In [48]:
```python
# Check the working path

import os
import sys

#sys.path.append(os.path.expanduser('~')+"/miniconda3/lib/python3.8/site-packages")
CWD=os.getcwd()

print("Current working directory: {0}".format(CWD))
```

Current working directory: /mnt/f/WGS_Paper/Draft/Package/Final

In [49]:
```python
# Seed seed value
seed_value= 9999

# Set the `PYTHONHASHSEED`

import os
os.environ['PYTHONHASHSEED']=str(seed_value)

# Set the `python` built-in pseudo-random generator

import random
random.seed(seed_value)

# Set the `numpy` pseudo-random generator

import numpy as np
np.random.seed(seed_value)
```

```python
# Set the `tensorflow` pseudo-random generator

import tensorflow as tf
tf.random.set_seed(seed_value)
```

In [50]:
```python
# Read the training file
# The column name for the outcome is "Phenotype"

import pandas

# Set number of variants

N_var=2861


train_data=pandas.read_table('train.txt',delim_whitespace=True)

train_X_col=train_data.columns[1:(N_var+1)]
train_X=train_data[train_X_col]
train_Y=train_data['Phenotype']
```

In [51]:
```python
# Read the test file

test_data=pandas.read_table('test.txt',delim_whitespace=True)

test_X_col=test_data.columns[1:(N_var+1)]
test_X=test_data[test_X_col]
test_Y=test_data['Phenotype']
```

In [52]:
```python
# NN model

from keras.models import Sequential
from keras.layers import Dense
from keras.layers import Dropout
from keras.layers import LSTM
from keras.layers import Embedding
from keras.regularizers import l1, l1_l2, l2


model = Sequential()


model.add(Dropout(0.3, input_shape=(N_var,)))
```

```python
model.add(Dense(50, activation='sigmoid',
kernel_regularizer=l1(5e-5)))

model.add(Dropout(0.1))

model.add(Dense(20, activation='sigmoid',
kernel_regularizer=l1(5e-5)))

model.add(Dense(10, activation='sigmoid', ))

model.add(Dense(5, activation='sigmoid', ))

model.add(Dense(1, activation='sigmoid', ))

model.summary()
```

Model: "sequential_3"

Layer (type)	Output Shape	Param #
dropout_6 (Dropout)	(None, 2861)	0
dense_15 (Dense)	(None, 50)	143100
dropout_7 (Dropout)	(None, 50)	0
dense_16 (Dense)	(None, 20)	1020
dense_17 (Dense)	(None, 10)	210
dense_18 (Dense)	(None, 5)	55
dense_19 (Dense)	(None, 1)	6

Total params: 144,391
Trainable params: 144,391
Non-trainable params: 0

In [53]:
```python
# Compile the model for REGRESSION problem

# model.compile(loss='binary_crossentropy', optimizer='adam', metrics=['accuracy'])




# Alternatively, can try the exponential decay model
```

```
initial_learning_rate = 0.3
lr_schedule = tf.keras.optimizers.schedules.ExponentialDecay(
    initial_learning_rate,
    decay_steps=100000,
    decay_rate=0.96,
    staircase=True)

model.compile(optimizer=tf.keras.optimizers.SGD(learning_rate=lr_schedule),
    loss='binary_crossentropy',
    metrics=['accuracy'])
```

