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8666 - loss: 0.5717
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8590 - loss: 0.5786
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.8568 - loss: 0.5704
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.8657 - loss: 0.5763
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8657 - loss: 0.5695
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 687us/step - accuracy: 0.8709 - loss: 0.5558
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8902 - loss: 0.5552
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.4500 - loss: 0.6966
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 874us/step - accuracy: 0.4888 - loss: 0.6931
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.5065 - loss: 0.6929
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5084 - loss: 0.6947
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 895us/step - accuracy: 0.5864 - loss: 0.6919
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.4566 - loss: 0.6992
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4973 - loss: 0.6956
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4492 - loss: 0.6990
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.5312 - loss: 0.6957
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5387 - loss: 0.6947
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Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5210 - loss: 0.6912
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 835us/step - accuracy: 0.5506 - loss: 0.6947
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5092 - loss: 0.6940
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5376 - loss: 0.6946
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5761 - loss: 0.6911
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5932 - loss: 0.6915
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5294 - loss: 0.6950
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6131 - loss: 0.6901
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5101 - loss: 0.6957
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5378 - loss: 0.6948
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6050 - loss: 0.6879
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5314 - loss: 0.6949
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6149 - loss: 0.6906
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5986 - loss: 0.6923
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5289 - loss: 0.6951
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5720 - loss: 0.6930
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6108 - loss: 0.6906
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5862 - loss: 0.6926
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5222 - loss: 0.6965
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.6139 - loss: 0.6921
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6186 - loss: 0.6895
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5289 - loss: 0.6948
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5708 - loss: 0.6928
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.6274 - loss: 0.6894
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.5714 - loss: 0.6935
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5865 - loss: 0.6905
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5813 - loss: 0.6921
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6174 - loss: 0.6901
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.5736 - loss: 0.6945
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 750us/step - accuracy: 0.5621 - loss: 0.6933
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5837 - loss: 0.6913
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Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5732 - loss: 0.6922
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5737 - loss: 0.6922
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6450 - loss: 0.6916
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5915 - loss: 0.6898
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5997 - loss: 0.6928
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5252 - loss: 0.6974
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6009 - loss: 0.6926
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5371 - loss: 0.6962
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5678 - loss: 0.6952
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6798 - loss: 0.6850
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.5611 - loss: 0.6960
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 634us/step - accuracy: 0.6180 - loss: 0.6909
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5230 - loss: 0.6957
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5902 - loss: 0.6926
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.5119 - loss: 0.6957
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6219 - loss: 0.6904
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6263 - loss: 0.6936
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6175 - loss: 0.6929
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6047 - loss: 0.6924
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6359 - loss: 0.6910
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6114 - loss: 0.6924
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6426 - loss: 0.6914
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6497 - loss: 0.6911
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5478 - loss: 0.6961
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5724 - loss: 0.6940
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 703us/step - accuracy: 0.5447 - loss: 0.6970
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5309 - loss: 0.6932
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6544 - loss: 0.6892
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6776 - loss: 0.6893
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6925 - loss: 0.6884
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5443 - loss: 0.6963
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Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5915 - loss: 0.6937
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6643 - loss: 0.6899
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6591 - loss: 0.6882
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5839 - loss: 0.6934
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6593 - loss: 0.6896
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6476 - loss: 0.6905
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 999us/step - accuracy: 0.6139 - loss: 0.6936
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.6756 - loss: 0.6898
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.6380 - loss: 0.6905
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6578 - loss: 0.6899
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6226 - loss: 0.6921
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6372 - loss: 0.6928
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.6314 - loss: 0.6890
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5669 - loss: 0.6944
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6201 - loss: 0.6921
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6191 - loss: 0.6904
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6179 - loss: 0.6932
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6111 - loss: 0.6937
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 813us/step - accuracy: 0.6125 - loss: 0.6936
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6730 - loss: 0.6876
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6414 - loss: 0.6908
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.6692 - loss: 0.6900
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5808 - loss: 0.6927
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6363 - loss: 0.6884
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5856 - loss: 0.6955
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5898 - loss: 0.6934
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6183 - loss: 0.6898
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6830 - loss: 0.6854
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6431 - loss: 0.6885
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5296 - loss: 0.7172
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 873us/step - accuracy: 0.5629 - loss: 0.6843
Epoch 3/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.5186 - loss: 0.7168
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5447 - loss: 0.7132
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 870us/step - accuracy: 0.4770 - loss: 0.7456
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 770us/step - accuracy: 0.5200 - loss: 0.7175
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5549 - loss: 0.6935
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5293 - loss: 0.7082
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5272 - loss: 0.6977
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5169 - loss: 0.7003
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5098 - loss: 0.6995
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5350 - loss: 0.6968
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5262 - loss: 0.7008
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6346 - loss: 0.6626
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5471 - loss: 0.6950
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6373 - loss: 0.6741
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5677 - loss: 0.6860
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5635 - loss: 0.6919
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6624 - loss: 0.6634
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5880 - loss: 0.6874
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5844 - loss: 0.6836
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.6528 - loss: 0.6657
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6408 - loss: 0.6673
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5883 - loss: 0.6782
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6266 - loss: 0.6663
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.6285 - loss: 0.6745
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.7213 - loss: 0.6529
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6758 - loss: 0.6668
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6199 - loss: 0.6759
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5750 - loss: 0.6848
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6801 - loss: 0.6519
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6169 - loss: 0.6778
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5868 - loss: 0.6758
Epoch 34/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6210 - loss: 0.6622
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 634us/step - accuracy: 0.6463 - loss: 0.6658
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6703 - loss: 0.6675
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6535 - loss: 0.6545
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 704us/step - accuracy: 0.6501 - loss: 0.6511
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.6647 - loss: 0.6530
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 689us/step - accuracy: 0.6413 - loss: 0.6529
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6669 - loss: 0.6488
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.5759 - loss: 0.6662
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6430 - loss: 0.6563
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5890 - loss: 0.6580
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6272 - loss: 0.6608
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.6260 - loss: 0.6521
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6466 - loss: 0.6478
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6446 - loss: 0.6413
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6750 - loss: 0.6497
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6837 - loss: 0.6445
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6127 - loss: 0.6503
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6581 - loss: 0.6455
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6593 - loss: 0.6390
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6663 - loss: 0.6396
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6684 - loss: 0.6329
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6635 - loss: 0.6428
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6756 - loss: 0.6316
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6799 - loss: 0.6244
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6938 - loss: 0.6244
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.7061 - loss: 0.6334
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6739 - loss: 0.6344
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7591 - loss: 0.6166
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.7361 - loss: 0.6146
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6961 - loss: 0.6303
Epoch 65/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 634us/step - accuracy: 0.7824 - loss: 0.6018
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7904 - loss: 0.6039
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.7996 - loss: 0.6163
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 767us/step - accuracy: 0.7794 - loss: 0.6002
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.7770 - loss: 0.5931
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7801 - loss: 0.5938
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7839 - loss: 0.5911
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7754 - loss: 0.5921
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.8015 - loss: 0.5957
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.8319 - loss: 0.5777
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8040 - loss: 0.5846
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8085 - loss: 0.5617
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8179 - loss: 0.5672
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.8696 - loss: 0.5416
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8589 - loss: 0.5406
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7929 - loss: 0.5642
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 819us/step - accuracy: 0.8590 - loss: 0.5361
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.8000 - loss: 0.5359
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.8574 - loss: 0.5307
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8682 - loss: 0.5041
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8723 - loss: 0.5084
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8695 - loss: 0.4932
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8124 - loss: 0.4999
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7755 - loss: 0.5139
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8648 - loss: 0.4659
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8230 - loss: 0.4892
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8536 - loss: 0.4473
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.8461 - loss: 0.4609
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 811us/step - accuracy: 0.8429 - loss: 0.4517
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.8777 - loss: 0.4424
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.8762 - loss: 0.4452
Epoch 96/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 603us/step - accuracy: 0.8370 - loss: 0.4489
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8323 - loss: 0.4418
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.8565 - loss: 0.4372
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8547 - loss: 0.4270
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.8368 - loss: 0.4073
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8905 - loss: 0.4054
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.4823 - loss: 0.7154
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.5203 - loss: 0.7108
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6060 - loss: 0.6827
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 738us/step - accuracy: 0.6038 - loss: 0.6823
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5974 - loss: 0.6886
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 828us/step - accuracy: 0.6303 - loss: 0.6686
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5971 - loss: 0.6868
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.5901 - loss: 0.6794
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6380 - loss: 0.6740
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6715 - loss: 0.6622
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6775 - loss: 0.6545
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 871us/step - accuracy: 0.6060 - loss: 0.6760
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6544 - loss: 0.6569
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 747us/step - accuracy: 0.6264 - loss: 0.6667
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.7283 - loss: 0.6336
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.6837 - loss: 0.6403
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7520 - loss: 0.6119
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.6697 - loss: 0.6480
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.6741 - loss: 0.6493
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.6378 - loss: 0.6496
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 796us/step - accuracy: 0.6522 - loss: 0.6558
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.6935 - loss: 0.6322
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.6935 - loss: 0.6265
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.7017 - loss: 0.6324
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7192 - loss: 0.6157
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7111 - loss: 0.6167
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Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6833 - loss: 0.6316
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 950us/step - accuracy: 0.6995 - loss: 0.6196
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.6636 - loss: 0.6362
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6728 - loss: 0.6206
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 852us/step - accuracy: 0.7160 - loss: 0.6174
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.6522 - loss: 0.6403
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.7349 - loss: 0.6039
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 918us/step - accuracy: 0.7245 - loss: 0.6087
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6993 - loss: 0.6174
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6671 - loss: 0.6301
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.7328 - loss: 0.6097
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 797us/step - accuracy: 0.6239 - loss: 0.6414
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6890 - loss: 0.6184
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6742 - loss: 0.6419
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.7364 - loss: 0.6008
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.7163 - loss: 0.6074
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 879us/step - accuracy: 0.7083 - loss: 0.6053
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.7218 - loss: 0.6031
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.7267 - loss: 0.5886
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.7062 - loss: 0.6083
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 781us/step - accuracy: 0.7305 - loss: 0.6006
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6343 - loss: 0.6296
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.7415 - loss: 0.5828
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 612us/step - accuracy: 0.6961 - loss: 0.6202
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.7243 - loss: 0.5922
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 607us/step - accuracy: 0.6436 - loss: 0.6238
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6950 - loss: 0.6077
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 542us/step - accuracy: 0.6552 - loss: 0.6339
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.7139 - loss: 0.6114
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.7105 - loss: 0.5954
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6945 - loss: 0.6035
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Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.6950 - loss: 0.6098
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.7211 - loss: 0.5950
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 717us/step - accuracy: 0.7148 - loss: 0.5870
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 694us/step - accuracy: 0.6954 - loss: 0.5915
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 693us/step - accuracy: 0.6847 - loss: 0.5969
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 688us/step - accuracy: 0.6983 - loss: 0.5870
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.7125 - loss: 0.5788
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7159 - loss: 0.5754
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6830 - loss: 0.5976
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 762us/step - accuracy: 0.6880 - loss: 0.5996
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.6599 - loss: 0.6208
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.7066 - loss: 0.5913
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5869 - loss: 0.6482
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6852 - loss: 0.5824
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.6926 - loss: 0.5953
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7681 - loss: 0.5511
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 828us/step - accuracy: 0.7154 - loss: 0.5599
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 727us/step - accuracy: 0.7268 - loss: 0.5667
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.7051 - loss: 0.5829
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.6757 - loss: 0.6008
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.7414 - loss: 0.5564
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 696us/step - accuracy: 0.6890 - loss: 0.6012
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.6720 - loss: 0.6060
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 748us/step - accuracy: 0.6957 - loss: 0.6003
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6902 - loss: 0.5682
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 715us/step - accuracy: 0.7022 - loss: 0.5882
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 743us/step - accuracy: 0.6753 - loss: 0.5901
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.7056 - loss: 0.5696
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 675us/step - accuracy: 0.6543 - loss: 0.6041
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 683us/step - accuracy: 0.7296 - loss: 0.5658
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6418 - loss: 0.6147
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Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.7103 - loss: 0.5862
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 653us/step - accuracy: 0.6914 - loss: 0.6061
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.6906 - loss: 0.5743
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.6974 - loss: 0.5757
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 806us/step - accuracy: 0.6991 - loss: 0.5556
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 870us/step - accuracy: 0.6954 - loss: 0.5873
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.7347 - loss: 0.5742
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 808us/step - accuracy: 0.6378 - loss: 0.6049
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.6579 - loss: 0.6165
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6993 - loss: 0.5889
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6799 - loss: 0.5953
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 777us/step - accuracy: 0.6800 - loss: 0.5851
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8342 - loss: 0.5478
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.5271 - loss: 0.7070
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 784us/step - accuracy: 0.5000 - loss: 0.7175
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4741 - loss: 0.7122