In [54]:
```
# Fit the model on the dataset

history = model.fit(train_X.values, train_Y.values, epochs=1000, batch_size=256, shuffle=False,
                    validation_data=(test_X.values, test_Y.values))
```

```
Epoch 1/1000
5/5 [==============================] - 0s 22ms/step - loss: 0.7746 - accuracy: 0.6190 - val_loss: 0.6721 - val_accuracy: 0.8027
Epoch 2/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7266 - accuracy: 0.7947 - val_loss: 0.6656 - val_accuracy: 0.8027
Epoch 3/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7310 - accuracy: 0.7947 - val_loss: 0.6677 - val_accuracy: 0.8027
Epoch 4/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7350 - accuracy: 0.7947 - val_loss: 0.6691 - val_accuracy: 0.8027
Epoch 5/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7365 - accuracy: 0.7947 - val_loss: 0.6694 - val_accuracy: 0.8027
Epoch 6/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7366 - accuracy: 0.7947 - val_loss: 0.6691 - val_accuracy: 0.8027
Epoch 7/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7360 - accuracy: 0.7947 - val_loss: 0.6686 - val_accuracy: 0.8027
Epoch 8/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7352 - accuracy: 0.7947 - val_loss: 0.6679 - val_accuracy: 0.8027
Epoch 9/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7341 - accuracy: 0.7947 - val_loss: 0.6671 - val_accuracy: 0.8027
Epoch 10/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7330 - accuracy: 0.7947 - val_loss: 0.6664 - val_accuracy: 0.8027
Epoch 11/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7318 - accuracy: 0.7947 - val_loss: 0.6656 - val_accuracy: 0.8027
Epoch 12/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7308 - accuracy: 0.7947 - val_loss: 0.6648 - val_accuracy: 0.8027
Epoch 13/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7296 - accuracy: 0.7947 - val_loss: 0.6640 - val_accuracy: 0.8027
Epoch 14/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7285 - accuracy: 0.7947 - val_loss: 0.6633 - val_accuracy: 0.8027
Epoch 15/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7274 - accuracy: 0.7947 - val_loss: 0.6625 - val_accuracy: 0.8027
```

```
Epoch 16/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7263 - accuracy: 0.7947 - val_loss: 0.6618 - val_accuracy: 0.8027
Epoch 17/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7253 - accuracy: 0.7947 - val_loss: 0.6610 - val_accuracy: 0.8027
Epoch 18/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7243 - accuracy: 0.7947 - val_loss: 0.6603 - val_accuracy: 0.8027
Epoch 19/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7233 - accuracy: 0.7947 - val_loss: 0.6595 - val_accuracy: 0.8027
Epoch 20/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7222 - accuracy: 0.7947 - val_loss: 0.6588 - val_accuracy: 0.8027
Epoch 21/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7211 - accuracy: 0.7947 - val_loss: 0.6581 - val_accuracy: 0.8027
Epoch 22/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7201 - accuracy: 0.7947 - val_loss: 0.6574 - val_accuracy: 0.8027
Epoch 23/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7193 - accuracy: 0.7947 - val_loss: 0.6567 - val_accuracy: 0.8027
Epoch 24/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7182 - accuracy: 0.7947 - val_loss: 0.6560 - val_accuracy: 0.8027
Epoch 25/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7174 - accuracy: 0.7947 - val_loss: 0.6553 - val_accuracy: 0.8027
Epoch 26/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7163 - accuracy: 0.7947 - val_loss: 0.6546 - val_accuracy: 0.8027
Epoch 27/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7154 - accuracy: 0.7947 - val_loss: 0.6539 - val_accuracy: 0.8027
Epoch 28/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7144 - accuracy: 0.7947 - val_loss: 0.6532 - val_accuracy: 0.8027
Epoch 29/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7136 - accuracy: 0.7947 - val_loss: 0.6525 - val_accuracy: 0.8027
Epoch 30/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7127 - accuracy: 0.7947 - val_loss: 0.6518 - val_accuracy: 0.8027
Epoch 31/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7117 - accuracy: 0.7947 - val_loss: 0.6511 - val_accuracy: 0.8027
Epoch 32/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7107 - accuracy: 0.7947 - val_loss: 0.6504 - val_accuracy: 0.8027
Epoch 33/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7099 - accuracy: 0.7947 - val_loss: 0.6497 - val_accuracy: 0.8027
Epoch 34/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7090 - accuracy: 0.7947 - val_loss: 0.6490 - val_accuracy: 0.8027
Epoch 35/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7081 - accuracy: 0.7947 - val_loss: 0.6483 - val_accuracy: 0.8027
Epoch 36/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7074 - accuracy: 0.7947 - val_loss: 0.6477 - val_accuracy: 0.8027
Epoch 37/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7064 - accuracy: 0.7947 - val_loss: 0.6470 - val_accuracy: 0.8027
Epoch 38/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7055 - accuracy: 0.7947 - val_loss: 0.6463 - val_accuracy: 0.8027
Epoch 39/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7048 - accuracy: 0.7947 - val_loss: 0.6456 - val_accuracy: 0.8027
Epoch 40/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7038 - accuracy: 0.7947 - val_loss: 0.6449 - val_accuracy: 0.8027
```

```
Epoch 41/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7031 - accuracy: 0.7947 - val_loss: 0.6442 - val_accuracy: 0.8027
Epoch 42/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7022 - accuracy: 0.7947 - val_loss: 0.6435 - val_accuracy: 0.8027
Epoch 43/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7014 - accuracy: 0.7947 - val_loss: 0.6428 - val_accuracy: 0.8027
Epoch 44/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.7007 - accuracy: 0.7947 - val_loss: 0.6422 - val_accuracy: 0.8027
Epoch 45/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6996 - accuracy: 0.7947 - val_loss: 0.6415 - val_accuracy: 0.8027
Epoch 46/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6988 - accuracy: 0.7947 - val_loss: 0.6408 - val_accuracy: 0.8027
Epoch 47/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6980 - accuracy: 0.7947 - val_loss: 0.6401 - val_accuracy: 0.8027
Epoch 48/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6972 - accuracy: 0.7947 - val_loss: 0.6394 - val_accuracy: 0.8027
Epoch 49/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6964 - accuracy: 0.7947 - val_loss: 0.6386 - val_accuracy: 0.8027
Epoch 50/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6954 - accuracy: 0.7947 - val_loss: 0.6379 - val_accuracy: 0.8027
Epoch 51/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6948 - accuracy: 0.7947 - val_loss: 0.6372 - val_accuracy: 0.8027
Epoch 52/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6938 - accuracy: 0.7947 - val_loss: 0.6365 - val_accuracy: 0.8027
Epoch 53/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6931 - accuracy: 0.7947 - val_loss: 0.6358 - val_accuracy: 0.8027
Epoch 54/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6923 - accuracy: 0.7947 - val_loss: 0.6351 - val_accuracy: 0.8027
Epoch 55/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6913 - accuracy: 0.7947 - val_loss: 0.6343 - val_accuracy: 0.8027
Epoch 56/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6906 - accuracy: 0.7947 - val_loss: 0.6336 - val_accuracy: 0.8027
Epoch 57/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6897 - accuracy: 0.7947 - val_loss: 0.6328 - val_accuracy: 0.8027
Epoch 58/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6887 - accuracy: 0.7947 - val_loss: 0.6321 - val_accuracy: 0.8027
Epoch 59/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6879 - accuracy: 0.7947 - val_loss: 0.6313 - val_accuracy: 0.8027
Epoch 60/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6871 - accuracy: 0.7947 - val_loss: 0.6306 - val_accuracy: 0.8027
Epoch 61/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6862 - accuracy: 0.7947 - val_loss: 0.6298 - val_accuracy: 0.8027
Epoch 62/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6853 - accuracy: 0.7947 - val_loss: 0.6290 - val_accuracy: 0.8027
Epoch 63/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6846 - accuracy: 0.7947 - val_loss: 0.6282 - val_accuracy: 0.8027
Epoch 64/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6839 - accuracy: 0.7947 - val_loss: 0.6274 - val_accuracy: 0.8027
Epoch 65/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6829 - accuracy: 0.7947 - val_loss: 0.6266 - val_accuracy: 0.8027
```

```
Epoch 66/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6821 - accuracy: 0.7947 - val_loss: 0.6258 - val_accuracy: 0.8027
Epoch 67/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6811 - accuracy: 0.7947 - val_loss: 0.6250 - val_accuracy: 0.8027
Epoch 68/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6803 - accuracy: 0.7947 - val_loss: 0.6242 - val_accuracy: 0.8027
Epoch 69/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6793 - accuracy: 0.7947 - val_loss: 0.6233 - val_accuracy: 0.8027
Epoch 70/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6784 - accuracy: 0.7947 - val_loss: 0.6225 - val_accuracy: 0.8027
Epoch 71/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6775 - accuracy: 0.7947 - val_loss: 0.6216 - val_accuracy: 0.8027
Epoch 72/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6763 - accuracy: 0.7947 - val_loss: 0.6207 - val_accuracy: 0.8027
Epoch 73/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6755 - accuracy: 0.7947 - val_loss: 0.6198 - val_accuracy: 0.8027
Epoch 74/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6747 - accuracy: 0.7947 - val_loss: 0.6189 - val_accuracy: 0.8027
Epoch 75/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6737 - accuracy: 0.7947 - val_loss: 0.6180 - val_accuracy: 0.8027
Epoch 76/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6728 - accuracy: 0.7947 - val_loss: 0.6171 - val_accuracy: 0.8027
Epoch 77/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6715 - accuracy: 0.7947 - val_loss: 0.6161 - val_accuracy: 0.8027
Epoch 78/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6706 - accuracy: 0.7947 - val_loss: 0.6151 - val_accuracy: 0.8027
Epoch 79/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6699 - accuracy: 0.7947 - val_loss: 0.6141 - val_accuracy: 0.8027
Epoch 80/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6689 - accuracy: 0.7947 - val_loss: 0.6131 - val_accuracy: 0.8027
Epoch 81/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6680 - accuracy: 0.7947 - val_loss: 0.6121 - val_accuracy: 0.8027
Epoch 82/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6668 - accuracy: 0.7947 - val_loss: 0.6111 - val_accuracy: 0.8027
Epoch 83/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6659 - accuracy: 0.7947 - val_loss: 0.6100 - val_accuracy: 0.8027
Epoch 84/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6645 - accuracy: 0.7947 - val_loss: 0.6089 - val_accuracy: 0.8027
Epoch 85/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6633 - accuracy: 0.7947 - val_loss: 0.6078 - val_accuracy: 0.8027
Epoch 86/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6625 - accuracy: 0.7947 - val_loss: 0.6066 - val_accuracy: 0.8027
Epoch 87/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6613 - accuracy: 0.7947 - val_loss: 0.6055 - val_accuracy: 0.8027
Epoch 88/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6604 - accuracy: 0.7947 - val_loss: 0.6043 - val_accuracy: 0.8027
Epoch 89/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6593 - accuracy: 0.7947 - val_loss: 0.6031 - val_accuracy: 0.8027
Epoch 90/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6573 - accuracy: 0.7947 - val_loss: 0.6019 - val_accuracy: 0.8027
```

```
Epoch 91/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6561 - accuracy: 0.7947 - val_loss: 0.6007 - val_accuracy: 0.8027
Epoch 92/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6556 - accuracy: 0.7947 - val_loss: 0.5994 - val_accuracy: 0.8027
Epoch 93/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6537 - accuracy: 0.7947 - val_loss: 0.5981 - val_accuracy: 0.8027
Epoch 94/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6526 - accuracy: 0.7947 - val_loss: 0.5968 - val_accuracy: 0.8027
Epoch 95/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6517 - accuracy: 0.7947 - val_loss: 0.5954 - val_accuracy: 0.8027
Epoch 96/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6502 - accuracy: 0.7947 - val_loss: 0.5940 - val_accuracy: 0.8027
Epoch 97/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6483 - accuracy: 0.7947 - val_loss: 0.5926 - val_accuracy: 0.8027
Epoch 98/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6475 - accuracy: 0.7947 - val_loss: 0.5911 - val_accuracy: 0.8027
Epoch 99/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6458 - accuracy: 0.7947 - val_loss: 0.5896 - val_accuracy: 0.8027
Epoch 100/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6449 - accuracy: 0.7947 - val_loss: 0.5881 - val_accuracy: 0.8027
Epoch 101/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6438 - accuracy: 0.7947 - val_loss: 0.5866 - val_accuracy: 0.8027
Epoch 102/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6418 - accuracy: 0.7947 - val_loss: 0.5850 - val_accuracy: 0.8027
Epoch 103/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6406 - accuracy: 0.7947 - val_loss: 0.5835 - val_accuracy: 0.8027
Epoch 104/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6387 - accuracy: 0.7947 - val_loss: 0.5818 - val_accuracy: 0.8027
Epoch 105/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6368 - accuracy: 0.7947 - val_loss: 0.5802 - val_accuracy: 0.8027
Epoch 106/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6358 - accuracy: 0.7947 - val_loss: 0.5785 - val_accuracy: 0.8027
Epoch 107/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6337 - accuracy: 0.7947 - val_loss: 0.5769 - val_accuracy: 0.8027
Epoch 108/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6325 - accuracy: 0.7947 - val_loss: 0.5751 - val_accuracy: 0.8027
Epoch 109/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6308 - accuracy: 0.7947 - val_loss: 0.5734 - val_accuracy: 0.8027
Epoch 110/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6292 - accuracy: 0.7947 - val_loss: 0.5717 - val_accuracy: 0.8027
Epoch 111/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6278 - accuracy: 0.7947 - val_loss: 0.5699 - val_accuracy: 0.8027
Epoch 112/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6259 - accuracy: 0.7947 - val_loss: 0.5681 - val_accuracy: 0.8027
Epoch 113/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6250 - accuracy: 0.7947 - val_loss: 0.5665 - val_accuracy: 0.8027
Epoch 114/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6228 - accuracy: 0.7947 - val_loss: 0.5647 - val_accuracy: 0.8027
Epoch 115/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6215 - accuracy: 0.7947 - val_loss: 0.5628 - val_accuracy: 0.8027
```

```
Epoch 116/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6189 - accuracy: 0.7947 - val_loss: 0.5610 - val_accuracy: 0.8027
Epoch 117/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6167 - accuracy: 0.7947 - val_loss: 0.5591 - val_accuracy: 0.8027
Epoch 118/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6170 - accuracy: 0.7947 - val_loss: 0.5573 - val_accuracy: 0.8027
Epoch 119/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6137 - accuracy: 0.7947 - val_loss: 0.5556 - val_accuracy: 0.8027
Epoch 120/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6129 - accuracy: 0.7947 - val_loss: 0.5539 - val_accuracy: 0.8027
Epoch 121/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6121 - accuracy: 0.7947 - val_loss: 0.5522 - val_accuracy: 0.8027
Epoch 122/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6095 - accuracy: 0.7947 - val_loss: 0.5505 - val_accuracy: 0.8027
Epoch 123/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6070 - accuracy: 0.7947 - val_loss: 0.5486 - val_accuracy: 0.8027
Epoch 124/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6068 - accuracy: 0.7947 - val_loss: 0.5468 - val_accuracy: 0.8027
Epoch 125/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6041 - accuracy: 0.7947 - val_loss: 0.5451 - val_accuracy: 0.8027
Epoch 126/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6030 - accuracy: 0.7947 - val_loss: 0.5435 - val_accuracy: 0.8027
Epoch 127/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.6008 - accuracy: 0.7947 - val_loss: 0.5419 - val_accuracy: 0.8027
Epoch 128/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5995 - accuracy: 0.7947 - val_loss: 0.5402 - val_accuracy: 0.8027
Epoch 129/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5973 - accuracy: 0.7947 - val_loss: 0.5387 - val_accuracy: 0.8027
Epoch 130/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5967 - accuracy: 0.7947 - val_loss: 0.5372 - val_accuracy: 0.8027
Epoch 131/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5973 - accuracy: 0.7947 - val_loss: 0.5356 - val_accuracy: 0.8027
Epoch 132/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5953 - accuracy: 0.7947 - val_loss: 0.5343 - val_accuracy: 0.8027
Epoch 133/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5916 - accuracy: 0.7947 - val_loss: 0.5330 - val_accuracy: 0.8027
Epoch 134/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5903 - accuracy: 0.7947 - val_loss: 0.5313 - val_accuracy: 0.8027
Epoch 135/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5890 - accuracy: 0.7947 - val_loss: 0.5299 - val_accuracy: 0.8027
Epoch 136/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5887 - accuracy: 0.7947 - val_loss: 0.5286 - val_accuracy: 0.8027
Epoch 137/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5861 - accuracy: 0.7947 - val_loss: 0.5274 - val_accuracy: 0.8027
Epoch 138/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5877 - accuracy: 0.7947 - val_loss: 0.5259 - val_accuracy: 0.8027
Epoch 139/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5819 - accuracy: 0.7947 - val_loss: 0.5249 - val_accuracy: 0.8027
Epoch 140/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5836 - accuracy: 0.7947 - val_loss: 0.5233 - val_accuracy: 0.8027
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Epoch 141/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5808 - accuracy: 0.7947 - val_loss: 0.5221 - val_accuracy: 0.8027
Epoch 142/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5793 - accuracy: 0.7947 - val_loss: 0.5209 - val_accuracy: 0.8027
Epoch 143/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5778 - accuracy: 0.7947 - val_loss: 0.5200 - val_accuracy: 0.8027
Epoch 144/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5794 - accuracy: 0.7947 - val_loss: 0.5187 - val_accuracy: 0.8027
Epoch 145/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5762 - accuracy: 0.7947 - val_loss: 0.5176 - val_accuracy: 0.8027
Epoch 146/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5748 - accuracy: 0.7947 - val_loss: 0.5166 - val_accuracy: 0.8027
Epoch 147/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5753 - accuracy: 0.7947 - val_loss: 0.5153 - val_accuracy: 0.8027
Epoch 148/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5744 - accuracy: 0.7947 - val_loss: 0.5143 - val_accuracy: 0.8027
Epoch 149/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5715 - accuracy: 0.7947 - val_loss: 0.5133 - val_accuracy: 0.8027
Epoch 150/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5698 - accuracy: 0.7947 - val_loss: 0.5124 - val_accuracy: 0.8027
Epoch 151/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5703 - accuracy: 0.7947 - val_loss: 0.5113 - val_accuracy: 0.8027
Epoch 152/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5690 - accuracy: 0.7947 - val_loss: 0.5101 - val_accuracy: 0.8027
Epoch 153/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5665 - accuracy: 0.7947 - val_loss: 0.5093 - val_accuracy: 0.8027
Epoch 154/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5657 - accuracy: 0.7947 - val_loss: 0.5084 - val_accuracy: 0.8027
Epoch 155/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5638 - accuracy: 0.7947 - val_loss: 0.5073 - val_accuracy: 0.8027
Epoch 156/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5645 - accuracy: 0.7947 - val_loss: 0.5065 - val_accuracy: 0.8027
Epoch 157/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5643 - accuracy: 0.7947 - val_loss: 0.5054 - val_accuracy: 0.8027
Epoch 158/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5610 - accuracy: 0.7947 - val_loss: 0.5046 - val_accuracy: 0.8027
Epoch 159/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5584 - accuracy: 0.7947 - val_loss: 0.5040 - val_accuracy: 0.8027
Epoch 160/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5612 - accuracy: 0.7947 - val_loss: 0.5029 - val_accuracy: 0.8027
Epoch 161/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5598 - accuracy: 0.7947 - val_loss: 0.5022 - val_accuracy: 0.8027
Epoch 162/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5570 - accuracy: 0.7947 - val_loss: 0.5011 - val_accuracy: 0.8027
Epoch 163/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5548 - accuracy: 0.7947 - val_loss: 0.5004 - val_accuracy: 0.8027
Epoch 164/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5551 - accuracy: 0.7947 - val_loss: 0.4997 - val_accuracy: 0.8027
Epoch 165/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5546 - accuracy: 0.7947 - val_loss: 0.4987 - val_accuracy: 0.8027
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Epoch 166/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5568 - accuracy: 0.7947 - val_loss: 0.4980 - val_accuracy: 0.8027
Epoch 167/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5496 - accuracy: 0.7947 - val_loss: 0.4973 - val_accuracy: 0.8027
Epoch 168/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5491 - accuracy: 0.7931 - val_loss: 0.4966 - val_accuracy: 0.8027
Epoch 169/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5498 - accuracy: 0.7859 - val_loss: 0.4958 - val_accuracy: 0.8027
Epoch 170/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5514 - accuracy: 0.7851 - val_loss: 0.4946 - val_accuracy: 0.8027
Epoch 171/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5504 - accuracy: 0.7875 - val_loss: 0.4939 - val_accuracy: 0.8027
Epoch 172/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5477 - accuracy: 0.7835 - val_loss: 0.4930 - val_accuracy: 0.8027
Epoch 173/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5488 - accuracy: 0.7835 - val_loss: 0.4922 - val_accuracy: 0.8027
Epoch 174/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5423 - accuracy: 0.7819 - val_loss: 0.4917 - val_accuracy: 0.8027
Epoch 175/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5475 - accuracy: 0.7843 - val_loss: 0.4905 - val_accuracy: 0.8027
Epoch 176/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5452 - accuracy: 0.7788 - val_loss: 0.4899 - val_accuracy: 0.8027
Epoch 177/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5410 - accuracy: 0.7764 - val_loss: 0.4887 - val_accuracy: 0.8027
Epoch 178/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5387 - accuracy: 0.7732 - val_loss: 0.4880 - val_accuracy: 0.8027
Epoch 179/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5435 - accuracy: 0.7724 - val_loss: 0.4871 - val_accuracy: 0.8027
Epoch 180/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5372 - accuracy: 0.7748 - val_loss: 0.4866 - val_accuracy: 0.8027
Epoch 181/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5399 - accuracy: 0.7724 - val_loss: 0.4852 - val_accuracy: 0.8027
Epoch 182/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5412 - accuracy: 0.7692 - val_loss: 0.4843 - val_accuracy: 0.8027
Epoch 183/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5337 - accuracy: 0.7676 - val_loss: 0.4839 - val_accuracy: 0.8027
Epoch 184/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5385 - accuracy: 0.7668 - val_loss: 0.4829 - val_accuracy: 0.8027
Epoch 185/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5363 - accuracy: 0.7676 - val_loss: 0.4825 - val_accuracy: 0.8027
Epoch 186/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5358 - accuracy: 0.7660 - val_loss: 0.4819 - val_accuracy: 0.8027
Epoch 187/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5325 - accuracy: 0.7692 - val_loss: 0.4810 - val_accuracy: 0.8027
Epoch 188/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5304 - accuracy: 0.7684 - val_loss: 0.4800 - val_accuracy: 0.8027
Epoch 189/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5289 - accuracy: 0.7644 - val_loss: 0.4797 - val_accuracy: 0.8027
Epoch 190/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5325 - accuracy: 0.7620 - val_loss: 0.4790 - val_accuracy: 0.8027
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Epoch 191/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5310 - accuracy: 0.7636 - val_loss: 0.4779 - val_accuracy: 0.8027
Epoch 192/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5301 - accuracy: 0.7636 - val_loss: 0.4772 - val_accuracy: 0.8027
Epoch 193/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5304 - accuracy: 0.7628 - val_loss: 0.4763 - val_accuracy: 0.8027
Epoch 194/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5264 - accuracy: 0.7644 - val_loss: 0.4758 - val_accuracy: 0.8027
Epoch 195/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5291 - accuracy: 0.7572 - val_loss: 0.4745 - val_accuracy: 0.8027
Epoch 196/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5268 - accuracy: 0.7612 - val_loss: 0.4738 - val_accuracy: 0.8027
Epoch 197/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5247 - accuracy: 0.7652 - val_loss: 0.4730 - val_accuracy: 0.8027
Epoch 198/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5245 - accuracy: 0.7588 - val_loss: 0.4728 - val_accuracy: 0.8027
Epoch 199/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5207 - accuracy: 0.7660 - val_loss: 0.4719 - val_accuracy: 0.8027
Epoch 200/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5199 - accuracy: 0.7612 - val_loss: 0.4714 - val_accuracy: 0.8027
Epoch 201/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5246 - accuracy: 0.7572 - val_loss: 0.4707 - val_accuracy: 0.8027
Epoch 202/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5218 - accuracy: 0.7572 - val_loss: 0.4701 - val_accuracy: 0.8027
Epoch 203/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5201 - accuracy: 0.7548 - val_loss: 0.4694 - val_accuracy: 0.8027
Epoch 204/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5272 - accuracy: 0.7532 - val_loss: 0.4683 - val_accuracy: 0.8027
Epoch 205/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5216 - accuracy: 0.7556 - val_loss: 0.4679 - val_accuracy: 0.8027
Epoch 206/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5205 - accuracy: 0.7548 - val_loss: 0.4673 - val_accuracy: 0.8027
Epoch 207/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5191 - accuracy: 0.7524 - val_loss: 0.4671 - val_accuracy: 0.8027
Epoch 208/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5221 - accuracy: 0.7556 - val_loss: 0.4662 - val_accuracy: 0.8027
Epoch 209/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5164 - accuracy: 0.7540 - val_loss: 0.4657 - val_accuracy: 0.8027
Epoch 210/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5185 - accuracy: 0.7572 - val_loss: 0.4654 - val_accuracy: 0.8027
Epoch 211/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5195 - accuracy: 0.7516 - val_loss: 0.4641 - val_accuracy: 0.8027
Epoch 212/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5171 - accuracy: 0.7492 - val_loss: 0.4633 - val_accuracy: 0.8027
Epoch 213/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5117 - accuracy: 0.7532 - val_loss: 0.4631 - val_accuracy: 0.8027
Epoch 214/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5168 - accuracy: 0.7548 - val_loss: 0.4623 - val_accuracy: 0.8027
Epoch 215/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5120 - accuracy: 0.7508 - val_loss: 0.4619 - val_accuracy: 0.8027
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Epoch 216/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5137 - accuracy: 0.7508 - val_loss: 0.4604 - val_accuracy: 0.8027
Epoch 217/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5118 - accuracy: 0.7476 - val_loss: 0.4603 - val_accuracy: 0.8027
Epoch 218/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5084 - accuracy: 0.7484 - val_loss: 0.4601 - val_accuracy: 0.8027
Epoch 219/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5113 - accuracy: 0.7492 - val_loss: 0.4591 - val_accuracy: 0.8027
Epoch 220/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5056 - accuracy: 0.7484 - val_loss: 0.4579 - val_accuracy: 0.8027
Epoch 221/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5133 - accuracy: 0.7468 - val_loss: 0.4568 - val_accuracy: 0.8027
Epoch 222/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5063 - accuracy: 0.7500 - val_loss: 0.4569 - val_accuracy: 0.8027
Epoch 223/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5065 - accuracy: 0.7492 - val_loss: 0.4567 - val_accuracy: 0.8027
Epoch 224/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5068 - accuracy: 0.7492 - val_loss: 0.4558 - val_accuracy: 0.8027
Epoch 225/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5051 - accuracy: 0.7460 - val_loss: 0.4554 - val_accuracy: 0.8027
Epoch 226/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5027 - accuracy: 0.7460 - val_loss: 0.4548 - val_accuracy: 0.8027
Epoch 227/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5114 - accuracy: 0.7492 - val_loss: 0.4534 - val_accuracy: 0.8027
Epoch 228/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5057 - accuracy: 0.7452 - val_loss: 0.4535 - val_accuracy: 0.8027
Epoch 229/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5013 - accuracy: 0.7516 - val_loss: 0.4526 - val_accuracy: 0.8027
Epoch 230/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5041 - accuracy: 0.7492 - val_loss: 0.4522 - val_accuracy: 0.8027
Epoch 231/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5038 - accuracy: 0.7476 - val_loss: 0.4520 - val_accuracy: 0.8027
Epoch 232/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5022 - accuracy: 0.7444 - val_loss: 0.4512 - val_accuracy: 0.8027
Epoch 233/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4982 - accuracy: 0.7460 - val_loss: 0.4510 - val_accuracy: 0.8027
Epoch 234/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5034 - accuracy: 0.7468 - val_loss: 0.4497 - val_accuracy: 0.8027
Epoch 235/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4989 - accuracy: 0.7396 - val_loss: 0.4504 - val_accuracy: 0.8027
Epoch 236/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5033 - accuracy: 0.7452 - val_loss: 0.4494 - val_accuracy: 0.8027
Epoch 237/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4931 - accuracy: 0.7460 - val_loss: 0.4487 - val_accuracy: 0.8027
Epoch 238/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4958 - accuracy: 0.7468 - val_loss: 0.4477 - val_accuracy: 0.8067
Epoch 239/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4935 - accuracy: 0.7548 - val_loss: 0.4473 - val_accuracy: 0.8091
Epoch 240/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4920 - accuracy: 0.7556 - val_loss: 0.4468 - val_accuracy: 0.8139
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Epoch 241/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4968 - accuracy: 0.7548 - val_loss: 0.4459 - val_accuracy: 0.8163
Epoch 242/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4944 - accuracy: 0.7580 - val_loss: 0.4458 - val_accuracy: 0.8195
Epoch 243/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4989 - accuracy: 0.7588 - val_loss: 0.4457 - val_accuracy: 0.8187
Epoch 244/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4876 - accuracy: 0.7644 - val_loss: 0.4452 - val_accuracy: 0.8275
Epoch 245/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.5009 - accuracy: 0.7636 - val_loss: 0.4447 - val_accuracy: 0.8315
Epoch 246/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4861 - accuracy: 0.7676 - val_loss: 0.4438 - val_accuracy: 0.8379
Epoch 247/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4931 - accuracy: 0.7716 - val_loss: 0.4443 - val_accuracy: 0.8363
Epoch 248/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4897 - accuracy: 0.7819 - val_loss: 0.4438 - val_accuracy: 0.8371
Epoch 249/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4918 - accuracy: 0.7796 - val_loss: 0.4432 - val_accuracy: 0.8379
Epoch 250/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4944 - accuracy: 0.7796 - val_loss: 0.4425 - val_accuracy: 0.8387
Epoch 251/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4890 - accuracy: 0.7859 - val_loss: 0.4414 - val_accuracy: 0.8395
Epoch 252/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4853 - accuracy: 0.7827 - val_loss: 0.4413 - val_accuracy: 0.8435
Epoch 253/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4998 - accuracy: 0.7724 - val_loss: 0.4403 - val_accuracy: 0.8442
Epoch 254/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4831 - accuracy: 0.7875 - val_loss: 0.4400 - val_accuracy: 0.8442
Epoch 255/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4873 - accuracy: 0.7859 - val_loss: 0.4391 - val_accuracy: 0.8466
Epoch 256/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4837 - accuracy: 0.7947 - val_loss: 0.4395 - val_accuracy: 0.8450
Epoch 257/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4875 - accuracy: 0.7891 - val_loss: 0.4396 - val_accuracy: 0.8482
Epoch 258/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4766 - accuracy: 0.7939 - val_loss: 0.4393 - val_accuracy: 0.8474
Epoch 259/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4918 - accuracy: 0.7891 - val_loss: 0.4379 - val_accuracy: 0.8474
Epoch 260/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4890 - accuracy: 0.7891 - val_loss: 0.4383 - val_accuracy: 0.8474
Epoch 261/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4809 - accuracy: 0.7955 - val_loss: 0.4368 - val_accuracy: 0.8482
Epoch 262/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4789 - accuracy: 0.7963 - val_loss: 0.4368 - val_accuracy: 0.8474
Epoch 263/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4847 - accuracy: 0.7971 - val_loss: 0.4360 - val_accuracy: 0.8474
Epoch 264/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4859 - accuracy: 0.7963 - val_loss: 0.4353 - val_accuracy: 0.8490
Epoch 265/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4776 - accuracy: 0.7955 - val_loss: 0.4356 - val_accuracy: 0.8490
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Epoch 266/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4822 - accuracy: 0.7963 - val_loss: 0.4344 - val_accuracy: 0.8490
Epoch 267/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4808 - accuracy: 0.7987 - val_loss: 0.4353 - val_accuracy: 0.8498
Epoch 268/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4759 - accuracy: 0.7963 - val_loss: 0.4342 - val_accuracy: 0.8498
Epoch 269/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4804 - accuracy: 0.8075 - val_loss: 0.4338 - val_accuracy: 0.8514
Epoch 270/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4851 - accuracy: 0.8019 - val_loss: 0.4338 - val_accuracy: 0.8514
Epoch 271/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4756 - accuracy: 0.7995 - val_loss: 0.4329 - val_accuracy: 0.8546
Epoch 272/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4759 - accuracy: 0.8051 - val_loss: 0.4315 - val_accuracy: 0.8578
Epoch 273/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4723 - accuracy: 0.8027 - val_loss: 0.4315 - val_accuracy: 0.8578
Epoch 274/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4815 - accuracy: 0.8035 - val_loss: 0.4312 - val_accuracy: 0.8586
Epoch 275/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4782 - accuracy: 0.8035 - val_loss: 0.4310 - val_accuracy: 0.8578
Epoch 276/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4698 - accuracy: 0.8155 - val_loss: 0.4310 - val_accuracy: 0.8586
Epoch 277/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4782 - accuracy: 0.8059 - val_loss: 0.4308 - val_accuracy: 0.8594
Epoch 278/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4785 - accuracy: 0.8075 - val_loss: 0.4302 - val_accuracy: 0.8586
Epoch 279/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4655 - accuracy: 0.8155 - val_loss: 0.4299 - val_accuracy: 0.8602
Epoch 280/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4735 - accuracy: 0.8019 - val_loss: 0.4290 - val_accuracy: 0.8602
Epoch 281/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4686 - accuracy: 0.8091 - val_loss: 0.4287 - val_accuracy: 0.8602
Epoch 282/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4716 - accuracy: 0.8075 - val_loss: 0.4286 - val_accuracy: 0.8602
Epoch 283/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4809 - accuracy: 0.8035 - val_loss: 0.4277 - val_accuracy: 0.8666
Epoch 284/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4687 - accuracy: 0.8131 - val_loss: 0.4289 - val_accuracy: 0.8602
Epoch 285/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4729 - accuracy: 0.8131 - val_loss: 0.4275 - val_accuracy: 0.8602
Epoch 286/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4694 - accuracy: 0.8099 - val_loss: 0.4266 - val_accuracy: 0.8602
Epoch 287/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4646 - accuracy: 0.8107 - val_loss: 0.4271 - val_accuracy: 0.8618
Epoch 288/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4706 - accuracy: 0.8171 - val_loss: 0.4256 - val_accuracy: 0.8602
Epoch 289/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4719 - accuracy: 0.8107 - val_loss: 0.4253 - val_accuracy: 0.8602
Epoch 290/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4648 - accuracy: 0.8091 - val_loss: 0.4247 - val_accuracy: 0.8610
```

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Epoch 291/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4707 - accuracy: 0.8115 - val_loss: 0.4244 - val_accuracy: 0.8642
Epoch 292/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4584 - accuracy: 0.8171 - val_loss: 0.4244 - val_accuracy: 0.8610
Epoch 293/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4648 - accuracy: 0.8091 - val_loss: 0.4234 - val_accuracy: 0.8682
Epoch 294/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4635 - accuracy: 0.8123 - val_loss: 0.4227 - val_accuracy: 0.8666
Epoch 295/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4664 - accuracy: 0.8203 - val_loss: 0.4226 - val_accuracy: 0.8634
Epoch 296/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4676 - accuracy: 0.8059 - val_loss: 0.4223 - val_accuracy: 0.8666
Epoch 297/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4622 - accuracy: 0.8179 - val_loss: 0.4229 - val_accuracy: 0.8618
Epoch 298/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4705 - accuracy: 0.8107 - val_loss: 0.4226 - val_accuracy: 0.8690
Epoch 299/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4667 - accuracy: 0.8179 - val_loss: 0.4228 - val_accuracy: 0.8682
Epoch 300/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4639 - accuracy: 0.8195 - val_loss: 0.4214 - val_accuracy: 0.8666
Epoch 301/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4608 - accuracy: 0.8203 - val_loss: 0.4213 - val_accuracy: 0.8634
Epoch 302/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4632 - accuracy: 0.8163 - val_loss: 0.4206 - val_accuracy: 0.8650
Epoch 303/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4622 - accuracy: 0.8099 - val_loss: 0.4205 - val_accuracy: 0.8714
Epoch 304/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4642 - accuracy: 0.8203 - val_loss: 0.4202 - val_accuracy: 0.8658
Epoch 305/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4611 - accuracy: 0.8155 - val_loss: 0.4203 - val_accuracy: 0.8642
Epoch 306/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4603 - accuracy: 0.8171 - val_loss: 0.4199 - val_accuracy: 0.8642
Epoch 307/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4615 - accuracy: 0.8195 - val_loss: 0.4196 - val_accuracy: 0.8642
Epoch 308/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4584 - accuracy: 0.8227 - val_loss: 0.4189 - val_accuracy: 0.8634
Epoch 309/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4625 - accuracy: 0.8155 - val_loss: 0.4188 - val_accuracy: 0.8706
Epoch 310/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4508 - accuracy: 0.8243 - val_loss: 0.4184 - val_accuracy: 0.8698
Epoch 311/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4638 - accuracy: 0.8155 - val_loss: 0.4186 - val_accuracy: 0.8698
Epoch 312/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4611 - accuracy: 0.8139 - val_loss: 0.4179 - val_accuracy: 0.8698
Epoch 313/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4559 - accuracy: 0.8203 - val_loss: 0.4169 - val_accuracy: 0.8666
Epoch 314/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4533 - accuracy: 0.8259 - val_loss: 0.4170 - val_accuracy: 0.8650
Epoch 315/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4668 - accuracy: 0.8099 - val_loss: 0.4162 - val_accuracy: 0.8690
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Epoch 316/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4582 - accuracy: 0.8211 - val_loss: 0.4169 - val_accuracy: 0.8650
Epoch 317/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4590 - accuracy: 0.8131 - val_loss: 0.4163 - val_accuracy: 0.8658
Epoch 318/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4575 - accuracy: 0.8091 - val_loss: 0.4153 - val_accuracy: 0.8658
Epoch 319/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4502 - accuracy: 0.8155 - val_loss: 0.4148 - val_accuracy: 0.8698
Epoch 320/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4566 - accuracy: 0.8203 - val_loss: 0.4148 - val_accuracy: 0.8706
Epoch 321/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4528 - accuracy: 0.8211 - val_loss: 0.4140 - val_accuracy: 0.8650
Epoch 322/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4547 - accuracy: 0.8195 - val_loss: 0.4137 - val_accuracy: 0.8650
Epoch 323/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4460 - accuracy: 0.8267 - val_loss: 0.4144 - val_accuracy: 0.8658
Epoch 324/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4590 - accuracy: 0.8107 - val_loss: 0.4136 - val_accuracy: 0.8658
Epoch 325/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4539 - accuracy: 0.8227 - val_loss: 0.4138 - val_accuracy: 0.8666
Epoch 326/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4429 - accuracy: 0.8235 - val_loss: 0.4128 - val_accuracy: 0.8666
Epoch 327/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4449 - accuracy: 0.8291 - val_loss: 0.4126 - val_accuracy: 0.8674
Epoch 328/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4552 - accuracy: 0.8211 - val_loss: 0.4124 - val_accuracy: 0.8658
Epoch 329/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4563 - accuracy: 0.8131 - val_loss: 0.4117 - val_accuracy: 0.8658
Epoch 330/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4507 - accuracy: 0.8235 - val_loss: 0.4106 - val_accuracy: 0.8658
Epoch 331/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4447 - accuracy: 0.8347 - val_loss: 0.4128 - val_accuracy: 0.8666
Epoch 332/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4526 - accuracy: 0.8187 - val_loss: 0.4097 - val_accuracy: 0.8674
Epoch 333/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4437 - accuracy: 0.8315 - val_loss: 0.4087 - val_accuracy: 0.8666
Epoch 334/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4467 - accuracy: 0.8299 - val_loss: 0.4096 - val_accuracy: 0.8658
Epoch 335/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4517 - accuracy: 0.8187 - val_loss: 0.4087 - val_accuracy: 0.8674
Epoch 336/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4374 - accuracy: 0.8275 - val_loss: 0.4098 - val_accuracy: 0.8674
Epoch 337/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4536 - accuracy: 0.8147 - val_loss: 0.4085 - val_accuracy: 0.8666
Epoch 338/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4481 - accuracy: 0.8267 - val_loss: 0.4088 - val_accuracy: 0.8674
Epoch 339/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4517 - accuracy: 0.8219 - val_loss: 0.4086 - val_accuracy: 0.8666
Epoch 340/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4424 - accuracy: 0.8235 - val_loss: 0.4080 - val_accuracy: 0.8682
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Epoch 341/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4499 - accuracy: 0.8291 - val_loss: 0.4076 - val_accuracy: 0.8682
Epoch 342/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4488 - accuracy: 0.8219 - val_loss: 0.4083 - val_accuracy: 0.8674
Epoch 343/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4509 - accuracy: 0.8211 - val_loss: 0.4073 - val_accuracy: 0.8666
Epoch 344/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4464 - accuracy: 0.8203 - val_loss: 0.4074 - val_accuracy: 0.8666
Epoch 345/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4498 - accuracy: 0.8187 - val_loss: 0.4059 - val_accuracy: 0.8674
Epoch 346/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4460 - accuracy: 0.8267 - val_loss: 0.4059 - val_accuracy: 0.8690
Epoch 347/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4418 - accuracy: 0.8259 - val_loss: 0.4064 - val_accuracy: 0.8698
Epoch 348/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4441 - accuracy: 0.8227 - val_loss: 0.4066 - val_accuracy: 0.8690
Epoch 349/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4431 - accuracy: 0.8307 - val_loss: 0.4053 - val_accuracy: 0.8690
Epoch 350/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4406 - accuracy: 0.8283 - val_loss: 0.4050 - val_accuracy: 0.8690
Epoch 351/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4419 - accuracy: 0.8315 - val_loss: 0.4056 - val_accuracy: 0.8690
Epoch 352/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4440 - accuracy: 0.8171 - val_loss: 0.4057 - val_accuracy: 0.8698
Epoch 353/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4401 - accuracy: 0.8259 - val_loss: 0.4048 - val_accuracy: 0.8698
Epoch 354/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4373 - accuracy: 0.8331 - val_loss: 0.4050 - val_accuracy: 0.8706
Epoch 355/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4408 - accuracy: 0.8307 - val_loss: 0.4042 - val_accuracy: 0.8682
Epoch 356/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4443 - accuracy: 0.8235 - val_loss: 0.4032 - val_accuracy: 0.8690
Epoch 357/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4317 - accuracy: 0.8403 - val_loss: 0.4040 - val_accuracy: 0.8682
Epoch 358/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4511 - accuracy: 0.8243 - val_loss: 0.4034 - val_accuracy: 0.8698
Epoch 359/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4390 - accuracy: 0.8299 - val_loss: 0.4037 - val_accuracy: 0.8706
Epoch 360/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4442 - accuracy: 0.8307 - val_loss: 0.4019 - val_accuracy: 0.8706
Epoch 361/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4375 - accuracy: 0.8347 - val_loss: 0.4015 - val_accuracy: 0.8706
Epoch 362/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4344 - accuracy: 0.8347 - val_loss: 0.4012 - val_accuracy: 0.8706
Epoch 363/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4380 - accuracy: 0.8363 - val_loss: 0.4013 - val_accuracy: 0.8706
Epoch 364/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4349 - accuracy: 0.8307 - val_loss: 0.4011 - val_accuracy: 0.8714
Epoch 365/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4382 - accuracy: 0.8323 - val_loss: 0.4028 - val_accuracy: 0.8698
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Epoch 366/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4317 - accuracy: 0.8339 - val_loss: 0.4011 - val_accuracy: 0.8706
Epoch 367/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4381 - accuracy: 0.8211 - val_loss: 0.4021 - val_accuracy: 0.8706
Epoch 368/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4408 - accuracy: 0.8315 - val_loss: 0.4008 - val_accuracy: 0.8690
Epoch 369/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4372 - accuracy: 0.8347 - val_loss: 0.3994 - val_accuracy: 0.8722
Epoch 370/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4309 - accuracy: 0.8331 - val_loss: 0.4011 - val_accuracy: 0.8722
Epoch 371/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4287 - accuracy: 0.8379 - val_loss: 0.4014 - val_accuracy: 0.8698
Epoch 372/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4450 - accuracy: 0.8283 - val_loss: 0.4004 - val_accuracy: 0.8714
Epoch 373/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4378 - accuracy: 0.8299 - val_loss: 0.3999 - val_accuracy: 0.8698
Epoch 374/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4331 - accuracy: 0.8315 - val_loss: 0.3978 - val_accuracy: 0.8698
Epoch 375/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4258 - accuracy: 0.8427 - val_loss: 0.3988 - val_accuracy: 0.8698
Epoch 376/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.4257 - accuracy: 0.8347 - val_loss: 0.3974 - val_accuracy: 0.8706
Epoch 377/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4281 - accuracy: 0.8347 - val_loss: 0.3981 - val_accuracy: 0.8706
Epoch 378/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4294 - accuracy: 0.8347 - val_loss: 0.3984 - val_accuracy: 0.8706
Epoch 379/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4318 - accuracy: 0.8283 - val_loss: 0.3975 - val_accuracy: 0.8714
Epoch 380/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4308 - accuracy: 0.8339 - val_loss: 0.3988 - val_accuracy: 0.8690
Epoch 381/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.4367 - accuracy: 0.8299 - val_loss: 0.3974 - val_accuracy: 0.8722
Epoch 382/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4264 - accuracy: 0.8363 - val_loss: 0.3985 - val_accuracy: 0.8714
Epoch 383/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4357 - accuracy: 0.8347 - val_loss: 0.3968 - val_accuracy: 0.8714
Epoch 384/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4313 - accuracy: 0.8363 - val_loss: 0.3967 - val_accuracy: 0.8714
Epoch 385/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4260 - accuracy: 0.8442 - val_loss: 0.3957 - val_accuracy: 0.8722
Epoch 386/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4275 - accuracy: 0.8379 - val_loss: 0.3953 - val_accuracy: 0.8714
Epoch 387/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4259 - accuracy: 0.8403 - val_loss: 0.3947 - val_accuracy: 0.8746
Epoch 388/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4177 - accuracy: 0.8411 - val_loss: 0.3943 - val_accuracy: 0.8722
Epoch 389/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4319 - accuracy: 0.8355 - val_loss: 0.3952 - val_accuracy: 0.8714
Epoch 390/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4300 - accuracy: 0.8347 - val_loss: 0.3955 - val_accuracy: 0.8722
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Epoch 391/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4246 - accuracy: 0.8387 - val_loss: 0.3959 - val_accuracy: 0.8706
Epoch 392/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4171 - accuracy: 0.8538 - val_loss: 0.3949 - val_accuracy: 0.8730
Epoch 393/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4132 - accuracy: 0.8450 - val_loss: 0.3945 - val_accuracy: 0.8746
Epoch 394/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4236 - accuracy: 0.8450 - val_loss: 0.3929 - val_accuracy: 0.8746
Epoch 395/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4214 - accuracy: 0.8371 - val_loss: 0.3940 - val_accuracy: 0.8746
Epoch 396/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4228 - accuracy: 0.8435 - val_loss: 0.3949 - val_accuracy: 0.8738
Epoch 397/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4188 - accuracy: 0.8427 - val_loss: 0.3924 - val_accuracy: 0.8754
Epoch 398/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4217 - accuracy: 0.8395 - val_loss: 0.3920 - val_accuracy: 0.8778
Epoch 399/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4239 - accuracy: 0.8419 - val_loss: 0.3923 - val_accuracy: 0.8762
Epoch 400/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4183 - accuracy: 0.8458 - val_loss: 0.3935 - val_accuracy: 0.8738
Epoch 401/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4175 - accuracy: 0.8442 - val_loss: 0.3918 - val_accuracy: 0.8746
Epoch 402/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4153 - accuracy: 0.8450 - val_loss: 0.3920 - val_accuracy: 0.8746
Epoch 403/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4266 - accuracy: 0.8371 - val_loss: 0.3921 - val_accuracy: 0.8762
Epoch 404/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4216 - accuracy: 0.8442 - val_loss: 0.3941 - val_accuracy: 0.8730
Epoch 405/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4182 - accuracy: 0.8474 - val_loss: 0.3915 - val_accuracy: 0.8754
Epoch 406/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4215 - accuracy: 0.8482 - val_loss: 0.3915 - val_accuracy: 0.8746
Epoch 407/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4244 - accuracy: 0.8387 - val_loss: 0.3928 - val_accuracy: 0.8754
Epoch 408/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4210 - accuracy: 0.8442 - val_loss: 0.3896 - val_accuracy: 0.8754
Epoch 409/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4089 - accuracy: 0.8506 - val_loss: 0.3909 - val_accuracy: 0.8754
Epoch 410/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4217 - accuracy: 0.8411 - val_loss: 0.3907 - val_accuracy: 0.8746
Epoch 411/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4195 - accuracy: 0.8419 - val_loss: 0.3889 - val_accuracy: 0.8746
Epoch 412/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4105 - accuracy: 0.8506 - val_loss: 0.3886 - val_accuracy: 0.8754
Epoch 413/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4173 - accuracy: 0.8403 - val_loss: 0.3898 - val_accuracy: 0.8746
Epoch 414/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4158 - accuracy: 0.8522 - val_loss: 0.3885 - val_accuracy: 0.8746
Epoch 415/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4122 - accuracy: 0.8450 - val_loss: 0.3909 - val_accuracy: 0.8738
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Epoch 416/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4219 - accuracy: 0.8435 - val_loss: 0.3894 - val_accuracy: 0.8754
Epoch 417/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4151 - accuracy: 0.8474 - val_loss: 0.3904 - val_accuracy: 0.8746
Epoch 418/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4219 - accuracy: 0.8411 - val_loss: 0.3878 - val_accuracy: 0.8770
Epoch 419/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4083 - accuracy: 0.8554 - val_loss: 0.3912 - val_accuracy: 0.8746
Epoch 420/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4154 - accuracy: 0.8522 - val_loss: 0.3903 - val_accuracy: 0.8746
Epoch 421/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4072 - accuracy: 0.8514 - val_loss: 0.3874 - val_accuracy: 0.8738
Epoch 422/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4097 - accuracy: 0.8490 - val_loss: 0.3881 - val_accuracy: 0.8738
Epoch 423/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4060 - accuracy: 0.8442 - val_loss: 0.3880 - val_accuracy: 0.8738
Epoch 424/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4236 - accuracy: 0.8466 - val_loss: 0.3876 - val_accuracy: 0.8762
Epoch 425/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4057 - accuracy: 0.8610 - val_loss: 0.3885 - val_accuracy: 0.8746
Epoch 426/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4202 - accuracy: 0.8474 - val_loss: 0.3881 - val_accuracy: 0.8762
Epoch 427/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4066 - accuracy: 0.8586 - val_loss: 0.3875 - val_accuracy: 0.8762
Epoch 428/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4224 - accuracy: 0.8458 - val_loss: 0.3869 - val_accuracy: 0.8818
Epoch 429/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4043 - accuracy: 0.8618 - val_loss: 0.3873 - val_accuracy: 0.8754
Epoch 430/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4078 - accuracy: 0.8530 - val_loss: 0.3875 - val_accuracy: 0.8770
Epoch 431/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4118 - accuracy: 0.8530 - val_loss: 0.3873 - val_accuracy: 0.8770
Epoch 432/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4098 - accuracy: 0.8530 - val_loss: 0.3865 - val_accuracy: 0.8762
Epoch 433/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4076 - accuracy: 0.8522 - val_loss: 0.3871 - val_accuracy: 0.8762
Epoch 434/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4142 - accuracy: 0.8466 - val_loss: 0.3850 - val_accuracy: 0.8778
Epoch 435/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4091 - accuracy: 0.8514 - val_loss: 0.3853 - val_accuracy: 0.8794
Epoch 436/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4026 - accuracy: 0.8610 - val_loss: 0.3861 - val_accuracy: 0.8762
Epoch 437/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3988 - accuracy: 0.8586 - val_loss: 0.3846 - val_accuracy: 0.8786
Epoch 438/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3929 - accuracy: 0.8618 - val_loss: 0.3850 - val_accuracy: 0.8770
Epoch 439/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4045 - accuracy: 0.8530 - val_loss: 0.3843 - val_accuracy: 0.8770
Epoch 440/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4021 - accuracy: 0.8666 - val_loss: 0.3841 - val_accuracy: 0.8770
```

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Epoch 441/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4062 - accuracy: 0.8498 - val_loss: 0.3845 - val_accuracy: 0.8778
Epoch 442/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4032 - accuracy: 0.8538 - val_loss: 0.3840 - val_accuracy: 0.8778
Epoch 443/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4125 - accuracy: 0.8442 - val_loss: 0.3854 - val_accuracy: 0.8778
Epoch 444/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4097 - accuracy: 0.8490 - val_loss: 0.3840 - val_accuracy: 0.8786
Epoch 445/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4022 - accuracy: 0.8578 - val_loss: 0.3839 - val_accuracy: 0.8810
Epoch 446/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3971 - accuracy: 0.8570 - val_loss: 0.3847 - val_accuracy: 0.8786
Epoch 447/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4138 - accuracy: 0.8538 - val_loss: 0.3864 - val_accuracy: 0.8794
Epoch 448/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4126 - accuracy: 0.8498 - val_loss: 0.3833 - val_accuracy: 0.8786
Epoch 449/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4002 - accuracy: 0.8602 - val_loss: 0.3825 - val_accuracy: 0.8786
Epoch 450/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3984 - accuracy: 0.8642 - val_loss: 0.3844 - val_accuracy: 0.8770
Epoch 451/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4096 - accuracy: 0.8522 - val_loss: 0.3830 - val_accuracy: 0.8818
Epoch 452/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3948 - accuracy: 0.8594 - val_loss: 0.3830 - val_accuracy: 0.8786
Epoch 453/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4014 - accuracy: 0.8570 - val_loss: 0.3824 - val_accuracy: 0.8786
Epoch 454/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3940 - accuracy: 0.8626 - val_loss: 0.3817 - val_accuracy: 0.8810
Epoch 455/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3951 - accuracy: 0.8562 - val_loss: 0.3826 - val_accuracy: 0.8794
Epoch 456/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3959 - accuracy: 0.8626 - val_loss: 0.3841 - val_accuracy: 0.8762
Epoch 457/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4069 - accuracy: 0.8482 - val_loss: 0.3817 - val_accuracy: 0.8794
Epoch 458/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3902 - accuracy: 0.8570 - val_loss: 0.3840 - val_accuracy: 0.8778
Epoch 459/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4120 - accuracy: 0.8450 - val_loss: 0.3842 - val_accuracy: 0.8778
Epoch 460/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4054 - accuracy: 0.8546 - val_loss: 0.3826 - val_accuracy: 0.8762
Epoch 461/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3991 - accuracy: 0.8626 - val_loss: 0.3844 - val_accuracy: 0.8778
Epoch 462/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3961 - accuracy: 0.8682 - val_loss: 0.3805 - val_accuracy: 0.8778
Epoch 463/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3937 - accuracy: 0.8594 - val_loss: 0.3804 - val_accuracy: 0.8794
Epoch 464/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3976 - accuracy: 0.8618 - val_loss: 0.3811 - val_accuracy: 0.8786
Epoch 465/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3963 - accuracy: 0.8586 - val_loss: 0.3820 - val_accuracy: 0.8770
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Epoch 466/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3928 - accuracy: 0.8610 - val_loss: 0.3814 - val_accuracy: 0.8778
Epoch 467/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3946 - accuracy: 0.8586 - val_loss: 0.3820 - val_accuracy: 0.8762
Epoch 468/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3956 - accuracy: 0.8594 - val_loss: 0.3819 - val_accuracy: 0.8770
Epoch 469/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4053 - accuracy: 0.8562 - val_loss: 0.3807 - val_accuracy: 0.8786
Epoch 470/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3875 - accuracy: 0.8690 - val_loss: 0.3788 - val_accuracy: 0.8818
Epoch 471/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3828 - accuracy: 0.8642 - val_loss: 0.3791 - val_accuracy: 0.8818
Epoch 472/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4072 - accuracy: 0.8538 - val_loss: 0.3793 - val_accuracy: 0.8778
Epoch 473/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3813 - accuracy: 0.8674 - val_loss: 0.3790 - val_accuracy: 0.8802
Epoch 474/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3930 - accuracy: 0.8610 - val_loss: 0.3806 - val_accuracy: 0.8794
Epoch 475/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3826 - accuracy: 0.8730 - val_loss: 0.3777 - val_accuracy: 0.8786
Epoch 476/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3902 - accuracy: 0.8634 - val_loss: 0.3804 - val_accuracy: 0.8786
Epoch 477/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3973 - accuracy: 0.8570 - val_loss: 0.3779 - val_accuracy: 0.8842
Epoch 478/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3830 - accuracy: 0.8690 - val_loss: 0.3796 - val_accuracy: 0.8778
Epoch 479/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3952 - accuracy: 0.8602 - val_loss: 0.3788 - val_accuracy: 0.8826
Epoch 480/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3906 - accuracy: 0.8658 - val_loss: 0.3789 - val_accuracy: 0.8794
Epoch 481/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3831 - accuracy: 0.8658 - val_loss: 0.3791 - val_accuracy: 0.8810
Epoch 482/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3928 - accuracy: 0.8642 - val_loss: 0.3780 - val_accuracy: 0.8842
Epoch 483/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3866 - accuracy: 0.8674 - val_loss: 0.3793 - val_accuracy: 0.8794
Epoch 484/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3955 - accuracy: 0.8586 - val_loss: 0.3768 - val_accuracy: 0.8834
Epoch 485/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3884 - accuracy: 0.8706 - val_loss: 0.3803 - val_accuracy: 0.8778
Epoch 486/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.4073 - accuracy: 0.8514 - val_loss: 0.3779 - val_accuracy: 0.8818
Epoch 487/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3856 - accuracy: 0.8650 - val_loss: 0.3763 - val_accuracy: 0.8810
Epoch 488/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3793 - accuracy: 0.8754 - val_loss: 0.3772 - val_accuracy: 0.8786
Epoch 489/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3910 - accuracy: 0.8626 - val_loss: 0.3778 - val_accuracy: 0.8826
Epoch 490/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3997 - accuracy: 0.8642 - val_loss: 0.3775 - val_accuracy: 0.8810
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Epoch 491/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3845 - accuracy: 0.8650 - val_loss: 0.3770 - val_accuracy: 0.8818
Epoch 492/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3970 - accuracy: 0.8634 - val_loss: 0.3771 - val_accuracy: 0.8810
Epoch 493/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3828 - accuracy: 0.8674 - val_loss: 0.3761 - val_accuracy: 0.8842
Epoch 494/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3921 - accuracy: 0.8634 - val_loss: 0.3770 - val_accuracy: 0.8842
Epoch 495/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3768 - accuracy: 0.8746 - val_loss: 0.3801 - val_accuracy: 0.8810
Epoch 496/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3881 - accuracy: 0.8658 - val_loss: 0.3779 - val_accuracy: 0.8802
Epoch 497/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3989 - accuracy: 0.8586 - val_loss: 0.3762 - val_accuracy: 0.8842
Epoch 498/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3973 - accuracy: 0.8594 - val_loss: 0.3790 - val_accuracy: 0.8786
Epoch 499/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3825 - accuracy: 0.8682 - val_loss: 0.3751 - val_accuracy: 0.8826
Epoch 500/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3768 - accuracy: 0.8778 - val_loss: 0.3767 - val_accuracy: 0.8842
Epoch 501/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3855 - accuracy: 0.8714 - val_loss: 0.3772 - val_accuracy: 0.8794
Epoch 502/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3845 - accuracy: 0.8626 - val_loss: 0.3786 - val_accuracy: 0.8818
Epoch 503/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3879 - accuracy: 0.8618 - val_loss: 0.3778 - val_accuracy: 0.8810
Epoch 504/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3830 - accuracy: 0.8714 - val_loss: 0.3748 - val_accuracy: 0.8826
Epoch 505/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3767 - accuracy: 0.8706 - val_loss: 0.3752 - val_accuracy: 0.8842
Epoch 506/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3758 - accuracy: 0.8794 - val_loss: 0.3757 - val_accuracy: 0.8802
Epoch 507/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3839 - accuracy: 0.8690 - val_loss: 0.3746 - val_accuracy: 0.8810
Epoch 508/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3805 - accuracy: 0.8658 - val_loss: 0.3762 - val_accuracy: 0.8842
Epoch 509/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3854 - accuracy: 0.8666 - val_loss: 0.3744 - val_accuracy: 0.8842
Epoch 510/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3747 - accuracy: 0.8730 - val_loss: 0.3771 - val_accuracy: 0.8834
Epoch 511/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3871 - accuracy: 0.8658 - val_loss: 0.3753 - val_accuracy: 0.8810
Epoch 512/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3865 - accuracy: 0.8706 - val_loss: 0.3744 - val_accuracy: 0.8818
Epoch 513/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3710 - accuracy: 0.8762 - val_loss: 0.3735 - val_accuracy: 0.8834
Epoch 514/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3828 - accuracy: 0.8698 - val_loss: 0.3759 - val_accuracy: 0.8834
Epoch 515/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3730 - accuracy: 0.8770 - val_loss: 0.3758 - val_accuracy: 0.8818
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Epoch 516/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3865 - accuracy: 0.8650 - val_loss: 0.3734 - val_accuracy: 0.8850
Epoch 517/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3790 - accuracy: 0.8690 - val_loss: 0.3746 - val_accuracy: 0.8818
Epoch 518/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3770 - accuracy: 0.8746 - val_loss: 0.3758 - val_accuracy: 0.8826
Epoch 519/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3866 - accuracy: 0.8658 - val_loss: 0.3733 - val_accuracy: 0.8858
Epoch 520/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3804 - accuracy: 0.8658 - val_loss: 0.3744 - val_accuracy: 0.8850
Epoch 521/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3781 - accuracy: 0.8746 - val_loss: 0.3752 - val_accuracy: 0.8850
Epoch 522/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3728 - accuracy: 0.8786 - val_loss: 0.3749 - val_accuracy: 0.8858
Epoch 523/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3726 - accuracy: 0.8746 - val_loss: 0.3729 - val_accuracy: 0.8858
Epoch 524/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3843 - accuracy: 0.8674 - val_loss: 0.3740 - val_accuracy: 0.8826
Epoch 525/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3679 - accuracy: 0.8818 - val_loss: 0.3721 - val_accuracy: 0.8834
Epoch 526/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3734 - accuracy: 0.8714 - val_loss: 0.3750 - val_accuracy: 0.8810
Epoch 527/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3779 - accuracy: 0.8754 - val_loss: 0.3766 - val_accuracy: 0.8842
Epoch 528/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3798 - accuracy: 0.8770 - val_loss: 0.3745 - val_accuracy: 0.8834
Epoch 529/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3835 - accuracy: 0.8674 - val_loss: 0.3731 - val_accuracy: 0.8810
Epoch 530/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3809 - accuracy: 0.8650 - val_loss: 0.3728 - val_accuracy: 0.8858
Epoch 531/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3648 - accuracy: 0.8794 - val_loss: 0.3730 - val_accuracy: 0.8826
Epoch 532/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3708 - accuracy: 0.8722 - val_loss: 0.3711 - val_accuracy: 0.8850
Epoch 533/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3707 - accuracy: 0.8794 - val_loss: 0.3739 - val_accuracy: 0.8818
Epoch 534/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3968 - accuracy: 0.8650 - val_loss: 0.3745 - val_accuracy: 0.8818
Epoch 535/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3712 - accuracy: 0.8722 - val_loss: 0.3729 - val_accuracy: 0.8834
Epoch 536/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3834 - accuracy: 0.8674 - val_loss: 0.3757 - val_accuracy: 0.8818
Epoch 537/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3769 - accuracy: 0.8698 - val_loss: 0.3743 - val_accuracy: 0.8826
Epoch 538/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3900 - accuracy: 0.8650 - val_loss: 0.3729 - val_accuracy: 0.8834
Epoch 539/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3752 - accuracy: 0.8714 - val_loss: 0.3688 - val_accuracy: 0.8898
Epoch 540/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3609 - accuracy: 0.8810 - val_loss: 0.3716 - val_accuracy: 0.8874
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Epoch 541/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3670 - accuracy: 0.8770 - val_loss: 0.3724 - val_accuracy: 0.8826
Epoch 542/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3768 - accuracy: 0.8770 - val_loss: 0.3725 - val_accuracy: 0.8834
Epoch 543/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3908 - accuracy: 0.8634 - val_loss: 0.3745 - val_accuracy: 0.8826
Epoch 544/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3811 - accuracy: 0.8698 - val_loss: 0.3713 - val_accuracy: 0.8834
Epoch 545/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3652 - accuracy: 0.8802 - val_loss: 0.3718 - val_accuracy: 0.8826
Epoch 546/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3865 - accuracy: 0.8650 - val_loss: 0.3708 - val_accuracy: 0.8858
Epoch 547/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3706 - accuracy: 0.8762 - val_loss: 0.3703 - val_accuracy: 0.8842
Epoch 548/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3768 - accuracy: 0.8754 - val_loss: 0.3719 - val_accuracy: 0.8842
Epoch 549/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3798 - accuracy: 0.8738 - val_loss: 0.3740 - val_accuracy: 0.8834
Epoch 550/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3740 - accuracy: 0.8778 - val_loss: 0.3727 - val_accuracy: 0.8834
Epoch 551/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3608 - accuracy: 0.8754 - val_loss: 0.3713 - val_accuracy: 0.8850
Epoch 552/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3719 - accuracy: 0.8706 - val_loss: 0.3713 - val_accuracy: 0.8850
Epoch 553/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3616 - accuracy: 0.8818 - val_loss: 0.3705 - val_accuracy: 0.8842
Epoch 554/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3619 - accuracy: 0.8834 - val_loss: 0.3701 - val_accuracy: 0.8858
Epoch 555/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3723 - accuracy: 0.8722 - val_loss: 0.3751 - val_accuracy: 0.8826
Epoch 556/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3872 - accuracy: 0.8650 - val_loss: 0.3717 - val_accuracy: 0.8834
Epoch 557/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3715 - accuracy: 0.8786 - val_loss: 0.3711 - val_accuracy: 0.8818
Epoch 558/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3705 - accuracy: 0.8826 - val_loss: 0.3713 - val_accuracy: 0.8834
Epoch 559/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3720 - accuracy: 0.8706 - val_loss: 0.3688 - val_accuracy: 0.8858
Epoch 560/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3586 - accuracy: 0.8818 - val_loss: 0.3705 - val_accuracy: 0.8810
Epoch 561/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3739 - accuracy: 0.8658 - val_loss: 0.3696 - val_accuracy: 0.8858
Epoch 562/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3595 - accuracy: 0.8810 - val_loss: 0.3673 - val_accuracy: 0.8882
Epoch 563/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3536 - accuracy: 0.8826 - val_loss: 0.3689 - val_accuracy: 0.8882
Epoch 564/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3611 - accuracy: 0.8818 - val_loss: 0.3686 - val_accuracy: 0.8874
Epoch 565/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3609 - accuracy: 0.8802 - val_loss: 0.3695 - val_accuracy: 0.8874
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Epoch 566/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3733 - accuracy: 0.8762 - val_loss: 0.3682 - val_accuracy: 0.8874
Epoch 567/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3594 - accuracy: 0.8850 - val_loss: 0.3728 - val_accuracy: 0.8850
Epoch 568/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3742 - accuracy: 0.8698 - val_loss: 0.3706 - val_accuracy: 0.8850
Epoch 569/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3639 - accuracy: 0.8842 - val_loss: 0.3705 - val_accuracy: 0.8842
Epoch 570/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3750 - accuracy: 0.8722 - val_loss: 0.3711 - val_accuracy: 0.8850
Epoch 571/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3714 - accuracy: 0.8714 - val_loss: 0.3648 - val_accuracy: 0.8882
Epoch 572/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3664 - accuracy: 0.8818 - val_loss: 0.3694 - val_accuracy: 0.8866
Epoch 573/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3589 - accuracy: 0.8810 - val_loss: 0.3702 - val_accuracy: 0.8834
Epoch 574/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3703 - accuracy: 0.8738 - val_loss: 0.3738 - val_accuracy: 0.8818
Epoch 575/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3650 - accuracy: 0.8658 - val_loss: 0.3672 - val_accuracy: 0.8858
Epoch 576/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3608 - accuracy: 0.8834 - val_loss: 0.3705 - val_accuracy: 0.8826
Epoch 577/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3625 - accuracy: 0.8794 - val_loss: 0.3691 - val_accuracy: 0.8866
Epoch 578/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3652 - accuracy: 0.8778 - val_loss: 0.3703 - val_accuracy: 0.8842
Epoch 579/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3672 - accuracy: 0.8810 - val_loss: 0.3704 - val_accuracy: 0.8874
Epoch 580/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3689 - accuracy: 0.8810 - val_loss: 0.3697 - val_accuracy: 0.8842
Epoch 581/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3620 - accuracy: 0.8834 - val_loss: 0.3696 - val_accuracy: 0.8866
Epoch 582/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3712 - accuracy: 0.8762 - val_loss: 0.3716 - val_accuracy: 0.8826
Epoch 583/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3689 - accuracy: 0.8698 - val_loss: 0.3675 - val_accuracy: 0.8882
Epoch 584/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3557 - accuracy: 0.8818 - val_loss: 0.3689 - val_accuracy: 0.8866
Epoch 585/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3627 - accuracy: 0.8802 - val_loss: 0.3727 - val_accuracy: 0.8826
Epoch 586/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3556 - accuracy: 0.8842 - val_loss: 0.3683 - val_accuracy: 0.8874
Epoch 587/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3596 - accuracy: 0.8882 - val_loss: 0.3724 - val_accuracy: 0.8826
Epoch 588/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3688 - accuracy: 0.8674 - val_loss: 0.3710 - val_accuracy: 0.8858
Epoch 589/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3717 - accuracy: 0.8754 - val_loss: 0.3700 - val_accuracy: 0.8850
Epoch 590/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3569 - accuracy: 0.8794 - val_loss: 0.3690 - val_accuracy: 0.8890
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Epoch 591/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3580 - accuracy: 0.8802 - val_loss: 0.3737 - val_accuracy: 0.8834
Epoch 592/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3716 - accuracy: 0.8722 - val_loss: 0.3683 - val_accuracy: 0.8858
Epoch 593/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3567 - accuracy: 0.8842 - val_loss: 0.3676 - val_accuracy: 0.8882
Epoch 594/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3637 - accuracy: 0.8786 - val_loss: 0.3679 - val_accuracy: 0.8866
Epoch 595/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3636 - accuracy: 0.8802 - val_loss: 0.3685 - val_accuracy: 0.8866
Epoch 596/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3523 - accuracy: 0.8834 - val_loss: 0.3702 - val_accuracy: 0.8842
Epoch 597/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3616 - accuracy: 0.8866 - val_loss: 0.3681 - val_accuracy: 0.8890
Epoch 598/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3614 - accuracy: 0.8738 - val_loss: 0.3699 - val_accuracy: 0.8866
Epoch 599/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3511 - accuracy: 0.8834 - val_loss: 0.3711 - val_accuracy: 0.8818
Epoch 600/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3592 - accuracy: 0.8850 - val_loss: 0.3727 - val_accuracy: 0.8850
Epoch 601/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3651 - accuracy: 0.8818 - val_loss: 0.3679 - val_accuracy: 0.8866
Epoch 602/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3584 - accuracy: 0.8842 - val_loss: 0.3685 - val_accuracy: 0.8882
Epoch 603/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3557 - accuracy: 0.8882 - val_loss: 0.3703 - val_accuracy: 0.8850
Epoch 604/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3562 - accuracy: 0.8818 - val_loss: 0.3683 - val_accuracy: 0.8882
Epoch 605/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3456 - accuracy: 0.8874 - val_loss: 0.3707 - val_accuracy: 0.8882
Epoch 606/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3626 - accuracy: 0.8746 - val_loss: 0.3704 - val_accuracy: 0.8882
Epoch 607/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3691 - accuracy: 0.8746 - val_loss: 0.3681 - val_accuracy: 0.8898
Epoch 608/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3593 - accuracy: 0.8754 - val_loss: 0.3689 - val_accuracy: 0.8882
Epoch 609/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3656 - accuracy: 0.8834 - val_loss: 0.3693 - val_accuracy: 0.8898
Epoch 610/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3641 - accuracy: 0.8722 - val_loss: 0.3710 - val_accuracy: 0.8882
Epoch 611/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3469 - accuracy: 0.8938 - val_loss: 0.3669 - val_accuracy: 0.8882
Epoch 612/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3588 - accuracy: 0.8810 - val_loss: 0.3669 - val_accuracy: 0.8914
Epoch 613/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3611 - accuracy: 0.8802 - val_loss: 0.3677 - val_accuracy: 0.8890
Epoch 614/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3642 - accuracy: 0.8698 - val_loss: 0.3730 - val_accuracy: 0.8858
Epoch 615/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3570 - accuracy: 0.8858 - val_loss: 0.3689 - val_accuracy: 0.8874
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Epoch 616/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3538 - accuracy: 0.8802 - val_loss: 0.3688 - val_accuracy: 0.8882
Epoch 617/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3650 - accuracy: 0.8802 - val_loss: 0.3689 - val_accuracy: 0.8898
Epoch 618/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3450 - accuracy: 0.8970 - val_loss: 0.3688 - val_accuracy: 0.8906
Epoch 619/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3586 - accuracy: 0.8834 - val_loss: 0.3677 - val_accuracy: 0.8874
Epoch 620/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3539 - accuracy: 0.8866 - val_loss: 0.3686 - val_accuracy: 0.8890
Epoch 621/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3556 - accuracy: 0.8834 - val_loss: 0.3697 - val_accuracy: 0.8890
Epoch 622/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3593 - accuracy: 0.8778 - val_loss: 0.3708 - val_accuracy: 0.8874
Epoch 623/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3584 - accuracy: 0.8818 - val_loss: 0.3684 - val_accuracy: 0.8890
Epoch 624/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3505 - accuracy: 0.8850 - val_loss: 0.3683 - val_accuracy: 0.8914
Epoch 625/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3585 - accuracy: 0.8778 - val_loss: 0.3719 - val_accuracy: 0.8866
Epoch 626/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3632 - accuracy: 0.8818 - val_loss: 0.3730 - val_accuracy: 0.8850
Epoch 627/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3558 - accuracy: 0.8762 - val_loss: 0.3659 - val_accuracy: 0.8890
Epoch 628/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3503 - accuracy: 0.8794 - val_loss: 0.3708 - val_accuracy: 0.8858
Epoch 629/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3645 - accuracy: 0.8810 - val_loss: 0.3645 - val_accuracy: 0.8906
Epoch 630/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3414 - accuracy: 0.8906 - val_loss: 0.3658 - val_accuracy: 0.8906
Epoch 631/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3450 - accuracy: 0.8954 - val_loss: 0.3670 - val_accuracy: 0.8890
Epoch 632/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3496 - accuracy: 0.8882 - val_loss: 0.3699 - val_accuracy: 0.8890
Epoch 633/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3431 - accuracy: 0.8890 - val_loss: 0.3703 - val_accuracy: 0.8866
Epoch 634/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3645 - accuracy: 0.8786 - val_loss: 0.3661 - val_accuracy: 0.8914
Epoch 635/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3422 - accuracy: 0.8874 - val_loss: 0.3670 - val_accuracy: 0.8890
Epoch 636/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3437 - accuracy: 0.8858 - val_loss: 0.3679 - val_accuracy: 0.8914
Epoch 637/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3509 - accuracy: 0.8810 - val_loss: 0.3701 - val_accuracy: 0.8914
Epoch 638/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3547 - accuracy: 0.8842 - val_loss: 0.3694 - val_accuracy: 0.8898
Epoch 639/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3418 - accuracy: 0.8826 - val_loss: 0.3670 - val_accuracy: 0.8914
Epoch 640/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3572 - accuracy: 0.8810 - val_loss: 0.3724 - val_accuracy: 0.8890
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Epoch 641/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3491 - accuracy: 0.8890 - val_loss: 0.3696 - val_accuracy: 0.8906
Epoch 642/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3435 - accuracy: 0.8866 - val_loss: 0.3632 - val_accuracy: 0.8922
Epoch 643/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3377 - accuracy: 0.8938 - val_loss: 0.3663 - val_accuracy: 0.8914
Epoch 644/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3474 - accuracy: 0.8898 - val_loss: 0.3697 - val_accuracy: 0.8882
Epoch 645/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3499 - accuracy: 0.8818 - val_loss: 0.3648 - val_accuracy: 0.8914
Epoch 646/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3518 - accuracy: 0.8882 - val_loss: 0.3679 - val_accuracy: 0.8914
Epoch 647/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3530 - accuracy: 0.8818 - val_loss: 0.3723 - val_accuracy: 0.8850
Epoch 648/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3657 - accuracy: 0.8706 - val_loss: 0.3689 - val_accuracy: 0.8906
Epoch 649/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3433 - accuracy: 0.8866 - val_loss: 0.3670 - val_accuracy: 0.8922
Epoch 650/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3391 - accuracy: 0.8898 - val_loss: 0.3650 - val_accuracy: 0.8914
Epoch 651/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3426 - accuracy: 0.8890 - val_loss: 0.3662 - val_accuracy: 0.8914
Epoch 652/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3405 - accuracy: 0.8914 - val_loss: 0.3682 - val_accuracy: 0.8938
Epoch 653/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3499 - accuracy: 0.8898 - val_loss: 0.3694 - val_accuracy: 0.8882
Epoch 654/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3508 - accuracy: 0.8778 - val_loss: 0.3684 - val_accuracy: 0.8914
Epoch 655/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3381 - accuracy: 0.8890 - val_loss: 0.3685 - val_accuracy: 0.8906
Epoch 656/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3468 - accuracy: 0.8890 - val_loss: 0.3669 - val_accuracy: 0.8922
Epoch 657/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3559 - accuracy: 0.8818 - val_loss: 0.3707 - val_accuracy: 0.8906
Epoch 658/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3461 - accuracy: 0.8858 - val_loss: 0.3677 - val_accuracy: 0.8914
Epoch 659/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3475 - accuracy: 0.8906 - val_loss: 0.3675 - val_accuracy: 0.8938
Epoch 660/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3354 - accuracy: 0.8914 - val_loss: 0.3703 - val_accuracy: 0.8882
Epoch 661/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3487 - accuracy: 0.8826 - val_loss: 0.3707 - val_accuracy: 0.8898
Epoch 662/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3520 - accuracy: 0.8834 - val_loss: 0.3687 - val_accuracy: 0.8914
Epoch 663/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3427 - accuracy: 0.8898 - val_loss: 0.3708 - val_accuracy: 0.8898
Epoch 664/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3530 - accuracy: 0.8850 - val_loss: 0.3679 - val_accuracy: 0.8898
Epoch 665/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3351 - accuracy: 0.8922 - val_loss: 0.3689 - val_accuracy: 0.8906
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Epoch 666/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3528 - accuracy: 0.8890 - val_loss: 0.3684 - val_accuracy: 0.8914
Epoch 667/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3526 - accuracy: 0.8882 - val_loss: 0.3680 - val_accuracy: 0.8930
Epoch 668/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3344 - accuracy: 0.8922 - val_loss: 0.3678 - val_accuracy: 0.8890
Epoch 669/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3387 - accuracy: 0.8954 - val_loss: 0.3672 - val_accuracy: 0.8906
Epoch 670/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3320 - accuracy: 0.8922 - val_loss: 0.3709 - val_accuracy: 0.8906
Epoch 671/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3339 - accuracy: 0.8962 - val_loss: 0.3667 - val_accuracy: 0.8914
Epoch 672/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3376 - accuracy: 0.8874 - val_loss: 0.3697 - val_accuracy: 0.8922
Epoch 673/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3470 - accuracy: 0.8826 - val_loss: 0.3680 - val_accuracy: 0.8914
Epoch 674/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3366 - accuracy: 0.8850 - val_loss: 0.3700 - val_accuracy: 0.8882
Epoch 675/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3555 - accuracy: 0.8794 - val_loss: 0.3676 - val_accuracy: 0.8914
Epoch 676/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3388 - accuracy: 0.8922 - val_loss: 0.3651 - val_accuracy: 0.8898
Epoch 677/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3395 - accuracy: 0.8866 - val_loss: 0.3701 - val_accuracy: 0.8914
Epoch 678/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3518 - accuracy: 0.8842 - val_loss: 0.3674 - val_accuracy: 0.8898
Epoch 679/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3434 - accuracy: 0.8922 - val_loss: 0.3692 - val_accuracy: 0.8914
Epoch 680/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3451 - accuracy: 0.8866 - val_loss: 0.3631 - val_accuracy: 0.8914
Epoch 681/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3193 - accuracy: 0.9018 - val_loss: 0.3696 - val_accuracy: 0.8898
Epoch 682/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3645 - accuracy: 0.8802 - val_loss: 0.3707 - val_accuracy: 0.8906
Epoch 683/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3309 - accuracy: 0.8882 - val_loss: 0.3694 - val_accuracy: 0.8914
Epoch 684/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3457 - accuracy: 0.8858 - val_loss: 0.3646 - val_accuracy: 0.8930
Epoch 685/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3323 - accuracy: 0.8994 - val_loss: 0.3676 - val_accuracy: 0.8930
Epoch 686/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3409 - accuracy: 0.8874 - val_loss: 0.3667 - val_accuracy: 0.8914
Epoch 687/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3325 - accuracy: 0.8922 - val_loss: 0.3677 - val_accuracy: 0.8906
Epoch 688/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3432 - accuracy: 0.8930 - val_loss: 0.3676 - val_accuracy: 0.8930
Epoch 689/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3339 - accuracy: 0.8962 - val_loss: 0.3680 - val_accuracy: 0.8930
Epoch 690/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3498 - accuracy: 0.8866 - val_loss: 0.3662 - val_accuracy: 0.8922
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Epoch 691/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3342 - accuracy: 0.8946 - val_loss: 0.3654 - val_accuracy: 0.8922
Epoch 692/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3439 - accuracy: 0.8890 - val_loss: 0.3692 - val_accuracy: 0.8922
Epoch 693/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3347 - accuracy: 0.8946 - val_loss: 0.3679 - val_accuracy: 0.8914
Epoch 694/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3302 - accuracy: 0.9002 - val_loss: 0.3743 - val_accuracy: 0.8874
Epoch 695/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3486 - accuracy: 0.8826 - val_loss: 0.3677 - val_accuracy: 0.8898
Epoch 696/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3334 - accuracy: 0.8922 - val_loss: 0.3649 - val_accuracy: 0.8914
Epoch 697/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3349 - accuracy: 0.8970 - val_loss: 0.3697 - val_accuracy: 0.8898
Epoch 698/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3502 - accuracy: 0.8818 - val_loss: 0.3708 - val_accuracy: 0.8914
Epoch 699/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3273 - accuracy: 0.8962 - val_loss: 0.3690 - val_accuracy: 0.8906
Epoch 700/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3325 - accuracy: 0.8994 - val_loss: 0.3656 - val_accuracy: 0.8922
Epoch 701/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3269 - accuracy: 0.8938 - val_loss: 0.3644 - val_accuracy: 0.8922
Epoch 702/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3269 - accuracy: 0.8954 - val_loss: 0.3657 - val_accuracy: 0.8922
Epoch 703/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3400 - accuracy: 0.8898 - val_loss: 0.3683 - val_accuracy: 0.8922
Epoch 704/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3442 - accuracy: 0.8874 - val_loss: 0.3662 - val_accuracy: 0.8922
Epoch 705/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3314 - accuracy: 0.8922 - val_loss: 0.3668 - val_accuracy: 0.8898
Epoch 706/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3366 - accuracy: 0.8930 - val_loss: 0.3704 - val_accuracy: 0.8906
Epoch 707/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3488 - accuracy: 0.8850 - val_loss: 0.3677 - val_accuracy: 0.8914
Epoch 708/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3352 - accuracy: 0.8946 - val_loss: 0.3687 - val_accuracy: 0.8906
Epoch 709/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3394 - accuracy: 0.8898 - val_loss: 0.3735 - val_accuracy: 0.8914
Epoch 710/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3374 - accuracy: 0.8882 - val_loss: 0.3666 - val_accuracy: 0.8914
Epoch 711/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3256 - accuracy: 0.9010 - val_loss: 0.3722 - val_accuracy: 0.8882
Epoch 712/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3423 - accuracy: 0.8850 - val_loss: 0.3682 - val_accuracy: 0.8922
Epoch 713/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3288 - accuracy: 0.8946 - val_loss: 0.3692 - val_accuracy: 0.8906
Epoch 714/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3245 - accuracy: 0.8978 - val_loss: 0.3729 - val_accuracy: 0.8890
Epoch 715/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3460 - accuracy: 0.8898 - val_loss: 0.3701 - val_accuracy: 0.8906
```