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4960 - loss: 0.7157
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 777us/step - accuracy: 0.5077 - loss: 0.7003
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5589 - loss: 0.6838
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 728us/step - accuracy: 0.5422 - loss: 0.6951
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.4569 - loss: 0.7123
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 603us/step - accuracy: 0.5742 - loss: 0.6870
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.5505 - loss: 0.6975
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.5356 - loss: 0.6983
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 717us/step - accuracy: 0.5194 - loss: 0.6953
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 660us/step - accuracy: 0.5972 - loss: 0.6729
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.5282 - loss: 0.6994
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 609us/step - accuracy: 0.5024 - loss: 0.7002
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 706us/step - accuracy: 0.6347 - loss: 0.6623
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6045 - loss: 0.6746
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 719us/step - accuracy: 0.5369 - loss: 0.6913
Epoch 19/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 775us/step - accuracy: 0.6099 - loss: 0.6732
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 865us/step - accuracy: 0.5266 - loss: 0.6853
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5742 - loss: 0.6828
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5521 - loss: 0.6763
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.5608 - loss: 0.6761
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5946 - loss: 0.6583
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5961 - loss: 0.6684
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5644 - loss: 0.6780
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.6118 - loss: 0.6648
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.5876 - loss: 0.6679
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 691us/step - accuracy: 0.6034 - loss: 0.6544
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5966 - loss: 0.6612
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 650us/step - accuracy: 0.5081 - loss: 0.6704
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.6160 - loss: 0.6549
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 699us/step - accuracy: 0.6091 - loss: 0.6473
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 765us/step - accuracy: 0.5916 - loss: 0.6554
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6322 - loss: 0.6479
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5747 - loss: 0.6571
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5949 - loss: 0.6433
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6260 - loss: 0.6528
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5705 - loss: 0.6597
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5830 - loss: 0.6551
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.5999 - loss: 0.6526
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 787us/step - accuracy: 0.5909 - loss: 0.6548
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5928 - loss: 0.6581
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.6542 - loss: 0.6502
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 644us/step - accuracy: 0.6116 - loss: 0.6454
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6257 - loss: 0.6387
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6834 - loss: 0.6344
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6383 - loss: 0.6483
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6470 - loss: 0.6463
Epoch 50/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 626us/step - accuracy: 0.6160 - loss: 0.6490
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 748us/step - accuracy: 0.6384 - loss: 0.6445
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6803 - loss: 0.6305
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 607us/step - accuracy: 0.5772 - loss: 0.6460
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6118 - loss: 0.6348
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 650us/step - accuracy: 0.6701 - loss: 0.6407
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.6324 - loss: 0.6358
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6402 - loss: 0.6461
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.6812 - loss: 0.6356
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 860us/step - accuracy: 0.6975 - loss: 0.6213
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6574 - loss: 0.6337
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.7076 - loss: 0.6303
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 839us/step - accuracy: 0.7583 - loss: 0.6114
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 681us/step - accuracy: 0.7766 - loss: 0.6249
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.7416 - loss: 0.6200
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 721us/step - accuracy: 0.7281 - loss: 0.6250
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7112 - loss: 0.6241
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.7255 - loss: 0.6308
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 681us/step - accuracy: 0.7433 - loss: 0.6233
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.7227 - loss: 0.6247
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6989 - loss: 0.6172
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7530 - loss: 0.6230
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 650us/step - accuracy: 0.7942 - loss: 0.6180
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7615 - loss: 0.6166
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7490 - loss: 0.6146
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7707 - loss: 0.6182
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 605us/step - accuracy: 0.7833 - loss: 0.6151
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 604us/step - accuracy: 0.8067 - loss: 0.6008
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7900 - loss: 0.6127
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 704us/step - accuracy: 0.8100 - loss: 0.6092
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.7693 - loss: 0.6186
Epoch 81/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 806us/step - accuracy: 0.7978 - loss: 0.6131
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.8089 - loss: 0.6074
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 780us/step - accuracy: 0.8147 - loss: 0.6077
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7758 - loss: 0.6063
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.8317 - loss: 0.5983
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.8057 - loss: 0.5915
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.8096 - loss: 0.5930
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7876 - loss: 0.6029
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 689us/step - accuracy: 0.8493 - loss: 0.5959
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 808us/step - accuracy: 0.8276 - loss: 0.5995
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 660us/step - accuracy: 0.8472 - loss: 0.5952
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.8631 - loss: 0.6036
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8453 - loss: 0.5888
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 656us/step - accuracy: 0.8764 - loss: 0.5852
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.8440 - loss: 0.5963
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.8738 - loss: 0.5943
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 676us/step - accuracy: 0.8426 - loss: 0.5793
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.8705 - loss: 0.5917
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.8936 - loss: 0.5862
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 679us/step - accuracy: 0.8449 - loss: 0.5973
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8758 - loss: 0.5994
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5122 - loss: 0.7232
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 812us/step - accuracy: 0.5368 - loss: 0.7037
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 873us/step - accuracy: 0.5186 - loss: 0.7001
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5057 - loss: 0.7093
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5025 - loss: 0.7026
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5359 - loss: 0.6974
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.5434 - loss: 0.6929
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 805us/step - accuracy: 0.4432 - loss: 0.7332
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 604us/step - accuracy: 0.4919 - loss: 0.7201
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.4678 - loss: 0.7225
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5701 - loss: 0.6865
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Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 776us/step - accuracy: 0.5324 - loss: 0.6958
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5717 - loss: 0.6844
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5422 - loss: 0.7058
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 651us/step - accuracy: 0.5184 - loss: 0.7075
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 812us/step - accuracy: 0.5513 - loss: 0.6944
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 743us/step - accuracy: 0.5158 - loss: 0.6970
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5553 - loss: 0.6972
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 772us/step - accuracy: 0.4893 - loss: 0.6993
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5324 - loss: 0.6953
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.5688 - loss: 0.6793
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.5318 - loss: 0.6879
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 821us/step - accuracy: 0.4642 - loss: 0.7091
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 726us/step - accuracy: 0.5332 - loss: 0.6888
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5182 - loss: 0.7003
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5217 - loss: 0.6939
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 846us/step - accuracy: 0.5513 - loss: 0.6877
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.5477 - loss: 0.6899
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5620 - loss: 0.6816
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 784us/step - accuracy: 0.5098 - loss: 0.6874
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.5295 - loss: 0.6859
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5676 - loss: 0.6795
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5943 - loss: 0.6809
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.5482 - loss: 0.6820
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5553 - loss: 0.6916
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 708us/step - accuracy: 0.5673 - loss: 0.6782
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 838us/step - accuracy: 0.5539 - loss: 0.6822
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5613 - loss: 0.6833
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 743us/step - accuracy: 0.5231 - loss: 0.6891
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 973us/step - accuracy: 0.5931 - loss: 0.6795
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.5954 - loss: 0.6755
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6045 - loss: 0.6803
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Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5542 - loss: 0.6925
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5603 - loss: 0.6829
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.6351 - loss: 0.6753
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 721us/step - accuracy: 0.6304 - loss: 0.6735
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5933 - loss: 0.6784
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.6308 - loss: 0.6720
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 675us/step - accuracy: 0.6620 - loss: 0.6686
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.5935 - loss: 0.6752
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6159 - loss: 0.6779
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 738us/step - accuracy: 0.6405 - loss: 0.6700
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6095 - loss: 0.6708
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.6168 - loss: 0.6704
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6224 - loss: 0.6733
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.5856 - loss: 0.6802
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6031 - loss: 0.6773
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.6390 - loss: 0.6719
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 608us/step - accuracy: 0.6499 - loss: 0.6626
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5830 - loss: 0.6753
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6462 - loss: 0.6669
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.6851 - loss: 0.6590
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 599us/step - accuracy: 0.6278 - loss: 0.6652
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 631us/step - accuracy: 0.5849 - loss: 0.6722
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5969 - loss: 0.6659
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6051 - loss: 0.6771
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5717 - loss: 0.6691
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6397 - loss: 0.6577
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6317 - loss: 0.6637
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 654us/step - accuracy: 0.6430 - loss: 0.6607
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.6428 - loss: 0.6604
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6199 - loss: 0.6615
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6167 - loss: 0.6651
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Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 939us/step - accuracy: 0.6770 - loss: 0.6510
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.5953 - loss: 0.6616
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 722us/step - accuracy: 0.6202 - loss: 0.6601
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6785 - loss: 0.6480
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.6229 - loss: 0.6587
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 797us/step - accuracy: 0.6633 - loss: 0.6488
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6520 - loss: 0.6550
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.6226 - loss: 0.6587
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.7114 - loss: 0.6495
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 599us/step - accuracy: 0.6824 - loss: 0.6501
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.6914 - loss: 0.6541
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6564 - loss: 0.6595
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 607us/step - accuracy: 0.6833 - loss: 0.6485
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6770 - loss: 0.6565
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7447 - loss: 0.6416
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6994 - loss: 0.6489
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.7188 - loss: 0.6380
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7293 - loss: 0.6468
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 605us/step - accuracy: 0.7021 - loss: 0.6438
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.7336 - loss: 0.6366
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 604us/step - accuracy: 0.7920 - loss: 0.6294
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 606us/step - accuracy: 0.7355 - loss: 0.6374
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 599us/step - accuracy: 0.7357 - loss: 0.6361
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7459 - loss: 0.6384
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7189 - loss: 0.6400
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.7052 - loss: 0.6363
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.7608 - loss: 0.6353
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6081 - loss: 0.6573
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 997us/step - accuracy: 0.5479 - loss: 0.6882
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 721us/step - accuracy: 0.4664 - loss: 0.6962
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.4474 - loss: 0.6984
Epoch 4/100
```

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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 836us/step - accuracy: 0.4359 - loss: 0.6985
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4093 - loss: 0.7063
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4732 - loss: 0.6945
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 697us/step - accuracy: 0.5526 - loss: 0.6868
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 808us/step - accuracy: 0.4885 - loss: 0.6863
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.3895 - loss: 0.7007
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4549 - loss: 0.6944
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.3625 - loss: 0.6992
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 715us/step - accuracy: 0.4036 - loss: 0.6983
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.3399 - loss: 0.7048
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.3147 - loss: 0.7033
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.3722 - loss: 0.6964
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4284 - loss: 0.6972
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.3494 - loss: 0.6980
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 808us/step - accuracy: 0.3847 - loss: 0.6920
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.3697 - loss: 0.6959
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.3884 - loss: 0.6949
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.3495 - loss: 0.6951
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 641us/step - accuracy: 0.3544 - loss: 0.6966
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 599us/step - accuracy: 0.3320 - loss: 0.6983
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.4025 - loss: 0.6914
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.3950 - loss: 0.6943
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.3956 - loss: 0.6935
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 815us/step - accuracy: 0.3911 - loss: 0.6882
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.3667 - loss: 0.6953
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 783us/step - accuracy: 0.3509 - loss: 0.6926
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.4181 - loss: 0.6877
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 797us/step - accuracy: 0.3193 - loss: 0.6978
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 913us/step - accuracy: 0.3062 - loss: 0.7000
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 806us/step - accuracy: 0.3955 - loss: 0.6888
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.3044 - loss: 0.6960
Epoch 35/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.3152 - loss: 0.7006
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3397 - loss: 0.6924
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.3736 - loss: 0.6905
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 770us/step - accuracy: 0.3518 - loss: 0.6952
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.3910 - loss: 0.6937
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.3978 - loss: 0.6906
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 755us/step - accuracy: 0.3909 - loss: 0.6872
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.3515 - loss: 0.6911
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.3290 - loss: 0.6893
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4591 - loss: 0.6879
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.3708 - loss: 0.6938
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.3711 - loss: 0.6865
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.3553 - loss: 0.6976
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.3750 - loss: 0.6909
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4106 - loss: 0.6889
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.3454 - loss: 0.6899
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 660us/step - accuracy: 0.4021 - loss: 0.6865
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 805us/step - accuracy: 0.3229 - loss: 0.6935
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 794us/step - accuracy: 0.3594 - loss: 0.6897
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4042 - loss: 0.6836
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 770us/step - accuracy: 0.3847 - loss: 0.6848
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 961us/step - accuracy: 0.3770 - loss: 0.6917
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3956 - loss: 0.6868
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 748us/step - accuracy: 0.3980 - loss: 0.6867
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.3985 - loss: 0.6851
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 711us/step - accuracy: 0.4057 - loss: 0.6862
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 729us/step - accuracy: 0.3405 - loss: 0.6914
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.3991 - loss: 0.6858
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.3610 - loss: 0.6877
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.4247 - loss: 0.6837
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.3382 - loss: 0.6915
Epoch 66/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.4526 - loss: 0.6835
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 738us/step - accuracy: 0.3704 - loss: 0.6893
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 772us/step - accuracy: 0.4640 - loss: 0.6800
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4315 - loss: 0.6832
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4293 - loss: 0.6835
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 675us/step - accuracy: 0.4481 - loss: 0.6823
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.4343 - loss: 0.6854
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4656 - loss: 0.6763
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 664us/step - accuracy: 0.4987 - loss: 0.6804
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 653us/step - accuracy: 0.5328 - loss: 0.6756
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4459 - loss: 0.6788
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4929 - loss: 0.6794
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.4469 - loss: 0.6823
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.5809 - loss: 0.6687
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4622 - loss: 0.6805
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.4958 - loss: 0.6794
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5438 - loss: 0.6734
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5072 - loss: 0.6822
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 650us/step - accuracy: 0.4720 - loss: 0.6824
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.5439 - loss: 0.6754
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.4974 - loss: 0.6797
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5384 - loss: 0.6730
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 607us/step - accuracy: 0.5989 - loss: 0.6727
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5982 - loss: 0.6708
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6018 - loss: 0.6760
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.5443 - loss: 0.6800
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5372 - loss: 0.6756
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 824us/step - accuracy: 0.5794 - loss: 0.6741
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5593 - loss: 0.6759
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 954us/step - accuracy: 0.5440 - loss: 0.6722
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5866 - loss: 0.6759
Epoch 97/100
```