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Epoch 716/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3236 - accuracy: 0.8978 - val_loss: 0.3697 - val_accuracy: 0.8914
Epoch 717/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3378 - accuracy: 0.8922 - val_loss: 0.3696 - val_accuracy: 0.8914
Epoch 718/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3395 - accuracy: 0.8882 - val_loss: 0.3696 - val_accuracy: 0.8898
Epoch 719/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3364 - accuracy: 0.8930 - val_loss: 0.3654 - val_accuracy: 0.8922
Epoch 720/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3287 - accuracy: 0.9002 - val_loss: 0.3694 - val_accuracy: 0.8898
Epoch 721/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3433 - accuracy: 0.8826 - val_loss: 0.3690 - val_accuracy: 0.8898
Epoch 722/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3439 - accuracy: 0.8834 - val_loss: 0.3654 - val_accuracy: 0.8922
Epoch 723/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3290 - accuracy: 0.8970 - val_loss: 0.3672 - val_accuracy: 0.8930
Epoch 724/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3323 - accuracy: 0.8866 - val_loss: 0.3699 - val_accuracy: 0.8906
Epoch 725/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3315 - accuracy: 0.8978 - val_loss: 0.3679 - val_accuracy: 0.8914
Epoch 726/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3295 - accuracy: 0.8938 - val_loss: 0.3655 - val_accuracy: 0.8938
Epoch 727/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3357 - accuracy: 0.8906 - val_loss: 0.3683 - val_accuracy: 0.8938
Epoch 728/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3201 - accuracy: 0.9034 - val_loss: 0.3715 - val_accuracy: 0.8906
Epoch 729/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3293 - accuracy: 0.8930 - val_loss: 0.3717 - val_accuracy: 0.8898
Epoch 730/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3362 - accuracy: 0.8858 - val_loss: 0.3701 - val_accuracy: 0.8922
Epoch 731/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3254 - accuracy: 0.8994 - val_loss: 0.3691 - val_accuracy: 0.8906
Epoch 732/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3425 - accuracy: 0.8882 - val_loss: 0.3740 - val_accuracy: 0.8898
Epoch 733/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3418 - accuracy: 0.8906 - val_loss: 0.3667 - val_accuracy: 0.8922
Epoch 734/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3197 - accuracy: 0.9034 - val_loss: 0.3624 - val_accuracy: 0.8962
Epoch 735/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3235 - accuracy: 0.9018 - val_loss: 0.3722 - val_accuracy: 0.8922
Epoch 736/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3345 - accuracy: 0.8890 - val_loss: 0.3695 - val_accuracy: 0.8930
Epoch 737/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3316 - accuracy: 0.8898 - val_loss: 0.3760 - val_accuracy: 0.8882
Epoch 738/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3462 - accuracy: 0.8826 - val_loss: 0.3705 - val_accuracy: 0.8922
Epoch 739/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3303 - accuracy: 0.8970 - val_loss: 0.3727 - val_accuracy: 0.8930
Epoch 740/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3351 - accuracy: 0.8914 - val_loss: 0.3710 - val_accuracy: 0.8914
```

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Epoch 741/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3354 - accuracy: 0.8922 - val_loss: 0.3714 - val_accuracy: 0.8938
Epoch 742/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3425 - accuracy: 0.8874 - val_loss: 0.3676 - val_accuracy: 0.8922
Epoch 743/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3300 - accuracy: 0.8938 - val_loss: 0.3692 - val_accuracy: 0.8930
Epoch 744/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3338 - accuracy: 0.8898 - val_loss: 0.3692 - val_accuracy: 0.8930
Epoch 745/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3333 - accuracy: 0.8930 - val_loss: 0.3681 - val_accuracy: 0.8922
Epoch 746/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3301 - accuracy: 0.8938 - val_loss: 0.3652 - val_accuracy: 0.8946
Epoch 747/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3198 - accuracy: 0.9002 - val_loss: 0.3689 - val_accuracy: 0.8906
Epoch 748/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3268 - accuracy: 0.8978 - val_loss: 0.3666 - val_accuracy: 0.8930
Epoch 749/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3126 - accuracy: 0.8978 - val_loss: 0.3651 - val_accuracy: 0.8922
Epoch 750/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3281 - accuracy: 0.8938 - val_loss: 0.3715 - val_accuracy: 0.8898
Epoch 751/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3363 - accuracy: 0.8858 - val_loss: 0.3647 - val_accuracy: 0.8930
Epoch 752/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3182 - accuracy: 0.9018 - val_loss: 0.3717 - val_accuracy: 0.8938
Epoch 753/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3216 - accuracy: 0.9042 - val_loss: 0.3729 - val_accuracy: 0.8914
Epoch 754/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3391 - accuracy: 0.8858 - val_loss: 0.3695 - val_accuracy: 0.8922
Epoch 755/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3270 - accuracy: 0.8994 - val_loss: 0.3662 - val_accuracy: 0.8954
Epoch 756/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3311 - accuracy: 0.8978 - val_loss: 0.3698 - val_accuracy: 0.8938
Epoch 757/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3423 - accuracy: 0.8898 - val_loss: 0.3677 - val_accuracy: 0.8954
Epoch 758/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3295 - accuracy: 0.8938 - val_loss: 0.3665 - val_accuracy: 0.8930
Epoch 759/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3338 - accuracy: 0.8898 - val_loss: 0.3692 - val_accuracy: 0.8922
Epoch 760/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3281 - accuracy: 0.8946 - val_loss: 0.3691 - val_accuracy: 0.8922
Epoch 761/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3357 - accuracy: 0.8930 - val_loss: 0.3710 - val_accuracy: 0.8906
Epoch 762/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3253 - accuracy: 0.8970 - val_loss: 0.3679 - val_accuracy: 0.8930
Epoch 763/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3240 - accuracy: 0.8962 - val_loss: 0.3672 - val_accuracy: 0.8954
Epoch 764/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3193 - accuracy: 0.9002 - val_loss: 0.3676 - val_accuracy: 0.8930
Epoch 765/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3169 - accuracy: 0.8970 - val_loss: 0.3706 - val_accuracy: 0.8914
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Epoch 766/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3267 - accuracy: 0.8962 - val_loss: 0.3711 - val_accuracy: 0.8938
Epoch 767/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3216 - accuracy: 0.9026 - val_loss: 0.3708 - val_accuracy: 0.8922
Epoch 768/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3421 - accuracy: 0.8786 - val_loss: 0.3686 - val_accuracy: 0.8946
Epoch 769/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3317 - accuracy: 0.8946 - val_loss: 0.3657 - val_accuracy: 0.8938
Epoch 770/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3313 - accuracy: 0.8946 - val_loss: 0.3683 - val_accuracy: 0.8922
Epoch 771/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3231 - accuracy: 0.8978 - val_loss: 0.3638 - val_accuracy: 0.8938
Epoch 772/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3229 - accuracy: 0.9058 - val_loss: 0.3698 - val_accuracy: 0.8922
Epoch 773/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3293 - accuracy: 0.8970 - val_loss: 0.3671 - val_accuracy: 0.8930
Epoch 774/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3252 - accuracy: 0.8970 - val_loss: 0.3670 - val_accuracy: 0.8938
Epoch 775/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3181 - accuracy: 0.9002 - val_loss: 0.3755 - val_accuracy: 0.8914
Epoch 776/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3438 - accuracy: 0.8802 - val_loss: 0.3694 - val_accuracy: 0.8938
Epoch 777/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3161 - accuracy: 0.9026 - val_loss: 0.3691 - val_accuracy: 0.8946
Epoch 778/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3114 - accuracy: 0.9018 - val_loss: 0.3689 - val_accuracy: 0.8930
Epoch 779/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3252 - accuracy: 0.9010 - val_loss: 0.3704 - val_accuracy: 0.8938
Epoch 780/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3327 - accuracy: 0.8930 - val_loss: 0.3694 - val_accuracy: 0.8930
Epoch 781/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3259 - accuracy: 0.9010 - val_loss: 0.3650 - val_accuracy: 0.8938
Epoch 782/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3027 - accuracy: 0.9058 - val_loss: 0.3741 - val_accuracy: 0.8922
Epoch 783/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3265 - accuracy: 0.8978 - val_loss: 0.3693 - val_accuracy: 0.8938
Epoch 784/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3170 - accuracy: 0.8994 - val_loss: 0.3677 - val_accuracy: 0.8930
Epoch 785/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3175 - accuracy: 0.8954 - val_loss: 0.3730 - val_accuracy: 0.8930
Epoch 786/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3272 - accuracy: 0.8970 - val_loss: 0.3648 - val_accuracy: 0.8954
Epoch 787/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3185 - accuracy: 0.9002 - val_loss: 0.3719 - val_accuracy: 0.8930
Epoch 788/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3206 - accuracy: 0.8954 - val_loss: 0.3688 - val_accuracy: 0.8938
Epoch 789/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3122 - accuracy: 0.9073 - val_loss: 0.3721 - val_accuracy: 0.8930
Epoch 790/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3261 - accuracy: 0.8938 - val_loss: 0.3726 - val_accuracy: 0.8938
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Epoch 791/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3241 - accuracy: 0.8922 - val_loss: 0.3717 - val_accuracy: 0.8922
Epoch 792/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3236 - accuracy: 0.8970 - val_loss: 0.3682 - val_accuracy: 0.8946
Epoch 793/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3187 - accuracy: 0.9042 - val_loss: 0.3692 - val_accuracy: 0.8922
Epoch 794/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3246 - accuracy: 0.9073 - val_loss: 0.3629 - val_accuracy: 0.8962
Epoch 795/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3010 - accuracy: 0.9097 - val_loss: 0.3702 - val_accuracy: 0.8938
Epoch 796/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3239 - accuracy: 0.8970 - val_loss: 0.3699 - val_accuracy: 0.8930
Epoch 797/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3393 - accuracy: 0.8922 - val_loss: 0.3666 - val_accuracy: 0.8962
Epoch 798/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3221 - accuracy: 0.9050 - val_loss: 0.3642 - val_accuracy: 0.8946
Epoch 799/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3217 - accuracy: 0.9010 - val_loss: 0.3696 - val_accuracy: 0.8938
Epoch 800/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3271 - accuracy: 0.8962 - val_loss: 0.3677 - val_accuracy: 0.8938
Epoch 801/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3256 - accuracy: 0.8946 - val_loss: 0.3703 - val_accuracy: 0.8946
Epoch 802/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3201 - accuracy: 0.9065 - val_loss: 0.3748 - val_accuracy: 0.8922
Epoch 803/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3263 - accuracy: 0.8970 - val_loss: 0.3720 - val_accuracy: 0.8930
Epoch 804/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3214 - accuracy: 0.8994 - val_loss: 0.3691 - val_accuracy: 0.8930
Epoch 805/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3269 - accuracy: 0.8914 - val_loss: 0.3664 - val_accuracy: 0.8954
Epoch 806/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3201 - accuracy: 0.8954 - val_loss: 0.3705 - val_accuracy: 0.8938
Epoch 807/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3193 - accuracy: 0.8994 - val_loss: 0.3704 - val_accuracy: 0.8914
Epoch 808/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3327 - accuracy: 0.8890 - val_loss: 0.3741 - val_accuracy: 0.8938
Epoch 809/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3226 - accuracy: 0.8994 - val_loss: 0.3648 - val_accuracy: 0.8938
Epoch 810/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3087 - accuracy: 0.9065 - val_loss: 0.3674 - val_accuracy: 0.8954
Epoch 811/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3079 - accuracy: 0.9034 - val_loss: 0.3691 - val_accuracy: 0.8930
Epoch 812/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3200 - accuracy: 0.9042 - val_loss: 0.3685 - val_accuracy: 0.8946
Epoch 813/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3155 - accuracy: 0.9034 - val_loss: 0.3695 - val_accuracy: 0.8946
Epoch 814/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3165 - accuracy: 0.8970 - val_loss: 0.3739 - val_accuracy: 0.8922
Epoch 815/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3325 - accuracy: 0.8906 - val_loss: 0.3717 - val_accuracy: 0.8954
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Epoch 816/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3272 - accuracy: 0.8946 - val_loss: 0.3666 - val_accuracy: 0.8954
Epoch 817/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3055 - accuracy: 0.9065 - val_loss: 0.3639 - val_accuracy: 0.8970
Epoch 818/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3040 - accuracy: 0.9105 - val_loss: 0.3667 - val_accuracy: 0.8954
Epoch 819/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3230 - accuracy: 0.8978 - val_loss: 0.3667 - val_accuracy: 0.8954
Epoch 820/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2965 - accuracy: 0.9129 - val_loss: 0.3621 - val_accuracy: 0.8962
Epoch 821/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2905 - accuracy: 0.9105 - val_loss: 0.3766 - val_accuracy: 0.8930
Epoch 822/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3189 - accuracy: 0.8994 - val_loss: 0.3689 - val_accuracy: 0.8954
Epoch 823/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3116 - accuracy: 0.9042 - val_loss: 0.3743 - val_accuracy: 0.8954
Epoch 824/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3399 - accuracy: 0.8906 - val_loss: 0.3678 - val_accuracy: 0.8930
Epoch 825/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3056 - accuracy: 0.9073 - val_loss: 0.3724 - val_accuracy: 0.8938
Epoch 826/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3159 - accuracy: 0.9081 - val_loss: 0.3692 - val_accuracy: 0.8938
Epoch 827/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3215 - accuracy: 0.8954 - val_loss: 0.3687 - val_accuracy: 0.8962
Epoch 828/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3115 - accuracy: 0.9058 - val_loss: 0.3653 - val_accuracy: 0.8970
Epoch 829/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3024 - accuracy: 0.9089 - val_loss: 0.3704 - val_accuracy: 0.8954
Epoch 830/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3256 - accuracy: 0.8954 - val_loss: 0.3708 - val_accuracy: 0.8962
Epoch 831/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3155 - accuracy: 0.8994 - val_loss: 0.3710 - val_accuracy: 0.8954
Epoch 832/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3093 - accuracy: 0.9010 - val_loss: 0.3675 - val_accuracy: 0.8954
Epoch 833/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3164 - accuracy: 0.8970 - val_loss: 0.3721 - val_accuracy: 0.8954
Epoch 834/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3229 - accuracy: 0.9034 - val_loss: 0.3751 - val_accuracy: 0.8938
Epoch 835/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3354 - accuracy: 0.8890 - val_loss: 0.3713 - val_accuracy: 0.8938
Epoch 836/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3146 - accuracy: 0.9065 - val_loss: 0.3729 - val_accuracy: 0.8914
Epoch 837/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3041 - accuracy: 0.9105 - val_loss: 0.3712 - val_accuracy: 0.8946
Epoch 838/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3131 - accuracy: 0.9034 - val_loss: 0.3725 - val_accuracy: 0.8946
Epoch 839/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3167 - accuracy: 0.9026 - val_loss: 0.3671 - val_accuracy: 0.8962
Epoch 840/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3245 - accuracy: 0.9026 - val_loss: 0.3674 - val_accuracy: 0.8962
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Epoch 841/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3073 - accuracy: 0.9105 - val_loss: 0.3703 - val_accuracy: 0.8946
Epoch 842/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3090 - accuracy: 0.9050 - val_loss: 0.3676 - val_accuracy: 0.8954
Epoch 843/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3067 - accuracy: 0.9073 - val_loss: 0.3650 - val_accuracy: 0.8962
Epoch 844/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3176 - accuracy: 0.9010 - val_loss: 0.3656 - val_accuracy: 0.8946
Epoch 845/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3251 - accuracy: 0.8946 - val_loss: 0.3684 - val_accuracy: 0.8954
Epoch 846/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3080 - accuracy: 0.9042 - val_loss: 0.3709 - val_accuracy: 0.8938
Epoch 847/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2957 - accuracy: 0.9137 - val_loss: 0.3727 - val_accuracy: 0.8938
Epoch 848/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3120 - accuracy: 0.9042 - val_loss: 0.3690 - val_accuracy: 0.8962
Epoch 849/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3094 - accuracy: 0.9010 - val_loss: 0.3680 - val_accuracy: 0.8954
Epoch 850/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2976 - accuracy: 0.9137 - val_loss: 0.3669 - val_accuracy: 0.8970
Epoch 851/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3166 - accuracy: 0.9034 - val_loss: 0.3686 - val_accuracy: 0.8954
Epoch 852/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3229 - accuracy: 0.8986 - val_loss: 0.3725 - val_accuracy: 0.8938
Epoch 853/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3056 - accuracy: 0.9113 - val_loss: 0.3760 - val_accuracy: 0.8922
Epoch 854/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3348 - accuracy: 0.8946 - val_loss: 0.3684 - val_accuracy: 0.8962
Epoch 855/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3064 - accuracy: 0.9050 - val_loss: 0.3688 - val_accuracy: 0.8938
Epoch 856/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3074 - accuracy: 0.9113 - val_loss: 0.3679 - val_accuracy: 0.8946
Epoch 857/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3006 - accuracy: 0.9121 - val_loss: 0.3731 - val_accuracy: 0.8938
Epoch 858/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3033 - accuracy: 0.9089 - val_loss: 0.3731 - val_accuracy: 0.8938
Epoch 859/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3184 - accuracy: 0.9081 - val_loss: 0.3746 - val_accuracy: 0.8954
Epoch 860/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3278 - accuracy: 0.9018 - val_loss: 0.3748 - val_accuracy: 0.8906
Epoch 861/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3000 - accuracy: 0.9097 - val_loss: 0.3753 - val_accuracy: 0.8914
Epoch 862/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3097 - accuracy: 0.9113 - val_loss: 0.3669 - val_accuracy: 0.8962
Epoch 863/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3041 - accuracy: 0.9081 - val_loss: 0.3693 - val_accuracy: 0.8954
Epoch 864/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3040 - accuracy: 0.9065 - val_loss: 0.3685 - val_accuracy: 0.8970
Epoch 865/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2955 - accuracy: 0.9193 - val_loss: 0.3731 - val_accuracy: 0.8938
```

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Epoch 866/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3159 - accuracy: 0.9026 - val_loss: 0.3712 - val_accuracy: 0.8946
Epoch 867/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3068 - accuracy: 0.9129 - val_loss: 0.3700 - val_accuracy: 0.8946
Epoch 868/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3057 - accuracy: 0.9121 - val_loss: 0.3666 - val_accuracy: 0.8970
Epoch 869/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3176 - accuracy: 0.9073 - val_loss: 0.3661 - val_accuracy: 0.8978
Epoch 870/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3000 - accuracy: 0.9145 - val_loss: 0.3714 - val_accuracy: 0.8946
Epoch 871/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3003 - accuracy: 0.9145 - val_loss: 0.3701 - val_accuracy: 0.8962
Epoch 872/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2956 - accuracy: 0.9105 - val_loss: 0.3776 - val_accuracy: 0.8938
Epoch 873/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3221 - accuracy: 0.9050 - val_loss: 0.3695 - val_accuracy: 0.8954
Epoch 874/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2959 - accuracy: 0.9097 - val_loss: 0.3677 - val_accuracy: 0.8954
Epoch 875/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3084 - accuracy: 0.9042 - val_loss: 0.3697 - val_accuracy: 0.8978
Epoch 876/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3109 - accuracy: 0.9042 - val_loss: 0.3773 - val_accuracy: 0.8930
Epoch 877/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3157 - accuracy: 0.9010 - val_loss: 0.3742 - val_accuracy: 0.8938
Epoch 878/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3170 - accuracy: 0.9065 - val_loss: 0.3707 - val_accuracy: 0.8938
Epoch 879/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3139 - accuracy: 0.9121 - val_loss: 0.3744 - val_accuracy: 0.8954
Epoch 880/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3231 - accuracy: 0.9026 - val_loss: 0.3726 - val_accuracy: 0.8954
Epoch 881/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3129 - accuracy: 0.9042 - val_loss: 0.3698 - val_accuracy: 0.8970
Epoch 882/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3070 - accuracy: 0.9026 - val_loss: 0.3759 - val_accuracy: 0.8914
Epoch 883/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3051 - accuracy: 0.9113 - val_loss: 0.3726 - val_accuracy: 0.8946
Epoch 884/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3236 - accuracy: 0.9010 - val_loss: 0.3679 - val_accuracy: 0.8962
Epoch 885/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2965 - accuracy: 0.9129 - val_loss: 0.3758 - val_accuracy: 0.8938
Epoch 886/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3078 - accuracy: 0.9026 - val_loss: 0.3719 - val_accuracy: 0.8930
Epoch 887/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3017 - accuracy: 0.9097 - val_loss: 0.3696 - val_accuracy: 0.8970
Epoch 888/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3023 - accuracy: 0.9105 - val_loss: 0.3679 - val_accuracy: 0.8962
Epoch 889/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3094 - accuracy: 0.9026 - val_loss: 0.3719 - val_accuracy: 0.8930
Epoch 890/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2989 - accuracy: 0.9113 - val_loss: 0.3715 - val_accuracy: 0.8938
```