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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5501 - loss: 0.6737
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 782us/step - accuracy: 0.5927 - loss: 0.6741
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 813us/step - accuracy: 0.6449 - loss: 0.6675
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 860us/step - accuracy: 0.6006 - loss: 0.6706
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4012 - loss: 0.6964
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 979us/step - accuracy: 0.4525 - loss: 0.7059
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 882us/step - accuracy: 0.5029 - loss: 0.6962
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.4613 - loss: 0.7009
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 848us/step - accuracy: 0.4810 - loss: 0.6999
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 857us/step - accuracy: 0.4632 - loss: 0.7013
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4134 - loss: 0.7041
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.4734 - loss: 0.6934
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4696 - loss: 0.6932
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4941 - loss: 0.6925
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.5223 - loss: 0.6954
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.4538 - loss: 0.6941
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 818us/step - accuracy: 0.4461 - loss: 0.7012
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 705us/step - accuracy: 0.4251 - loss: 0.6944
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4434 - loss: 0.6909
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4331 - loss: 0.6939
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4683 - loss: 0.6929
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.3855 - loss: 0.6989
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 743us/step - accuracy: 0.4550 - loss: 0.6891
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4414 - loss: 0.6930
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.3907 - loss: 0.6984
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.4573 - loss: 0.6906
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.4126 - loss: 0.6943
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4237 - loss: 0.6921
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4114 - loss: 0.6945
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4022 - loss: 0.6916
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.4442 - loss: 0.6903
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.4301 - loss: 0.6905
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Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.4568 - loss: 0.6925
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 648us/step - accuracy: 0.4658 - loss: 0.6939
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 726us/step - accuracy: 0.5241 - loss: 0.6908
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4432 - loss: 0.6902
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 605us/step - accuracy: 0.4714 - loss: 0.6916
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.4505 - loss: 0.6941
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 676us/step - accuracy: 0.4511 - loss: 0.6946
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 738us/step - accuracy: 0.4422 - loss: 0.6904
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 762us/step - accuracy: 0.4603 - loss: 0.6944
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4731 - loss: 0.6906
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4994 - loss: 0.6889
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 786us/step - accuracy: 0.5260 - loss: 0.6855
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 705us/step - accuracy: 0.4319 - loss: 0.6948
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4313 - loss: 0.6893
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 827us/step - accuracy: 0.4411 - loss: 0.6920
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 859us/step - accuracy: 0.4101 - loss: 0.6947
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.4709 - loss: 0.6909
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 902us/step - accuracy: 0.4579 - loss: 0.6933
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 738us/step - accuracy: 0.4480 - loss: 0.6926
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4431 - loss: 0.6925
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.3850 - loss: 0.6953
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 715us/step - accuracy: 0.4619 - loss: 0.6915
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 882us/step - accuracy: 0.4527 - loss: 0.6912
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4637 - loss: 0.6883
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 783us/step - accuracy: 0.4462 - loss: 0.6908
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.4253 - loss: 0.6919
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 692us/step - accuracy: 0.4960 - loss: 0.6861
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 713us/step - accuracy: 0.4622 - loss: 0.6876
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.4270 - loss: 0.6899
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.3755 - loss: 0.6947
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 675us/step - accuracy: 0.5078 - loss: 0.6858
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Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.4613 - loss: 0.6873
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.4682 - loss: 0.6884
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 605us/step - accuracy: 0.4337 - loss: 0.6894
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 650us/step - accuracy: 0.3903 - loss: 0.6941
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.4821 - loss: 0.6858
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.4585 - loss: 0.6899
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.4397 - loss: 0.6899
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.4466 - loss: 0.6875
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.5262 - loss: 0.6823
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.4289 - loss: 0.6895
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.3990 - loss: 0.6926
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.4572 - loss: 0.6877
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.4631 - loss: 0.6870
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.4503 - loss: 0.6898
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.4832 - loss: 0.6840
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 725us/step - accuracy: 0.3946 - loss: 0.6945
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 749us/step - accuracy: 0.4416 - loss: 0.6898
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 765us/step - accuracy: 0.4940 - loss: 0.6883
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4732 - loss: 0.6860
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4934 - loss: 0.6825
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.4560 - loss: 0.6847
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4631 - loss: 0.6845
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4726 - loss: 0.6837
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 850us/step - accuracy: 0.4799 - loss: 0.6818
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.4668 - loss: 0.6859
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4381 - loss: 0.6868
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 675us/step - accuracy: 0.4921 - loss: 0.6845
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5081 - loss: 0.6785
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 822us/step - accuracy: 0.4730 - loss: 0.6821
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4510 - loss: 0.6865
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 716us/step - accuracy: 0.4681 - loss: 0.6806
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Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4829 - loss: 0.6874
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4635 - loss: 0.6844
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 676us/step - accuracy: 0.4418 - loss: 0.6828
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4987 - loss: 0.6795
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4839 - loss: 0.6792
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 793us/step - accuracy: 0.4936 - loss: 0.6789
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 715us/step - accuracy: 0.4731 - loss: 0.6793
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.4787 - loss: 0.6788
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 662us/step - accuracy: 0.5717 - loss: 0.6741
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 678us/step - accuracy: 0.5232 - loss: 0.6749
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4689 - loss: 0.6795
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4810 - loss: 0.6752
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 931us/step - accuracy: 0.4862 - loss: 0.6999
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 831us/step - accuracy: 0.5398 - loss: 0.6957
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 814us/step - accuracy: 0.5626 - loss: 0.6914
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 880us/step - accuracy: 0.5321 - loss: 0.6937
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 884us/step - accuracy: 0.5948 - loss: 0.6887
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.5770 - loss: 0.6904
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 833us/step - accuracy: 0.5123 - loss: 0.6985
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 826us/step - accuracy: 0.6072 - loss: 0.6908
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 889us/step - accuracy: 0.5868 - loss: 0.6932
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 872us/step - accuracy: 0.7132 - loss: 0.6837
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6796 - loss: 0.6856
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5944 - loss: 0.6906
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5707 - loss: 0.6986
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.6582 - loss: 0.6879
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6026 - loss: 0.6928
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5959 - loss: 0.6921
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.6441 - loss: 0.6877
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.6500 - loss: 0.6884
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 645us/step - accuracy: 0.5969 - loss: 0.6922
Epoch 20/100
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 902us/step - accuracy: 0.6073 - loss: 0.6913
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 825us/step - accuracy: 0.6971 - loss: 0.6804
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.6096 - loss: 0.6913
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6700 - loss: 0.6840
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.6139 - loss: 0.6873
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.6649 - loss: 0.6845
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 714us/step - accuracy: 0.6431 - loss: 0.6830
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.6201 - loss: 0.6884
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6508 - loss: 0.6844
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5879 - loss: 0.6914
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 679us/step - accuracy: 0.6291 - loss: 0.6821
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 759us/step - accuracy: 0.6314 - loss: 0.6846
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.5730 - loss: 0.6902
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5684 - loss: 0.6905
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6952 - loss: 0.6775
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 724us/step - accuracy: 0.6007 - loss: 0.6843
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 707us/step - accuracy: 0.6461 - loss: 0.6792
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5687 - loss: 0.6909
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6367 - loss: 0.6805
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 677us/step - accuracy: 0.6011 - loss: 0.6854
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5761 - loss: 0.6863
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6045 - loss: 0.6863
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 728us/step - accuracy: 0.6741 - loss: 0.6735
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 640us/step - accuracy: 0.6592 - loss: 0.6793
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 753us/step - accuracy: 0.6246 - loss: 0.6827
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6715 - loss: 0.6776
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 677us/step - accuracy: 0.6920 - loss: 0.6647
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 745us/step - accuracy: 0.6314 - loss: 0.6808
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5793 - loss: 0.6885
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 851us/step - accuracy: 0.6182 - loss: 0.6803
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 839us/step - accuracy: 0.6376 - loss: 0.6721
Epoch 51/100
```

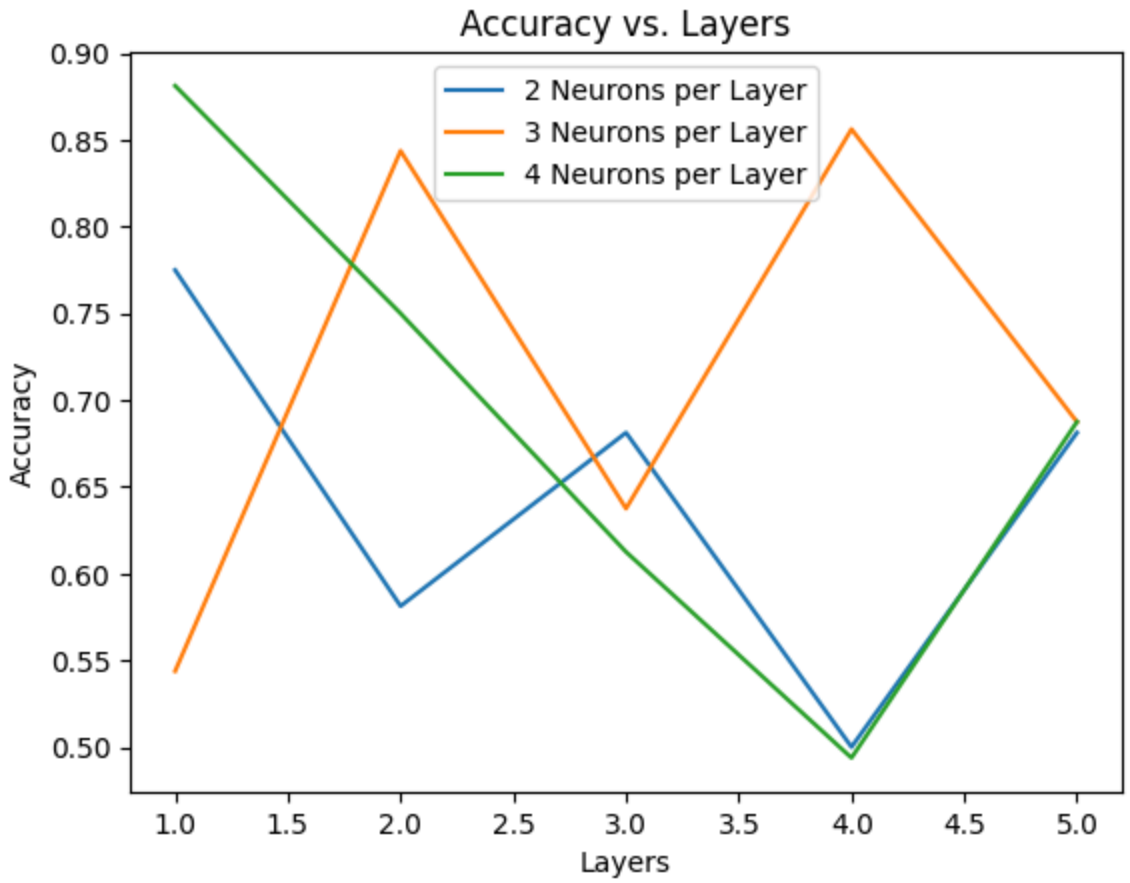
```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6721 - loss: 0.6704
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 815us/step - accuracy: 0.6583 - loss: 0.6704
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6579 - loss: 0.6715
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6559 - loss: 0.6663
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.7004 - loss: 0.6631
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6855 - loss: 0.6683
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6839 - loss: 0.6620
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.6389 - loss: 0.6713
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6440 - loss: 0.6650
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 830us/step - accuracy: 0.6209 - loss: 0.6747
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 691us/step - accuracy: 0.6107 - loss: 0.6732
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 751us/step - accuracy: 0.5754 - loss: 0.6790
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 930us/step - accuracy: 0.6398 - loss: 0.6637
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 753us/step - accuracy: 0.6191 - loss: 0.6652
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6226 - loss: 0.6710
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 928us/step - accuracy: 0.6383 - loss: 0.6636
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6593 - loss: 0.6551
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6650 - loss: 0.6588
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7132 - loss: 0.6483
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.6747 - loss: 0.6575
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 980us/step - accuracy: 0.6997 - loss: 0.6494
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6406 - loss: 0.6616
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 808us/step - accuracy: 0.6598 - loss: 0.6588
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 870us/step - accuracy: 0.7294 - loss: 0.6436
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.6711 - loss: 0.6478
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.6694 - loss: 0.6555
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.6764 - loss: 0.6488
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 715us/step - accuracy: 0.6298 - loss: 0.6594
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6547 - loss: 0.6582
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6458 - loss: 0.6564
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 675us/step - accuracy: 0.6752 - loss: 0.6405
Epoch 82/100
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6843 - loss: 0.6470
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.6779 - loss: 0.6432
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6724 - loss: 0.6419
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 654us/step - accuracy: 0.7002 - loss: 0.6260
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 687us/step - accuracy: 0.6596 - loss: 0.6563
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.6584 - loss: 0.6472
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.6623 - loss: 0.6390
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.6383 - loss: 0.6518
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.6666 - loss: 0.6435
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.6514 - loss: 0.6459
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 720us/step - accuracy: 0.6306 - loss: 0.6409
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6822 - loss: 0.6403
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 764us/step - accuracy: 0.7758 - loss: 0.5916
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.6609 - loss: 0.6390
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6455 - loss: 0.6421
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.7091 - loss: 0.6284
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 941us/step - accuracy: 0.6563 - loss: 0.6404
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.7192 - loss: 0.6093
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.6732 - loss: 0.6227
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7743 - loss: 0.6117
```

In [6]:

```python
for n in neurons:
    plt.plot(num_layers, res[n], label=f'{n} Neurons per Layer')

plt.xlabel('Layers')
plt.ylabel('Accuracy')
plt.title('Accuracy vs. Layers')
plt.legend()
plt.show()
```



Assessment of Optimal Configuration

The three neuron configuration performs poorly with only a single layer, while the two neuron layer performs adequately while the 4 neuron layer performs at its maximum accuracy. In the second layer, both the 4 and 2 neuron configurations decrease in accuracy, while the 3 neuron config increases to near its maximum. None of the configurations perform well with three layers. In the fourth layer, the 2 and 4 neuron configs performally poorly, while the 3 neuron layer is at its maximum accuracy. Finally, in the fifth layer, all configs perform approximately the same, and roughly average accuracy.

The accuracy for all configurations is not great, likely due to only executing 100 epochs with batch size 10 (due to computer limitations). In any case, we see that 4 layers with 3 neurons each has the highest accuracy. This is only slightly greater than the 2nd layer, also with 3 neuron configuration. Either configuration could be seen as the optimum in this scenario. Strictly using accuracy, 3 neurons in each of 4 layers is optimum. However, it would be substantially faster to run the 2 layer, 3 neuron configuration than running that model over 4 layers. Thus, trading a slight amount of accuracy for a great increase in computer performance/speed may be worthwhile.

3. 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/)

Running 2 layers with 3 neurons, 100 epochs for computer performance considerations.

In [7]:
```
from keras.layers import Activation
act_fun = ['tanh', 'sigmoid', 'softplus', 'relu', 'softmax', 'selu', 'linear']
#computer can't handle 400 epochs, using 100
```

```
def mod_act(activation, epochs=100):
    model=Sequential()
    #add 2 layers
    #layer 1
    model.add(Dense(3, input_dim = 2))
    model.add(Activation(activation))
    #layer 2
    model.add(Dense(3))
    model.add(Activation(activation))
    #output
    model.add(Dense(1, activation='sigmoid'))
    model.compile(loss='binary_crossentropy', optimizer='sgd', metrics=['accuracy'])
    model.fit(X, y, batch_size=10, epochs=100)
    loss, accuracy = model.evaluate(X, y)
    return loss, accuracy

act_res = {}

for activation in act_fun:
    loss, accuracy = mod_act(activation)
    act_res[activation] = {'loss': loss, 'accuracy': accuracy}
```