```
Epoch 891/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3215 - accuracy: 0.8962 - val_loss: 0.3715 - val_accuracy: 0.8970
Epoch 892/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3252 - accuracy: 0.9010 - val_loss: 0.3667 - val_accuracy: 0.8946
Epoch 893/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3075 - accuracy: 0.9113 - val_loss: 0.3677 - val_accuracy: 0.8954
Epoch 894/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2963 - accuracy: 0.9161 - val_loss: 0.3714 - val_accuracy: 0.8970
Epoch 895/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3175 - accuracy: 0.9026 - val_loss: 0.3707 - val_accuracy: 0.8930
Epoch 896/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2994 - accuracy: 0.9145 - val_loss: 0.3768 - val_accuracy: 0.8914
Epoch 897/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3147 - accuracy: 0.9073 - val_loss: 0.3716 - val_accuracy: 0.8930
Epoch 898/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3040 - accuracy: 0.9081 - val_loss: 0.3739 - val_accuracy: 0.8922
Epoch 899/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2982 - accuracy: 0.9081 - val_loss: 0.3692 - val_accuracy: 0.8954
Epoch 900/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3138 - accuracy: 0.8962 - val_loss: 0.3687 - val_accuracy: 0.8946
Epoch 901/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3139 - accuracy: 0.8986 - val_loss: 0.3728 - val_accuracy: 0.8946
Epoch 902/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2959 - accuracy: 0.9161 - val_loss: 0.3683 - val_accuracy: 0.8962
Epoch 903/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2988 - accuracy: 0.9161 - val_loss: 0.3724 - val_accuracy: 0.8938
Epoch 904/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3163 - accuracy: 0.9089 - val_loss: 0.3685 - val_accuracy: 0.8954
Epoch 905/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2952 - accuracy: 0.9121 - val_loss: 0.3639 - val_accuracy: 0.8954
Epoch 906/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3021 - accuracy: 0.9137 - val_loss: 0.3736 - val_accuracy: 0.8938
Epoch 907/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3185 - accuracy: 0.9113 - val_loss: 0.3757 - val_accuracy: 0.8922
Epoch 908/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3013 - accuracy: 0.9113 - val_loss: 0.3674 - val_accuracy: 0.8938
Epoch 909/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2967 - accuracy: 0.9145 - val_loss: 0.3716 - val_accuracy: 0.8946
Epoch 910/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3214 - accuracy: 0.8994 - val_loss: 0.3699 - val_accuracy: 0.8922
Epoch 911/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3022 - accuracy: 0.9161 - val_loss: 0.3663 - val_accuracy: 0.8954
Epoch 912/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2981 - accuracy: 0.9153 - val_loss: 0.3733 - val_accuracy: 0.8930
Epoch 913/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3133 - accuracy: 0.9042 - val_loss: 0.3688 - val_accuracy: 0.8954
Epoch 914/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2999 - accuracy: 0.9161 - val_loss: 0.3716 - val_accuracy: 0.8946
Epoch 915/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3082 - accuracy: 0.9089 - val_loss: 0.3707 - val_accuracy: 0.8938
```

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Epoch 916/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2951 - accuracy: 0.9177 - val_loss: 0.3742 - val_accuracy: 0.8930
Epoch 917/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.3169 - accuracy: 0.9026 - val_loss: 0.3730 - val_accuracy: 0.8938
Epoch 918/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3162 - accuracy: 0.9081 - val_loss: 0.3670 - val_accuracy: 0.8962
Epoch 919/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2964 - accuracy: 0.9145 - val_loss: 0.3777 - val_accuracy: 0.8922
Epoch 920/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3235 - accuracy: 0.9010 - val_loss: 0.3706 - val_accuracy: 0.8938
Epoch 921/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2952 - accuracy: 0.9121 - val_loss: 0.3696 - val_accuracy: 0.8946
Epoch 922/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2961 - accuracy: 0.9193 - val_loss: 0.3702 - val_accuracy: 0.8954
Epoch 923/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2950 - accuracy: 0.9161 - val_loss: 0.3736 - val_accuracy: 0.8970
Epoch 924/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3090 - accuracy: 0.9113 - val_loss: 0.3733 - val_accuracy: 0.8938
Epoch 925/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2971 - accuracy: 0.9113 - val_loss: 0.3766 - val_accuracy: 0.8930
Epoch 926/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3077 - accuracy: 0.9034 - val_loss: 0.3702 - val_accuracy: 0.8954
Epoch 927/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3052 - accuracy: 0.9129 - val_loss: 0.3660 - val_accuracy: 0.8954
Epoch 928/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2937 - accuracy: 0.9129 - val_loss: 0.3675 - val_accuracy: 0.8954
Epoch 929/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3027 - accuracy: 0.9089 - val_loss: 0.3755 - val_accuracy: 0.8930
Epoch 930/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3152 - accuracy: 0.9042 - val_loss: 0.3764 - val_accuracy: 0.8914
Epoch 931/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3106 - accuracy: 0.9058 - val_loss: 0.3677 - val_accuracy: 0.8946
Epoch 932/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2981 - accuracy: 0.9129 - val_loss: 0.3657 - val_accuracy: 0.8954
Epoch 933/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2828 - accuracy: 0.9257 - val_loss: 0.3742 - val_accuracy: 0.8938
Epoch 934/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3328 - accuracy: 0.8946 - val_loss: 0.3799 - val_accuracy: 0.8922
Epoch 935/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3172 - accuracy: 0.8994 - val_loss: 0.3730 - val_accuracy: 0.8938
Epoch 936/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2949 - accuracy: 0.9201 - val_loss: 0.3698 - val_accuracy: 0.8938
Epoch 937/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2920 - accuracy: 0.9177 - val_loss: 0.3727 - val_accuracy: 0.8954
Epoch 938/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3045 - accuracy: 0.9121 - val_loss: 0.3733 - val_accuracy: 0.8914
Epoch 939/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3105 - accuracy: 0.9113 - val_loss: 0.3726 - val_accuracy: 0.8930
Epoch 940/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2952 - accuracy: 0.9137 - val_loss: 0.3674 - val_accuracy: 0.8962
```