```
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5233 - loss: 0.7027
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 878us/step - accuracy: 0.4689 - loss: 0.7136
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 763us/step - accuracy: 0.4877 - loss: 0.7059
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5299 - loss: 0.6962
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5012 - loss: 0.7015
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4831 - loss: 0.7106
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5287 - loss: 0.6942
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 823us/step - accuracy: 0.5007 - loss: 0.6998
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 750us/step - accuracy: 0.5396 - loss: 0.6891
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4776 - loss: 0.7095
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 775us/step - accuracy: 0.5102 - loss: 0.6988
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4978 - loss: 0.7011
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 907us/step - accuracy: 0.4795 - loss: 0.7055
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.4853 - loss: 0.6984
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.5406 - loss: 0.6932
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4598 - loss: 0.7061
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5075 - loss: 0.7005
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5419 - loss: 0.6915
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5229 - loss: 0.6955
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 957us/step - accuracy: 0.5116 - loss: 0.6995
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4958 - loss: 0.6998
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 754us/step - accuracy: 0.5119 - loss: 0.6942
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 724us/step - accuracy: 0.5384 - loss: 0.6904
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 840us/step - accuracy: 0.4839 - loss: 0.6951
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.5254 - loss: 0.6969
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 717us/step - accuracy: 0.5614 - loss: 0.6837
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.5223 - loss: 0.6934
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 719us/step - accuracy: 0.5111 - loss: 0.6953
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 705us/step - accuracy: 0.5073 - loss: 0.6935
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4827 - loss: 0.6944
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5131 - loss: 0.6947
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Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4946 - loss: 0.6966
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5455 - loss: 0.6906
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4889 - loss: 0.6954
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.5262 - loss: 0.6915
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 704us/step - accuracy: 0.5530 - loss: 0.6899
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5209 - loss: 0.6889
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5262 - loss: 0.6936
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.5545 - loss: 0.6863
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5433 - loss: 0.6903
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 912us/step - accuracy: 0.5472 - loss: 0.6864
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5450 - loss: 0.6873
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.5460 - loss: 0.6820
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 714us/step - accuracy: 0.5388 - loss: 0.6909
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5155 - loss: 0.6894
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5245 - loss: 0.6909
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 745us/step - accuracy: 0.4551 - loss: 0.6981
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5400 - loss: 0.6909
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5377 - loss: 0.6891
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 678us/step - accuracy: 0.5574 - loss: 0.6833
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5228 - loss: 0.6902
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5322 - loss: 0.6869
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4851 - loss: 0.6948
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5256 - loss: 0.6910
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 842us/step - accuracy: 0.5473 - loss: 0.6868
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.5495 - loss: 0.6875
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 819us/step - accuracy: 0.5370 - loss: 0.6880
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 602us/step - accuracy: 0.5796 - loss: 0.6872
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5251 - loss: 0.6933
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 819us/step - accuracy: 0.5788 - loss: 0.6860
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6359 - loss: 0.6773
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.5847 - loss: 0.6858
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Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6167 - loss: 0.6787
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 897us/step - accuracy: 0.6386 - loss: 0.6787
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5522 - loss: 0.6890
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 835us/step - accuracy: 0.6542 - loss: 0.6799
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 779us/step - accuracy: 0.6472 - loss: 0.6805
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.6474 - loss: 0.6792
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 806us/step - accuracy: 0.6322 - loss: 0.6837
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 771us/step - accuracy: 0.6329 - loss: 0.6796
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 707us/step - accuracy: 0.6247 - loss: 0.6812
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 670us/step - accuracy: 0.6032 - loss: 0.6849
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6821 - loss: 0.6776
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 829us/step - accuracy: 0.5824 - loss: 0.6857
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5810 - loss: 0.6922
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6640 - loss: 0.6771
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 812us/step - accuracy: 0.6581 - loss: 0.6789
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 718us/step - accuracy: 0.6747 - loss: 0.6758
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6024 - loss: 0.6847
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5979 - loss: 0.6807
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 604us/step - accuracy: 0.5919 - loss: 0.6810
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6000 - loss: 0.6836
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5789 - loss: 0.6819
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5713 - loss: 0.6844
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 631us/step - accuracy: 0.6132 - loss: 0.6744
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 747us/step - accuracy: 0.6899 - loss: 0.6673
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6705 - loss: 0.6704
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6202 - loss: 0.6777
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 533us/step - accuracy: 0.5931 - loss: 0.6794
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5990 - loss: 0.6763
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 990us/step - accuracy: 0.6093 - loss: 0.6768
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 930us/step - accuracy: 0.6620 - loss: 0.6699
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 914us/step - accuracy: 0.6792 - loss: 0.6695
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Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6898 - loss: 0.6670
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.6510 - loss: 0.6721
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.6478 - loss: 0.6701
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 777us/step - accuracy: 0.6556 - loss: 0.6684
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5950 - loss: 0.6755
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6231 - loss: 0.6751
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6860 - loss: 0.6599
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4503 - loss: 0.7000
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4696 - loss: 0.8209
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.5566 - loss: 0.7318
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.5019 - loss: 0.7699
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5603 - loss: 0.7156
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4948 - loss: 0.7568
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4813 - loss: 0.7578
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.5052 - loss: 0.7362
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.4540 - loss: 0.7595
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 705us/step - accuracy: 0.5461 - loss: 0.7040
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 786us/step - accuracy: 0.4890 - loss: 0.7298
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4639 - loss: 0.7389
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5100 - loss: 0.7141
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 976us/step - accuracy: 0.5256 - loss: 0.7045
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 953us/step - accuracy: 0.5618 - loss: 0.6879
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.5196 - loss: 0.7026
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4935 - loss: 0.7099
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4552 - loss: 0.7197
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 769us/step - accuracy: 0.5305 - loss: 0.6938
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5047 - loss: 0.7008
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4419 - loss: 0.7184
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5297 - loss: 0.6936
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5152 - loss: 0.6973
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5054 - loss: 0.6983
Epoch 24/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4825 - loss: 0.7024
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4935 - loss: 0.6987
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4933 - loss: 0.6989
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5340 - loss: 0.6915
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5390 - loss: 0.6911
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.5005 - loss: 0.6960
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4846 - loss: 0.6974
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 643us/step - accuracy: 0.5147 - loss: 0.6947
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4481 - loss: 0.7005
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 873us/step - accuracy: 0.4108 - loss: 0.7048
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5215 - loss: 0.6925
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 871us/step - accuracy: 0.5220 - loss: 0.6922
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5247 - loss: 0.6923
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 805us/step - accuracy: 0.5571 - loss: 0.6887
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5662 - loss: 0.6892
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4545 - loss: 0.6970
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4505 - loss: 0.6991
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.4879 - loss: 0.6947
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 782us/step - accuracy: 0.4910 - loss: 0.6939
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4827 - loss: 0.6947
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4636 - loss: 0.6953
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5033 - loss: 0.6922
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 999us/step - accuracy: 0.5214 - loss: 0.6925
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 647us/step - accuracy: 0.5489 - loss: 0.6917
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.4818 - loss: 0.6939
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.4942 - loss: 0.6941
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5127 - loss: 0.6927
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 927us/step - accuracy: 0.5114 - loss: 0.6913
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 805us/step - accuracy: 0.4755 - loss: 0.6935
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4024 - loss: 0.6951
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.4500 - loss: 0.6943
Epoch 55/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4409 - loss: 0.6932
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.3678 - loss: 0.6939
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 649us/step - accuracy: 0.4030 - loss: 0.6936
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.4352 - loss: 0.6944
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4019 - loss: 0.6924
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 706us/step - accuracy: 0.4440 - loss: 0.6926
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.3296 - loss: 0.6952
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4067 - loss: 0.6930
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.4060 - loss: 0.6927
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4068 - loss: 0.6931
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.3806 - loss: 0.6932
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 664us/step - accuracy: 0.3536 - loss: 0.6938
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 863us/step - accuracy: 0.3797 - loss: 0.6934
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4426 - loss: 0.6928
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.4025 - loss: 0.6934
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 942us/step - accuracy: 0.3692 - loss: 0.6934
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.3956 - loss: 0.6934
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.3992 - loss: 0.6929
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3690 - loss: 0.6933
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4590 - loss: 0.6931
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 920us/step - accuracy: 0.3993 - loss: 0.6935
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.3994 - loss: 0.6940
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4045 - loss: 0.6934
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 608us/step - accuracy: 0.4605 - loss: 0.6937
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4772 - loss: 0.6922
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4951 - loss: 0.6921
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4249 - loss: 0.6932
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4196 - loss: 0.6932
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.4366 - loss: 0.6929
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 813us/step - accuracy: 0.4342 - loss: 0.6929
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.4886 - loss: 0.6933
Epoch 86/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4966 - loss: 0.6934
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4033 - loss: 0.6936
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4827 - loss: 0.6930
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 940us/step - accuracy: 0.5446 - loss: 0.6927
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.4886 - loss: 0.6928
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.4923 - loss: 0.6933
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5084 - loss: 0.6940
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4874 - loss: 0.6932
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.5663 - loss: 0.6922
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 710us/step - accuracy: 0.4475 - loss: 0.6935
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 861us/step - accuracy: 0.3685 - loss: 0.6955
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4122 - loss: 0.6935
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 840us/step - accuracy: 0.5076 - loss: 0.6926
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 998us/step - accuracy: 0.5055 - loss: 0.6928
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4574 - loss: 0.6929
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3898 - loss: 0.6952
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5000 - loss: 0.7179
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 899us/step - accuracy: 0.4599 - loss: 0.7302
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5543 - loss: 0.6902
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4992 - loss: 0.7068
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4805 - loss: 0.7079
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4749 - loss: 0.7064
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4864 - loss: 0.7065
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4544 - loss: 0.7117
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4608 - loss: 0.7058
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4965 - loss: 0.6973
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.5355 - loss: 0.6905
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5653 - loss: 0.6821
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4791 - loss: 0.6983
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5094 - loss: 0.6929
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5733 - loss: 0.6873
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4827 - loss: 0.6956
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Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 809us/step - accuracy: 0.5017 - loss: 0.6947
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4387 - loss: 0.6948
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4586 - loss: 0.6958
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4990 - loss: 0.6899
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.4527 - loss: 0.6883
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 969us/step - accuracy: 0.4647 - loss: 0.6904
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.3245 - loss: 0.6931
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4821 - loss: 0.6854
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.3212 - loss: 0.6926
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3144 - loss: 0.6953
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.3429 - loss: 0.6919
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 772us/step - accuracy: 0.3453 - loss: 0.6911
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.2822 - loss: 0.6935
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.3478 - loss: 0.6924
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 767us/step - accuracy: 0.3485 - loss: 0.6895
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.3974 - loss: 0.6908
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3793 - loss: 0.6914
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4970 - loss: 0.6912
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.4102 - loss: 0.6909
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 635us/step - accuracy: 0.4179 - loss: 0.6919
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4794 - loss: 0.6926
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4116 - loss: 0.6933
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.4559 - loss: 0.6912
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 661us/step - accuracy: 0.5446 - loss: 0.6913
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5301 - loss: 0.6909
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5270 - loss: 0.6921
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5789 - loss: 0.6903
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 815us/step - accuracy: 0.5427 - loss: 0.6902
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5346 - loss: 0.6918
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5268 - loss: 0.6920
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6128 - loss: 0.6880
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Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5696 - loss: 0.6913
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6001 - loss: 0.6911
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6075 - loss: 0.6903
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5962 - loss: 0.6922
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5985 - loss: 0.6928
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4681 - loss: 0.6957
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6161 - loss: 0.6916
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6077 - loss: 0.6916
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6245 - loss: 0.6902
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5001 - loss: 0.6949
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6620 - loss: 0.6901
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6410 - loss: 0.6912
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6260 - loss: 0.6898
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6413 - loss: 0.6902
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5571 - loss: 0.6939
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 623us/step - accuracy: 0.5586 - loss: 0.6911
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 601us/step - accuracy: 0.6113 - loss: 0.6905
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6001 - loss: 0.6909
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.6417 - loss: 0.6917
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6246 - loss: 0.6916
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.6318 - loss: 0.6909
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.5118 - loss: 0.6960
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6072 - loss: 0.6914
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6347 - loss: 0.6936
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6495 - loss: 0.6897
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7076 - loss: 0.6872
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6230 - loss: 0.6897
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6372 - loss: 0.6922
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6787 - loss: 0.6904
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5005 - loss: 0.6958
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5958 - loss: 0.6940
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Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6043 - loss: 0.6923
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5803 - loss: 0.6939
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 691us/step - accuracy: 0.6060 - loss: 0.6915
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.5215 - loss: 0.6956
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6177 - loss: 0.6917
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5740 - loss: 0.6909
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6104 - loss: 0.6924
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6425 - loss: 0.6890
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 690us/step - accuracy: 0.6125 - loss: 0.6908
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 681us/step - accuracy: 0.6089 - loss: 0.6924
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 751us/step - accuracy: 0.6670 - loss: 0.6894
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6603 - loss: 0.6902
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6041 - loss: 0.6929
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.6107 - loss: 0.6917
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6122 - loss: 0.6916
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5838 - loss: 0.6939
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5837 - loss: 0.6924
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6503 - loss: 0.6926
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6128 - loss: 0.6912
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6634 - loss: 0.6889
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6269 - loss: 0.6914
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.6433 - loss: 0.6902
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6753 - loss: 0.6876
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4812 - loss: 0.6975
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.4574 - loss: 0.6750
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.3761 - loss: 0.6875
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3865 - loss: 0.6783
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.3484 - loss: 0.6874
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.4120 - loss: 0.6644
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4326 - loss: 0.6639
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3990 - loss: 0.6578
Epoch 9/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3641 - loss: 0.6680
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 835us/step - accuracy: 0.4732 - loss: 0.6438
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4983 - loss: 0.6532
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5711 - loss: 0.6274
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 978us/step - accuracy: 0.5499 - loss: 0.6450
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6530 - loss: 0.6231
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5892 - loss: 0.6367
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 968us/step - accuracy: 0.6237 - loss: 0.6250
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.5933 - loss: 0.6320
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6330 - loss: 0.6244
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5911 - loss: 0.6294
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 931us/step - accuracy: 0.6372 - loss: 0.6345
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.5991 - loss: 0.6235
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.5888 - loss: 0.6350
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.6123 - loss: 0.6087
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6726 - loss: 0.6144
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6285 - loss: 0.6192
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5676 - loss: 0.6235
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6022 - loss: 0.6200
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 743us/step - accuracy: 0.6028 - loss: 0.6192
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.6528 - loss: 0.6040
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 712us/step - accuracy: 0.6659 - loss: 0.6047
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6492 - loss: 0.6048
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6481 - loss: 0.6028
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 999us/step - accuracy: 0.6549 - loss: 0.6062
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 806us/step - accuracy: 0.5732 - loss: 0.6277
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 780us/step - accuracy: 0.6784 - loss: 0.5950
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6286 - loss: 0.6070
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6464 - loss: 0.6008
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6443 - loss: 0.5867
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5713 - loss: 0.6378
Epoch 40/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 843us/step - accuracy: 0.6812 - loss: 0.5820
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6836 - loss: 0.5968
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6962 - loss: 0.5756
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5613 - loss: 0.6152
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.6138 - loss: 0.6079
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 700us/step - accuracy: 0.6799 - loss: 0.5787
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6306 - loss: 0.6032
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 975us/step - accuracy: 0.7139 - loss: 0.5705
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6339 - loss: 0.5946
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.6670 - loss: 0.5873
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 796us/step - accuracy: 0.6867 - loss: 0.5948
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6609 - loss: 0.5946
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 970us/step - accuracy: 0.6132 - loss: 0.5937
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6807 - loss: 0.5694
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 736us/step - accuracy: 0.6714 - loss: 0.5785
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 781us/step - accuracy: 0.6787 - loss: 0.5790
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.7043 - loss: 0.5789
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 878us/step - accuracy: 0.6082 - loss: 0.5958
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6643 - loss: 0.5759
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6722 - loss: 0.5615
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 751us/step - accuracy: 0.6585 - loss: 0.5821
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.6897 - loss: 0.5618
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 702us/step - accuracy: 0.6263 - loss: 0.5890
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6513 - loss: 0.5812
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6524 - loss: 0.5764
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6160 - loss: 0.5861
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 898us/step - accuracy: 0.6808 - loss: 0.5659
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6691 - loss: 0.5880
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.6487 - loss: 0.5690
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7329 - loss: 0.5509
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.6549 - loss: 0.5721
Epoch 71/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6567 - loss: 0.5536
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 750us/step - accuracy: 0.7026 - loss: 0.5619
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6805 - loss: 0.5500
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6887 - loss: 0.5420
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7140 - loss: 0.5448
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6383 - loss: 0.5926
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.7109 - loss: 0.5492
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6805 - loss: 0.5500
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6630 - loss: 0.5444
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6960 - loss: 0.5501
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6628 - loss: 0.5732
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6602 - loss: 0.5540
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 760us/step - accuracy: 0.6716 - loss: 0.5611
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7074 - loss: 0.5313
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7057 - loss: 0.5792
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7256 - loss: 0.5389
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.6837 - loss: 0.5398
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.7075 - loss: 0.5331
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 845us/step - accuracy: 0.6926 - loss: 0.5382
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6697 - loss: 0.5538
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6006 - loss: 0.5617
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6799 - loss: 0.5442
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 863us/step - accuracy: 0.6733 - loss: 0.5750
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6715 - loss: 0.5536
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6492 - loss: 0.5810
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6712 - loss: 0.5662
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 796us/step - accuracy: 0.6624 - loss: 0.5472
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 784us/step - accuracy: 0.6938 - loss: 0.5502
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6899 - loss: 0.5503
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6422 - loss: 0.5836
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8082 - loss: 0.5303
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5234 - loss: 0.6990
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Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4783 - loss: 0.7120
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5138 - loss: 0.6998
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 864us/step - accuracy: 0.5474 - loss: 0.6895
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.4938 - loss: 0.7033
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.5507 - loss: 0.6880
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5574 - loss: 0.6864
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5180 - loss: 0.6952
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4133 - loss: 0.7162
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.4882 - loss: 0.6999
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5053 - loss: 0.6963
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5081 - loss: 0.6954
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5188 - loss: 0.6934
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5023 - loss: 0.6957
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 852us/step - accuracy: 0.4550 - loss: 0.7020
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4722 - loss: 0.6990
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4913 - loss: 0.6965
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.4097 - loss: 0.7053
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 934us/step - accuracy: 0.5453 - loss: 0.6896
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5589 - loss: 0.6878
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5133 - loss: 0.6932
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6175 - loss: 0.6826
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 954us/step - accuracy: 0.5050 - loss: 0.6935
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5243 - loss: 0.6916
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4718 - loss: 0.6958
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5099 - loss: 0.6928
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4744 - loss: 0.6954
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 818us/step - accuracy: 0.5001 - loss: 0.6933
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4468 - loss: 0.6962
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5350 - loss: 0.6911
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4969 - loss: 0.6934
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5329 - loss: 0.6913
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Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 968us/step - accuracy: 0.5344 - loss: 0.6914
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5309 - loss: 0.6917
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5057 - loss: 0.6926
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 873us/step - accuracy: 0.5263 - loss: 0.6920
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 871us/step - accuracy: 0.5295 - loss: 0.6919
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 852us/step - accuracy: 0.4775 - loss: 0.6939
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5075 - loss: 0.6927
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5429 - loss: 0.6916
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4785 - loss: 0.6938
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5024 - loss: 0.6926
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 817us/step - accuracy: 0.5410 - loss: 0.6918
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 875us/step - accuracy: 0.5115 - loss: 0.6926
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.4977 - loss: 0.6928
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4813 - loss: 0.6932
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.5287 - loss: 0.6920
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4868 - loss: 0.6928
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 893us/step - accuracy: 0.5515 - loss: 0.6918
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5356 - loss: 0.6925
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5047 - loss: 0.6924
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5392 - loss: 0.6928
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5338 - loss: 0.6931
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.5689 - loss: 0.6930
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 942us/step - accuracy: 0.5497 - loss: 0.6928
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 865us/step - accuracy: 0.5491 - loss: 0.6926
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 941us/step - accuracy: 0.6152 - loss: 0.6926
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6398 - loss: 0.6920
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5895 - loss: 0.6932
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6788 - loss: 0.6928
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.6184 - loss: 0.6925
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.6389 - loss: 0.6933
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 898us/step - accuracy: 0.7097 - loss: 0.6922
```

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Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5969 - loss: 0.6935
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6493 - loss: 0.6930
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6542 - loss: 0.6924
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.5835 - loss: 0.6930
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 854us/step - accuracy: 0.5485 - loss: 0.6932
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 938us/step - accuracy: 0.5399 - loss: 0.6926
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6558 - loss: 0.6925
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.6059 - loss: 0.6931
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5708 - loss: 0.6925
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 885us/step - accuracy: 0.5673 - loss: 0.6927
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.6573 - loss: 0.6923
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 872us/step - accuracy: 0.6108 - loss: 0.6929
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4650 - loss: 0.6925
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.6320 - loss: 0.6923
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 989us/step - accuracy: 0.6183 - loss: 0.6928
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 891us/step - accuracy: 0.6587 - loss: 0.6922
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4852 - loss: 0.6932
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4859 - loss: 0.6934
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 977us/step - accuracy: 0.6773 - loss: 0.6921
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5350 - loss: 0.6925
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 999us/step - accuracy: 0.4774 - loss: 0.6925
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 996us/step - accuracy: 0.5750 - loss: 0.6925
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 929us/step - accuracy: 0.5907 - loss: 0.6929
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5741 - loss: 0.6924
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5108 - loss: 0.6928
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4846 - loss: 0.6930
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.5826 - loss: 0.6924
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 838us/step - accuracy: 0.5544 - loss: 0.6933
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 883us/step - accuracy: 0.4786 - loss: 0.6926
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5398 - loss: 0.6925
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.4410 - loss: 0.6925
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Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5431 - loss: 0.6921
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 897us/step - accuracy: 0.6612 - loss: 0.6923
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 856us/step - accuracy: 0.5100 - loss: 0.6931
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4524 - loss: 0.6925
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5849 - loss: 0.6922
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5452 - loss: 0.6923
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5450 - loss: 0.6930
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 869us/step - accuracy: 0.3226 - loss: 0.7231
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 927us/step - accuracy: 0.3702 - loss: 0.7086
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4489 - loss: 0.7069
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 699us/step - accuracy: 0.4856 - loss: 0.7011
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4191 - loss: 0.7044
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4358 - loss: 0.6984
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5182 - loss: 0.6869
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.5691 - loss: 0.6835
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.6403 - loss: 0.6754
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 818us/step - accuracy: 0.6222 - loss: 0.6805
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 761us/step - accuracy: 0.7385 - loss: 0.6656
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.7407 - loss: 0.6605
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7466 - loss: 0.6564
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8040 - loss: 0.6495
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 903us/step - accuracy: 0.7969 - loss: 0.6504
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8335 - loss: 0.6443
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8416 - loss: 0.6405
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8157 - loss: 0.6471
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8809 - loss: 0.6306
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 749us/step - accuracy: 0.8336 - loss: 0.6298
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.8404 - loss: 0.6277
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.7834 - loss: 0.6350
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8636 - loss: 0.6146
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8557 - loss: 0.6175
Epoch 25/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8502 - loss: 0.6245
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.8458 - loss: 0.6138
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8537 - loss: 0.6086
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8292 - loss: 0.6039
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8364 - loss: 0.6067
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8255 - loss: 0.6018
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.8310 - loss: 0.6020
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 611us/step - accuracy: 0.8549 - loss: 0.5989
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.7717 - loss: 0.5994
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 715us/step - accuracy: 0.9059 - loss: 0.5823
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8445 - loss: 0.5932
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8024 - loss: 0.5912
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 941us/step - accuracy: 0.8322 - loss: 0.5883
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8556 - loss: 0.5773
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 798us/step - accuracy: 0.8325 - loss: 0.5791
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.8308 - loss: 0.5750
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.8401 - loss: 0.5726
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8452 - loss: 0.5691
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8248 - loss: 0.5699
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.8465 - loss: 0.5580
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 619us/step - accuracy: 0.8514 - loss: 0.5485
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 637us/step - accuracy: 0.8819 - loss: 0.5326
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.8846 - loss: 0.5415
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.8453 - loss: 0.5320
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8318 - loss: 0.5485
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 727us/step - accuracy: 0.8666 - loss: 0.5372
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 726us/step - accuracy: 0.8295 - loss: 0.5426
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 972us/step - accuracy: 0.8933 - loss: 0.5211
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 764us/step - accuracy: 0.8633 - loss: 0.5361
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 839us/step - accuracy: 0.8394 - loss: 0.5356
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8490 - loss: 0.5172
Epoch 56/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.8869 - loss: 0.4914
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8823 - loss: 0.4994
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8800 - loss: 0.4867
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.8854 - loss: 0.4891
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.8441 - loss: 0.5058
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8105 - loss: 0.5186
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 796us/step - accuracy: 0.8864 - loss: 0.4909
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 843us/step - accuracy: 0.8932 - loss: 0.4854
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8866 - loss: 0.4875
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.8661 - loss: 0.4888
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 602us/step - accuracy: 0.8413 - loss: 0.4922
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.8712 - loss: 0.4750
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.9070 - loss: 0.4641
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 765us/step - accuracy: 0.8543 - loss: 0.4829
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 812us/step - accuracy: 0.8802 - loss: 0.4637
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 874us/step - accuracy: 0.8960 - loss: 0.4460
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.8932 - loss: 0.4517
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 605us/step - accuracy: 0.8891 - loss: 0.4340
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8782 - loss: 0.4261
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8577 - loss: 0.4582
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8921 - loss: 0.4366
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8503 - loss: 0.4515
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 984us/step - accuracy: 0.8869 - loss: 0.4278
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 792us/step - accuracy: 0.8961 - loss: 0.4199
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.9109 - loss: 0.4138
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.9173 - loss: 0.3877
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8715 - loss: 0.4440
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8914 - loss: 0.4075
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8796 - loss: 0.4026
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8379 - loss: 0.4265
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8834 - loss: 0.4075
Epoch 87/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.9341 - loss: 0.4062
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.9164 - loss: 0.3833
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 932us/step - accuracy: 0.9212 - loss: 0.3930
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.9093 - loss: 0.3679
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.8977 - loss: 0.3751
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 608us/step - accuracy: 0.9104 - loss: 0.3990
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.9119 - loss: 0.3712
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 968us/step - accuracy: 0.9404 - loss: 0.3688
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8913 - loss: 0.3987
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.8985 - loss: 0.3781
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 777us/step - accuracy: 0.9498 - loss: 0.3500
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 751us/step - accuracy: 0.8851 - loss: 0.3942
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.9206 - loss: 0.3517
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8875 - loss: 0.3759
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.9353 - loss: 0.3347
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4922 - loss: 0.6969
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4513 - loss: 0.6995
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 881us/step - accuracy: 0.5199 - loss: 0.6938
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4962 - loss: 0.6975
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5165 - loss: 0.6945
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4258 - loss: 0.6998
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4675 - loss: 0.6979
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4616 - loss: 0.6943
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 891us/step - accuracy: 0.5195 - loss: 0.6933
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.5296 - loss: 0.6978
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5578 - loss: 0.6927
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3916 - loss: 0.6994
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4969 - loss: 0.6920
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 674us/step - accuracy: 0.4962 - loss: 0.6876
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.4677 - loss: 0.6980
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5419 - loss: 0.6897
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4845 - loss: 0.6873
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Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5088 - loss: 0.6947
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.5696 - loss: 0.6923
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 793us/step - accuracy: 0.5133 - loss: 0.6947
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5221 - loss: 0.6933
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4693 - loss: 0.6956
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.4449 - loss: 0.6969
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5794 - loss: 0.6936
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 910us/step - accuracy: 0.5297 - loss: 0.6919
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.5608 - loss: 0.6905
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5384 - loss: 0.6902
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 999us/step - accuracy: 0.5565 - loss: 0.6918
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4819 - loss: 0.6958
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.4741 - loss: 0.6920
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4891 - loss: 0.6923
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5312 - loss: 0.6921
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.4632 - loss: 0.6917
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4875 - loss: 0.6951
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 853us/step - accuracy: 0.3919 - loss: 0.6987
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 671us/step - accuracy: 0.4759 - loss: 0.6944
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.5539 - loss: 0.6892
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4748 - loss: 0.6915
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5261 - loss: 0.6934
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 968us/step - accuracy: 0.5723 - loss: 0.6934
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5561 - loss: 0.6939
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 664us/step - accuracy: 0.4581 - loss: 0.6943
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 739us/step - accuracy: 0.5218 - loss: 0.6926
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.6330 - loss: 0.6903
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 805us/step - accuracy: 0.4769 - loss: 0.6939
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4877 - loss: 0.6940
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 729us/step - accuracy: 0.4801 - loss: 0.6928
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 606us/step - accuracy: 0.5276 - loss: 0.6935
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Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.5314 - loss: 0.6961
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 653us/step - accuracy: 0.5636 - loss: 0.6918
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4985 - loss: 0.6931
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.4781 - loss: 0.6952
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4973 - loss: 0.6931
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4628 - loss: 0.6922
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5002 - loss: 0.6940
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 797us/step - accuracy: 0.5368 - loss: 0.6914
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4809 - loss: 0.6950
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 813us/step - accuracy: 0.4860 - loss: 0.6937
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4995 - loss: 0.6953
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.3917 - loss: 0.6978
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4454 - loss: 0.6929
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 604us/step - accuracy: 0.4914 - loss: 0.6951
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 720us/step - accuracy: 0.4694 - loss: 0.6959
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5012 - loss: 0.6917
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4492 - loss: 0.6934
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4886 - loss: 0.6960
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 697us/step - accuracy: 0.6614 - loss: 0.6874
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 608us/step - accuracy: 0.5396 - loss: 0.6958
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 694us/step - accuracy: 0.4897 - loss: 0.6935
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5299 - loss: 0.6940
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4578 - loss: 0.6930
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4201 - loss: 0.6945
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 792us/step - accuracy: 0.5013 - loss: 0.6951
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 700us/step - accuracy: 0.5836 - loss: 0.6925
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 690us/step - accuracy: 0.5195 - loss: 0.6911
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5733 - loss: 0.6923
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5098 - loss: 0.6928
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4262 - loss: 0.6952
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.4778 - loss: 0.6957
```

```
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 876us/step - accuracy: 0.4708 - loss: 0.6933
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 817us/step - accuracy: 0.5366 - loss: 0.6946
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4421 - loss: 0.6922
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.4822 - loss: 0.6950
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.5046 - loss: 0.6919
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 742us/step - accuracy: 0.4276 - loss: 0.6959
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 606us/step - accuracy: 0.5382 - loss: 0.6928
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 608us/step - accuracy: 0.4696 - loss: 0.6952
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 608us/step - accuracy: 0.4593 - loss: 0.6920
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 998us/step - accuracy: 0.4991 - loss: 0.6953
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5139 - loss: 0.6917
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5446 - loss: 0.6918
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 731us/step - accuracy: 0.4275 - loss: 0.6963
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 755us/step - accuracy: 0.4428 - loss: 0.6930
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 660us/step - accuracy: 0.5273 - loss: 0.6934
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.4963 - loss: 0.6931
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6483 - loss: 0.6920
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4906 - loss: 0.6928
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.4735 - loss: 0.6926
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4742 - loss: 0.6943
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4883 - loss: 0.6943
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.5320 - loss: 0.6912
```