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Epoch 941/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2833 - accuracy: 0.9233 - val_loss: 0.3702 - val_accuracy: 0.8938
Epoch 942/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3119 - accuracy: 0.9010 - val_loss: 0.3721 - val_accuracy: 0.8930
Epoch 943/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2998 - accuracy: 0.9121 - val_loss: 0.3678 - val_accuracy: 0.8946
Epoch 944/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2830 - accuracy: 0.9193 - val_loss: 0.3679 - val_accuracy: 0.8938
Epoch 945/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2932 - accuracy: 0.9185 - val_loss: 0.3706 - val_accuracy: 0.8954
Epoch 946/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2944 - accuracy: 0.9121 - val_loss: 0.3699 - val_accuracy: 0.8946
Epoch 947/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3030 - accuracy: 0.9113 - val_loss: 0.3691 - val_accuracy: 0.8954
Epoch 948/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2801 - accuracy: 0.9257 - val_loss: 0.3640 - val_accuracy: 0.8954
Epoch 949/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2947 - accuracy: 0.9081 - val_loss: 0.3676 - val_accuracy: 0.8938
Epoch 950/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2975 - accuracy: 0.9145 - val_loss: 0.3717 - val_accuracy: 0.8946
Epoch 951/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3035 - accuracy: 0.9089 - val_loss: 0.3739 - val_accuracy: 0.8938
Epoch 952/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3155 - accuracy: 0.9002 - val_loss: 0.3698 - val_accuracy: 0.8938
Epoch 953/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2918 - accuracy: 0.9185 - val_loss: 0.3684 - val_accuracy: 0.8954
Epoch 954/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2862 - accuracy: 0.9161 - val_loss: 0.3731 - val_accuracy: 0.8946
Epoch 955/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2955 - accuracy: 0.9153 - val_loss: 0.3699 - val_accuracy: 0.8938
Epoch 956/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2998 - accuracy: 0.9081 - val_loss: 0.3657 - val_accuracy: 0.8954
Epoch 957/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3170 - accuracy: 0.8978 - val_loss: 0.3695 - val_accuracy: 0.8938
Epoch 958/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2928 - accuracy: 0.9145 - val_loss: 0.3725 - val_accuracy: 0.8930
Epoch 959/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2969 - accuracy: 0.9161 - val_loss: 0.3704 - val_accuracy: 0.8962
Epoch 960/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3039 - accuracy: 0.9089 - val_loss: 0.3675 - val_accuracy: 0.8930
Epoch 961/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2809 - accuracy: 0.9201 - val_loss: 0.3660 - val_accuracy: 0.8922
Epoch 962/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3060 - accuracy: 0.9073 - val_loss: 0.3786 - val_accuracy: 0.8906
Epoch 963/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2968 - accuracy: 0.9161 - val_loss: 0.3743 - val_accuracy: 0.8930
Epoch 964/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2880 - accuracy: 0.9193 - val_loss: 0.3792 - val_accuracy: 0.8890
Epoch 965/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2983 - accuracy: 0.9161 - val_loss: 0.3722 - val_accuracy: 0.8938
```

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Epoch 966/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2949 - accuracy: 0.9058 - val_loss: 0.3747 - val_accuracy: 0.8922
Epoch 967/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3135 - accuracy: 0.9050 - val_loss: 0.3787 - val_accuracy: 0.8882
Epoch 968/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3177 - accuracy: 0.9002 - val_loss: 0.3785 - val_accuracy: 0.8906
Epoch 969/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2994 - accuracy: 0.9129 - val_loss: 0.3740 - val_accuracy: 0.8930
Epoch 970/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2859 - accuracy: 0.9201 - val_loss: 0.3686 - val_accuracy: 0.8938
Epoch 971/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2849 - accuracy: 0.9081 - val_loss: 0.3750 - val_accuracy: 0.8922
Epoch 972/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2903 - accuracy: 0.9113 - val_loss: 0.3723 - val_accuracy: 0.8914
Epoch 973/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2890 - accuracy: 0.9177 - val_loss: 0.3708 - val_accuracy: 0.8914
Epoch 974/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3036 - accuracy: 0.9081 - val_loss: 0.3719 - val_accuracy: 0.8914
Epoch 975/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2945 - accuracy: 0.9209 - val_loss: 0.3723 - val_accuracy: 0.8922
Epoch 976/1000
5/5 [==============================] - 0s 8ms/step - loss: 0.3084 - accuracy: 0.9105 - val_loss: 0.3775 - val_accuracy: 0.8922
Epoch 977/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.2966 - accuracy: 0.9081 - val_loss: 0.3755 - val_accuracy: 0.8922
Epoch 978/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2997 - accuracy: 0.9137 - val_loss: 0.3733 - val_accuracy: 0.8906
Epoch 979/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2913 - accuracy: 0.9177 - val_loss: 0.3687 - val_accuracy: 0.8906
Epoch 980/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2848 - accuracy: 0.9185 - val_loss: 0.3691 - val_accuracy: 0.8922
Epoch 981/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2934 - accuracy: 0.9169 - val_loss: 0.3659 - val_accuracy: 0.8954
Epoch 982/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2818 - accuracy: 0.9225 - val_loss: 0.3684 - val_accuracy: 0.8914
Epoch 983/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2890 - accuracy: 0.9145 - val_loss: 0.3809 - val_accuracy: 0.8922
Epoch 984/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3040 - accuracy: 0.9105 - val_loss: 0.3678 - val_accuracy: 0.8930
Epoch 985/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2874 - accuracy: 0.9145 - val_loss: 0.3727 - val_accuracy: 0.8914
Epoch 986/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3053 - accuracy: 0.9050 - val_loss: 0.3713 - val_accuracy: 0.8922
Epoch 987/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2969 - accuracy: 0.9153 - val_loss: 0.3679 - val_accuracy: 0.8914
Epoch 988/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2871 - accuracy: 0.9217 - val_loss: 0.3665 - val_accuracy: 0.8946
Epoch 989/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2916 - accuracy: 0.9177 - val_loss: 0.3777 - val_accuracy: 0.8922
Epoch 990/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3210 - accuracy: 0.9018 - val_loss: 0.3705 - val_accuracy: 0.8930
```

```
Epoch 991/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2946 - accuracy: 0.9169 - val_loss: 0.3721 - val_accuracy: 0.8898
Epoch 992/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2846 - accuracy: 0.9169 - val_loss: 0.3711 - val_accuracy: 0.8930
Epoch 993/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3028 - accuracy: 0.9081 - val_loss: 0.3771 - val_accuracy: 0.8914
Epoch 994/1000
5/5 [==============================] - 0s 7ms/step - loss: 0.2778 - accuracy: 0.9289 - val_loss: 0.3673 - val_accuracy: 0.8938
Epoch 995/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2917 - accuracy: 0.9137 - val_loss: 0.3715 - val_accuracy: 0.8914
Epoch 996/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.3092 - accuracy: 0.9058 - val_loss: 0.3666 - val_accuracy: 0.8922
Epoch 997/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2986 - accuracy: 0.9065 - val_loss: 0.3712 - val_accuracy: 0.8922
Epoch 998/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2810 - accuracy: 0.9225 - val_loss: 0.3716 - val_accuracy: 0.8930
Epoch 999/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2918 - accuracy: 0.9137 - val_loss: 0.3701 - val_accuracy: 0.8930
Epoch 1000/1000
5/5 [==============================] - 0s 6ms/step - loss: 0.2835 - accuracy: 0.9177 - val_loss: 0.3669 - val_accuracy: 0.8938
```

In [55]:
```python
# Final accuracy in training data

_, accuracy = model.evaluate(train_X, train_Y)
print('Accuracy: %.2f' % (accuracy*100))
```

```
40/40 [==============================] - 0s 530us/step - loss: 0.2328 - accuracy: 0.9409
Accuracy: 94.09
```

In [56]:
```python
# Final accuracy in test data

_, accuracy = model.evaluate(test_X, test_Y)
print('Accuracy: %.2f' % (accuracy*100))
```

```
40/40 [==============================] - 0s 541us/step - loss: 0.3669 - accuracy: 0.8938
Accuracy: 89.38
```

In [57]:
```python
# Setting the plot function for visualize training and test accurary

import matplotlib.pyplot as plt
%matplotlib inline
%config InlineBackend.figure_format = 'svg'

def plot_metric(history, metric):
    train_metrics = history.history[metric]
    val_metrics = history.history['val_'+metric]
```
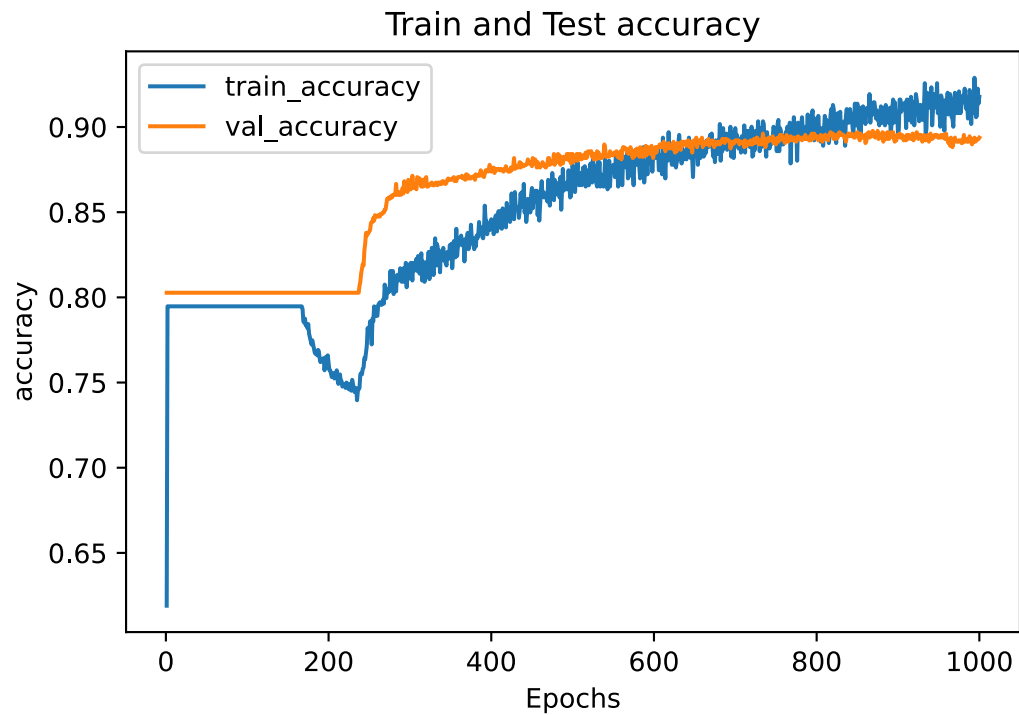
```
        epochs = range(1, len(train_metrics) + 1)
        plt.plot(epochs, train_metrics)
        plt.plot(epochs, val_metrics)
        plt.title('Train and Test '+ metric)
        plt.xlabel("Epochs")
        plt.ylabel(metric)
        plt.legend(["train_"+metric, 'val_'+metric])
        plt.show()
```