In [8]:
```
print("{:<10} {:<10} {:<10}".format('Activation', 'Loss', 'Accuracy'))
print("-----------------------------------")
for activation, result in act_res.items():
    print("{:<10} {:<10.4f} {:<10.4f}".format(activation, result['loss'], result['accuracy']))
```

```
Activation Loss       Accuracy
-----------------------------------
tanh       0.6680     0.6438
sigmoid    0.6931     0.5000
softplus   0.6913     0.6250
relu       0.5424     0.6875
softmax    0.6924     0.5750
selu       0.3611     0.9062
linear     0.6935     0.5063
```

Assessment of Activation Functions

Using the table above, we can see that the 'selu' function has the lowest loss, and also has the highest accuracy given the configuration and modeling (2 layers with 3 neurons each, 100 epochs/batch 10).

4. Again with the most optimal setup, try other optimizers (instead of `SGD`) and report on the loss score. (https://keras.io/optimizers/)

In [10]:
```
opt_fun = ['SGD', 'RMSprop', 'Adam', 'Lion']
def mod_opt(optimizer, epochs=100):
    model=Sequential()
    #add 2 layers
    #layer 1
    model.add(Dense(3, input_dim = 2, activation='selu'))
    #layer 2
    model.add(Dense(3, activation='selu'))
    #output
    model.add(Dense(1, activation='sigmoid'))
    model.compile(loss='binary_crossentropy', optimizer=optimizer, metrics=['accuracy'])
    model.fit(X, y, batch_size=10, epochs=100)
    loss, accuracy = model.evaluate(X, y)
    return loss, accuracy

opt_res = {}

for optimizer in opt_fun:
    loss, accuracy = mod_opt(optimizer)
    opt_res[optimizer] = {'loss': loss, 'accuracy': accuracy}
```

```
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 976us/step - accuracy: 0.5834 - loss: 0.7448
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4945 - loss: 0.7764
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 896us/step - accuracy: 0.5489 - loss: 0.7575
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.5497 - loss: 0.7169
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5768 - loss: 0.7282
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.6036 - loss: 0.7140
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 762us/step - accuracy: 0.6245 - loss: 0.6917
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 758us/step - accuracy: 0.6107 - loss: 0.7110
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.4961 - loss: 0.7535
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 702us/step - accuracy: 0.6297 - loss: 0.7078
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5906 - loss: 0.7132
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.6293 - loss: 0.6928
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6342 - loss: 0.6901
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6157 - loss: 0.6992
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 747us/step - accuracy: 0.6908 - loss: 0.6674
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 723us/step - accuracy: 0.5683 - loss: 0.7134
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 695us/step - accuracy: 0.6078 - loss: 0.6963
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6496 - loss: 0.6740
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 688us/step - accuracy: 0.6437 - loss: 0.6876
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 708us/step - accuracy: 0.6059 - loss: 0.6986
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.6669 - loss: 0.6711
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5962 - loss: 0.6950
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 762us/step - accuracy: 0.6527 - loss: 0.6787
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.5792 - loss: 0.7132
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6385 - loss: 0.6892
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 753us/step - accuracy: 0.6549 - loss: 0.6884
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 752us/step - accuracy: 0.6164 - loss: 0.6811
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6219 - loss: 0.6860
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5678 - loss: 0.7095
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 814us/step - accuracy: 0.6306 - loss: 0.6857
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6252 - loss: 0.6855
```

```
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6003 - loss: 0.6960
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 720us/step - accuracy: 0.5971 - loss: 0.6926
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6395 - loss: 0.6822
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.6305 - loss: 0.6833
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.5954 - loss: 0.6977
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6670 - loss: 0.6699
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 752us/step - accuracy: 0.5691 - loss: 0.6966
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 694us/step - accuracy: 0.6587 - loss: 0.6766
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 765us/step - accuracy: 0.6719 - loss: 0.6736
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 752us/step - accuracy: 0.6331 - loss: 0.6801
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 795us/step - accuracy: 0.6973 - loss: 0.6577
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 746us/step - accuracy: 0.6523 - loss: 0.6680
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6699 - loss: 0.6714
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6378 - loss: 0.6850
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6510 - loss: 0.6691
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 683us/step - accuracy: 0.6748 - loss: 0.6664
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6774 - loss: 0.6678
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5948 - loss: 0.6909
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 753us/step - accuracy: 0.6474 - loss: 0.6645
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 685us/step - accuracy: 0.6227 - loss: 0.6864
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 777us/step - accuracy: 0.6345 - loss: 0.6718
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6419 - loss: 0.6693
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5848 - loss: 0.6896
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6597 - loss: 0.6618
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 747us/step - accuracy: 0.6933 - loss: 0.6616
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 676us/step - accuracy: 0.6485 - loss: 0.6737
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 681us/step - accuracy: 0.6715 - loss: 0.6667
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 825us/step - accuracy: 0.6322 - loss: 0.6799
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 751us/step - accuracy: 0.5950 - loss: 0.6895
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6198 - loss: 0.6711
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6132 - loss: 0.6827
```

```
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6413 - loss: 0.6797
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.7090 - loss: 0.6652
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 746us/step - accuracy: 0.7209 - loss: 0.6583
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6412 - loss: 0.6837
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.7190 - loss: 0.6510
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 700us/step - accuracy: 0.6656 - loss: 0.6634
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 756us/step - accuracy: 0.6602 - loss: 0.6697
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6731 - loss: 0.6627
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 702us/step - accuracy: 0.6805 - loss: 0.6579
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 759us/step - accuracy: 0.6780 - loss: 0.6655
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 757us/step - accuracy: 0.6727 - loss: 0.6608
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6771 - loss: 0.6733
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 719us/step - accuracy: 0.6423 - loss: 0.6746
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.5593 - loss: 0.6900
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7027 - loss: 0.6484
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6932 - loss: 0.6631
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6675 - loss: 0.6653
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 853us/step - accuracy: 0.6430 - loss: 0.6771
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.6824 - loss: 0.6577
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6751 - loss: 0.6586
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 782us/step - accuracy: 0.7371 - loss: 0.6441
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.6567 - loss: 0.6701
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.6343 - loss: 0.6717
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 783us/step - accuracy: 0.7446 - loss: 0.6388
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.7344 - loss: 0.6409
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6395 - loss: 0.6659
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6613 - loss: 0.6622
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 708us/step - accuracy: 0.6776 - loss: 0.6558
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6356 - loss: 0.6706
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.7151 - loss: 0.6435
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6261 - loss: 0.6634
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Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6507 - loss: 0.6590
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.6617 - loss: 0.6610
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 730us/step - accuracy: 0.7077 - loss: 0.6524
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 796us/step - accuracy: 0.6918 - loss: 0.6448
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 810us/step - accuracy: 0.6794 - loss: 0.6497
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.6758 - loss: 0.6461
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 796us/step - accuracy: 0.6532 - loss: 0.6536
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8057 - loss: 0.6074
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4863 - loss: 0.7973
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 873us/step - accuracy: 0.5350 - loss: 0.7544
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.5151 - loss: 0.7534
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5196 - loss: 0.7239
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 833us/step - accuracy: 0.5381 - loss: 0.7115
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4850 - loss: 0.7200
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4866 - loss: 0.6989
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 723us/step - accuracy: 0.4400 - loss: 0.7116
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.4895 - loss: 0.6956
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.4808 - loss: 0.7002
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 814us/step - accuracy: 0.4723 - loss: 0.6795
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.4417 - loss: 0.6765
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 799us/step - accuracy: 0.4369 - loss: 0.6827
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.5167 - loss: 0.6656
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4829 - loss: 0.6671
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.5813 - loss: 0.6560
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 872us/step - accuracy: 0.5703 - loss: 0.6688
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.5998 - loss: 0.6601
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 874us/step - accuracy: 0.6517 - loss: 0.6584
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.6482 - loss: 0.6593
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6865 - loss: 0.6515
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.7109 - loss: 0.6539
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 910us/step - accuracy: 0.6795 - loss: 0.6628
Epoch 24/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 888us/step - accuracy: 0.7094 - loss: 0.6450
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6996 - loss: 0.6487
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 875us/step - accuracy: 0.6602 - loss: 0.6489
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 848us/step - accuracy: 0.7409 - loss: 0.6314
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6383 - loss: 0.6509
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7123 - loss: 0.6378
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7062 - loss: 0.6360
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7037 - loss: 0.6308
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6980 - loss: 0.6448
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7208 - loss: 0.6321
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6976 - loss: 0.6315
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6602 - loss: 0.6390
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6591 - loss: 0.6473
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6895 - loss: 0.6283
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6805 - loss: 0.6299
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6334 - loss: 0.6363
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7010 - loss: 0.6332
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7063 - loss: 0.6199
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7288 - loss: 0.6116
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7118 - loss: 0.6128
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.7005 - loss: 0.6099
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7800 - loss: 0.5944
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7023 - loss: 0.6075
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6737 - loss: 0.6151
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7303 - loss: 0.6073
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.7461 - loss: 0.5889
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 894us/step - accuracy: 0.7464 - loss: 0.5859
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6804 - loss: 0.6054
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.7341 - loss: 0.5931
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6400 - loss: 0.6004
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.7309 - loss: 0.5839
Epoch 55/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.7153 - loss: 0.5827
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 874us/step - accuracy: 0.6573 - loss: 0.5919
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7002 - loss: 0.5944
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 866us/step - accuracy: 0.6964 - loss: 0.5867
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 740us/step - accuracy: 0.6999 - loss: 0.5902
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 737us/step - accuracy: 0.6700 - loss: 0.5956
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.7390 - loss: 0.5694
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6680 - loss: 0.5875
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 741us/step - accuracy: 0.6747 - loss: 0.5801
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 916us/step - accuracy: 0.6393 - loss: 0.5994
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 766us/step - accuracy: 0.6393 - loss: 0.5982
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 796us/step - accuracy: 0.6946 - loss: 0.5696
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 891us/step - accuracy: 0.6862 - loss: 0.5712
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7123 - loss: 0.5599
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 782us/step - accuracy: 0.6845 - loss: 0.5667
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 765us/step - accuracy: 0.6972 - loss: 0.5552
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 692us/step - accuracy: 0.7255 - loss: 0.5464
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 766us/step - accuracy: 0.6904 - loss: 0.5616
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7038 - loss: 0.5492
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 676us/step - accuracy: 0.6803 - loss: 0.5651
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 751us/step - accuracy: 0.6671 - loss: 0.5641
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6855 - loss: 0.5581
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6761 - loss: 0.5442
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.6989 - loss: 0.5434
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7549 - loss: 0.5206
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 781us/step - accuracy: 0.7049 - loss: 0.5333
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 666us/step - accuracy: 0.7404 - loss: 0.5343
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7278 - loss: 0.5465
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7618 - loss: 0.5233
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7637 - loss: 0.5267
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7814 - loss: 0.5185
Epoch 86/100
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16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7883 - loss: 0.5174
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.6980 - loss: 0.5438
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7468 - loss: 0.5413
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.7836 - loss: 0.5097
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 700us/step - accuracy: 0.8013 - loss: 0.5150
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8194 - loss: 0.4975
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.7877 - loss: 0.5113
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.8100 - loss: 0.5035
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.7879 - loss: 0.5107
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.8168 - loss: 0.5020
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7976 - loss: 0.4984
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 827us/step - accuracy: 0.8205 - loss: 0.4905
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8231 - loss: 0.4817
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8181 - loss: 0.4946
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 968us/step - accuracy: 0.8477 - loss: 0.4837
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.8115 - loss: 0.4629
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 940us/step - accuracy: 0.3731 - loss: 0.7246
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4071 - loss: 0.7180
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.3709 - loss: 0.7130
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.3964 - loss: 0.7173
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.4283 - loss: 0.7081
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 770us/step - accuracy: 0.3896 - loss: 0.7091
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.3719 - loss: 0.7065
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4076 - loss: 0.7055
Epoch 9/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 768us/step - accuracy: 0.4923 - loss: 0.6961
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.3809 - loss: 0.7095
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4395 - loss: 0.7010
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4282 - loss: 0.7046
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4471 - loss: 0.7042
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4052 - loss: 0.7024
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 716us/step - accuracy: 0.4468 - loss: 0.7036
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 708us/step - accuracy: 0.4775 - loss: 0.6913
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Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4449 - loss: 0.6932
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4242 - loss: 0.6965
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4682 - loss: 0.6993
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4227 - loss: 0.6978
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.4645 - loss: 0.6963
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.4002 - loss: 0.7003
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.5204 - loss: 0.6859
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.4676 - loss: 0.6931
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5114 - loss: 0.6881
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.4697 - loss: 0.6950
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.5199 - loss: 0.6912
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5091 - loss: 0.6894
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5315 - loss: 0.6871
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5329 - loss: 0.6847
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.5347 - loss: 0.6872
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.4419 - loss: 0.6965
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.4957 - loss: 0.6868
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5434 - loss: 0.6876
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.5062 - loss: 0.6939
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5639 - loss: 0.6832
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.5678 - loss: 0.6857
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6015 - loss: 0.6865
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 703us/step - accuracy: 0.6092 - loss: 0.6880
Epoch 40/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.5837 - loss: 0.6851
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6355 - loss: 0.6851
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 752us/step - accuracy: 0.6004 - loss: 0.6884
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6236 - loss: 0.6874
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6693 - loss: 0.6816
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 937us/step - accuracy: 0.6593 - loss: 0.6825
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6845 - loss: 0.6773
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6349 - loss: 0.6840
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Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 803us/step - accuracy: 0.6612 - loss: 0.6801
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6167 - loss: 0.6854
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6659 - loss: 0.6798
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6573 - loss: 0.6829
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6450 - loss: 0.6802
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6588 - loss: 0.6799
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 936us/step - accuracy: 0.6690 - loss: 0.6795
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6381 - loss: 0.6845
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6909 - loss: 0.6804
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6505 - loss: 0.6800
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 701us/step - accuracy: 0.6850 - loss: 0.6779
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 720us/step - accuracy: 0.7057 - loss: 0.6819
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 2ms/step - accuracy: 0.6694 - loss: 0.6825
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.7063 - loss: 0.6747
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6543 - loss: 0.6785
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6838 - loss: 0.6772
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6608 - loss: 0.6770
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6404 - loss: 0.6748
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6578 - loss: 0.6788
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.7097 - loss: 0.6731
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.7362 - loss: 0.6691
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6867 - loss: 0.6711
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6081 - loss: 0.6839
Epoch 71/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6584 - loss: 0.6745
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6427 - loss: 0.6771
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6450 - loss: 0.6782
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 638us/step - accuracy: 0.7012 - loss: 0.6730
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6484 - loss: 0.6766
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 686us/step - accuracy: 0.6837 - loss: 0.6693
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6645 - loss: 0.6716
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6657 - loss: 0.6691
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Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6685 - loss: 0.6744
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7104 - loss: 0.6625
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6847 - loss: 0.6695
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.6284 - loss: 0.6743
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7037 - loss: 0.6645
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6818 - loss: 0.6689
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 665us/step - accuracy: 0.6218 - loss: 0.6745
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6597 - loss: 0.6699
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.6998 - loss: 0.6642
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 695us/step - accuracy: 0.6409 - loss: 0.6745
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 747us/step - accuracy: 0.6685 - loss: 0.6683
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1000us/step - accuracy: 0.7226 - loss: 0.6605
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.6911 - loss: 0.6627
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6539 - loss: 0.6707
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6668 - loss: 0.6666
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 834us/step - accuracy: 0.6035 - loss: 0.6705
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6398 - loss: 0.6653
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6593 - loss: 0.6657
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7128 - loss: 0.6612
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.6767 - loss: 0.6606
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.6381 - loss: 0.6640
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6424 - loss: 0.6633
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8465 - loss: 0.6354
Epoch 1/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.6075 - loss: 0.7093
Epoch 2/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.4767 - loss: 0.7513
Epoch 3/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.5418 - loss: 0.7054
Epoch 4/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.5068 - loss: 0.7097
Epoch 5/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4157 - loss: 0.7059
Epoch 6/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.4106 - loss: 0.6825
Epoch 7/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.3928 - loss: 0.6885
Epoch 8/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.3955 - loss: 0.6824
Epoch 9/100
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.3874 - loss: 0.6899
Epoch 10/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5387 - loss: 0.6791
Epoch 11/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 805us/step - accuracy: 0.4979 - loss: 0.6738
Epoch 12/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 767us/step - accuracy: 0.5367 - loss: 0.6633
Epoch 13/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.5357 - loss: 0.6632
Epoch 14/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.5931 - loss: 0.6589
Epoch 15/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6128 - loss: 0.6616
Epoch 16/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6823 - loss: 0.6489
Epoch 17/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 640us/step - accuracy: 0.6573 - loss: 0.6512
Epoch 18/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6324 - loss: 0.6529
Epoch 19/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 745us/step - accuracy: 0.6394 - loss: 0.6467
Epoch 20/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6183 - loss: 0.6514
Epoch 21/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.6286 - loss: 0.6443
Epoch 22/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.6515 - loss: 0.6353
Epoch 23/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 684us/step - accuracy: 0.6537 - loss: 0.6370
Epoch 24/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 668us/step - accuracy: 0.6538 - loss: 0.6315
Epoch 25/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 807us/step - accuracy: 0.6882 - loss: 0.6252
Epoch 26/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 871us/step - accuracy: 0.6708 - loss: 0.6181
Epoch 27/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.7527 - loss: 0.6085
Epoch 28/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7214 - loss: 0.6080
Epoch 29/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 672us/step - accuracy: 0.7187 - loss: 0.5941
Epoch 30/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6955 - loss: 0.6031
Epoch 31/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6530 - loss: 0.6083
Epoch 32/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.6955 - loss: 0.5961
Epoch 33/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.7281 - loss: 0.5965
Epoch 34/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.7546 - loss: 0.5813
Epoch 35/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.6970 - loss: 0.6032
Epoch 36/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.7627 - loss: 0.5865
Epoch 37/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.7652 - loss: 0.5802
Epoch 38/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8373 - loss: 0.5443
Epoch 39/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 968us/step - accuracy: 0.8117 - loss: 0.5421
Epoch 40/100
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.7767 - loss: 0.5616
Epoch 41/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8411 - loss: 0.5331
Epoch 42/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 818us/step - accuracy: 0.8645 - loss: 0.5267
Epoch 43/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 935us/step - accuracy: 0.8259 - loss: 0.5383
Epoch 44/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8228 - loss: 0.5399
Epoch 45/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.8390 - loss: 0.5405
Epoch 46/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8694 - loss: 0.5138
Epoch 47/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8928 - loss: 0.4848
Epoch 48/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 801us/step - accuracy: 0.8693 - loss: 0.4921
Epoch 49/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8348 - loss: 0.5036
Epoch 50/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8436 - loss: 0.5121
Epoch 51/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8480 - loss: 0.4811
Epoch 52/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 606us/step - accuracy: 0.8306 - loss: 0.4958
Epoch 53/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8614 - loss: 0.4679
Epoch 54/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8685 - loss: 0.4718
Epoch 55/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.8873 - loss: 0.4453
Epoch 56/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.8522 - loss: 0.4481
Epoch 57/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8369 - loss: 0.4632
Epoch 58/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8625 - loss: 0.4273
Epoch 59/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 901us/step - accuracy: 0.8657 - loss: 0.4294
Epoch 60/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 732us/step - accuracy: 0.8846 - loss: 0.4009
Epoch 61/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8599 - loss: 0.4059
Epoch 62/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8482 - loss: 0.4311
Epoch 63/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.8965 - loss: 0.4018
Epoch 64/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8429 - loss: 0.4312
Epoch 65/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.8383 - loss: 0.4191
Epoch 66/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8458 - loss: 0.4159
Epoch 67/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.9073 - loss: 0.3394
Epoch 68/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8492 - loss: 0.4013
Epoch 69/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 804us/step - accuracy: 0.8662 - loss: 0.3808
Epoch 70/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8490 - loss: 0.3839
Epoch 71/100
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8733 - loss: 0.3585
Epoch 72/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8655 - loss: 0.3388
Epoch 73/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 669us/step - accuracy: 0.8153 - loss: 0.4029
Epoch 74/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 686us/step - accuracy: 0.9091 - loss: 0.2952
Epoch 75/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.8477 - loss: 0.3588
Epoch 76/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8353 - loss: 0.3903
Epoch 77/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.8928 - loss: 0.3204
Epoch 78/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 933us/step - accuracy: 0.8659 - loss: 0.3370
Epoch 79/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 768us/step - accuracy: 0.8727 - loss: 0.3243
Epoch 80/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8772 - loss: 0.3075
Epoch 81/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8704 - loss: 0.3304
Epoch 82/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8262 - loss: 0.3578
Epoch 83/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8891 - loss: 0.3019
Epoch 84/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8850 - loss: 0.3005
Epoch 85/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 735us/step - accuracy: 0.8858 - loss: 0.2851
Epoch 86/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 809us/step - accuracy: 0.8983 - loss: 0.2749
Epoch 87/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.9134 - loss: 0.2577
Epoch 88/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8422 - loss: 0.3080
Epoch 89/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 769us/step - accuracy: 0.8686 - loss: 0.3082
Epoch 90/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 867us/step - accuracy: 0.8406 - loss: 0.3253
Epoch 91/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8760 - loss: 0.2941
Epoch 92/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 802us/step - accuracy: 0.8952 - loss: 0.3021
Epoch 93/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 667us/step - accuracy: 0.8516 - loss: 0.3240
Epoch 94/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8588 - loss: 0.3389
Epoch 95/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 734us/step - accuracy: 0.8772 - loss: 0.3186
Epoch 96/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 868us/step - accuracy: 0.8731 - loss: 0.3148
Epoch 97/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 733us/step - accuracy: 0.8895 - loss: 0.2839
Epoch 98/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 600us/step - accuracy: 0.8835 - loss: 0.2960
Epoch 99/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 673us/step - accuracy: 0.8756 - loss: 0.2853
Epoch 100/100
16/16 ━━━━━━━━━━━━━━━━━━━━ 0s 800us/step - accuracy: 0.8665 - loss: 0.2852
5/5 ━━━━━━━━━━━━━━━━━━━━ 0s 1ms/step - accuracy: 0.8672 - loss: 0.3152
```

In [11]:
```
print("{:<10} {:<10} {:<10}".format('Optimizer', 'Loss', 'Accuracy'))
print("----------------------------------")
for optimizer, result in opt_res.items():
    print("{:<10} {:<10.4f} {:<10.4f}".format(optimizer, result['loss'], result['accuracy']))
```

```
Optimizer  Loss       Accuracy
----------------------------------
SGD        0.6474     0.6750
RMSprop    0.4861     0.8250
Adam       0.6605     0.6750
Lion       0.3013     0.8750
```

Assessment of Optimal Optimizer

Looking at the table above we see the lowest loss and highest accuracy with the Lion optimizer method, given this configuration (2 layers, 3 neurons each, 100 epoch, batch size 10).

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 [58]:
```
import pandas as pd
from keras.utils import to_categorical
wine = pd.read_csv('../data/wine.data', names = ['class', 'alcohol', 'malic acid', 'ash', 'aclal
                                                 'flavanoids', 'nonflavanoids phenols', 'proanth
                                                 'od280/od315 of diluted wines', 'proline'])
wine.dropna(inplace=True)
X = wine.drop(columns=['class'])
y = wine['class'].copy()
y = to_categorical(y -1)

def byod2(layers, neurons, act, opt):
    model = Sequential()
    model.add(Dense(neurons, input_dim= 13, activation=act))
    for _ in range(layers - 1):
        model.add(Dense(neurons, activation=act))
    model.add(Dense(3, activation='softmax'))
    model.compile(loss='categorical_crossentropy', optimizer=opt, metrics=['accuracy'])
    record = model.fit(X, y, epochs=100, batch_size=10, validation_split=0.4, verbose=0)
    loss, accuracy = model.evaluate(X, y, verbose=0)
    return loss, accuracy, record.history
```

In [41]:
```
configs = [
    {'layers': 2, 'neurons': 3, 'act': 'tanh', 'opt': 'Lion'},
    {'layers': 5, 'neurons': 3, 'act': 'tanh', 'opt': 'Lion'},
    {'layers': 1, 'neurons': 4, 'act': 'tanh', 'opt': 'Lion'},
    {'layers': 2, 'neurons': 3, 'act': 'selu', 'opt': 'Lion'},
    {'layers': 5, 'neurons': 3, 'act': 'selu', 'opt': 'Lion'},
```

```
    {'layers': 1, 'neurons': 4, 'act': 'selu', 'opt': 'Lion'},
    {'layers': 2, 'neurons': 3, 'act': 'tanh', 'opt': 'Adam'},
    {'layers': 5, 'neurons': 3, 'act': 'tanh', 'opt': 'Adam'},
    {'layers': 1, 'neurons': 4, 'act': 'tanh', 'opt': 'Adam'},
    {'layers': 2, 'neurons': 3, 'act': 'selu', 'opt': 'Adam'},
    {'layers': 5, 'neurons': 2, 'act': 'selu', 'opt': 'Adam'},
    {'layers': 1, 'neurons': 4, 'act': 'selu', 'opt': 'Adam'}
]
```

In [59]:

```
results2 = []

for config in configs:
    layers = config['layers']
    neurons = config['neurons']
    act = config['act']
    opt = config['opt']
    loss, accuracy, record = byod2(layers, neurons, act,  opt)
    results2.append({'layers': layers, 'neurons': neurons, 'activation': act,
                     'optimizater':opt, 'loss':loss, 'accuracy':accuracy, 'record': record})
```

```
C:\Users\rober\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\de
nse.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using
Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
C:\Users\rober\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\de
nse.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using
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C:\Users\rober\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\de
nse.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using
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C:\Users\rober\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\de
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nse.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using
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  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
C:\Users\rober\AppData\Local\Programs\Python\Python311\Lib\site-packages\keras\src\layers\core\de
nse.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using
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nse.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using
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Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
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nse.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using
Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
```

In [60]:

```
print("{:<10} {:<10} {:<10} {:<10} {:<10} {:<10}".format('Layers', 'Neurons', 'Activation', 'Opt
print("-----------------------------------------------------------------------------------------
for result in results2:
    print("{:<10} {:<10} {:<10} {:<10} {:<10.4f} {:<10.4f}".format(result['layers'], result['neu
                                                                  result['activation'], result[
                                                                  result['loss'], result['accur
```

```
Layers     Neurons    Activation Optimizer  Loss       Accuracy
-------------------------------------------------------------------------------------------
2          3          tanh       Lion       1.5913     0.6348
5          3          tanh       Lion       2.6137     0.3315
1          4          tanh       Lion       2.7057     0.3315
2          3          selu       Lion       3.3941     0.3315
5          3          selu       Lion       3.8605     0.3315
1          4          selu       Lion       5.8608     0.6798
2          3          tanh       Adam       1.6706     0.3315
5          3          tanh       Adam       1.6418     0.3315
1          4          tanh       Adam       1.3295     0.6011
2          3          selu       Adam       1.8456     0.3315
5          2          selu       Adam       2.0812     0.3315
1          4          selu       Adam       6.2342     0.6629
```

Discussion

One major limitation is that I used the optimal configurations from the XOR dataset for the configurations in this dataset. However, the correct configuration would certainly be different for a wholly different dataset. A more robust function could be defined to evaluate layers and neurons, assuming network architecture existed to support the increase in computational power. For the sake of runtime and demonstration, I elected to use the known configurations from part one as part of the configurations for part 2.

Similarly, I elected to only test the 'tanh' and 'selu' activation methods, as well as the 'Lion' and 'Adam' optimizers, again using part 1 as a reference. The same discussion as above applies.

As we see, due to these limitations, as well as the batch size and epoch limit, none of these models is very accurate. The lowest loss is well over 1 (1.32, in the 1 layer, 4 neuron, tanh activation, Adam optimizer configuration). The highest accuracy is below 68% (67.98%, 1 layer 4 neuron, selu activation, lion optimizer). Given the models/configurations tested, I would elect to use the 2 layer, 3 neuron, tanh activation, lion optimizer configuration. It is the best combination of 'low' loss (1.59) and 'high' accuracy (63.5%). A close second would be the 1 layer, 4 neuron, tanh activation, Adam optimizer configuration, which has a lower loss figure (1.32), but also a lower accuracy (60.1%). Again, we could weigh the cost/benefit of multiple neurons across many layers and the effect on computational speed/power when determining the best model to go forward with. First, though, a more robust evaluation should be done (since none of these figures gives much confidence in the model).

Citations:

Data: https://archive.ics.uci.edu/dataset/109/wine

ChatGPT: Code help (tables, formatting of functions, categorical crossentropy modifications).

In [ ]: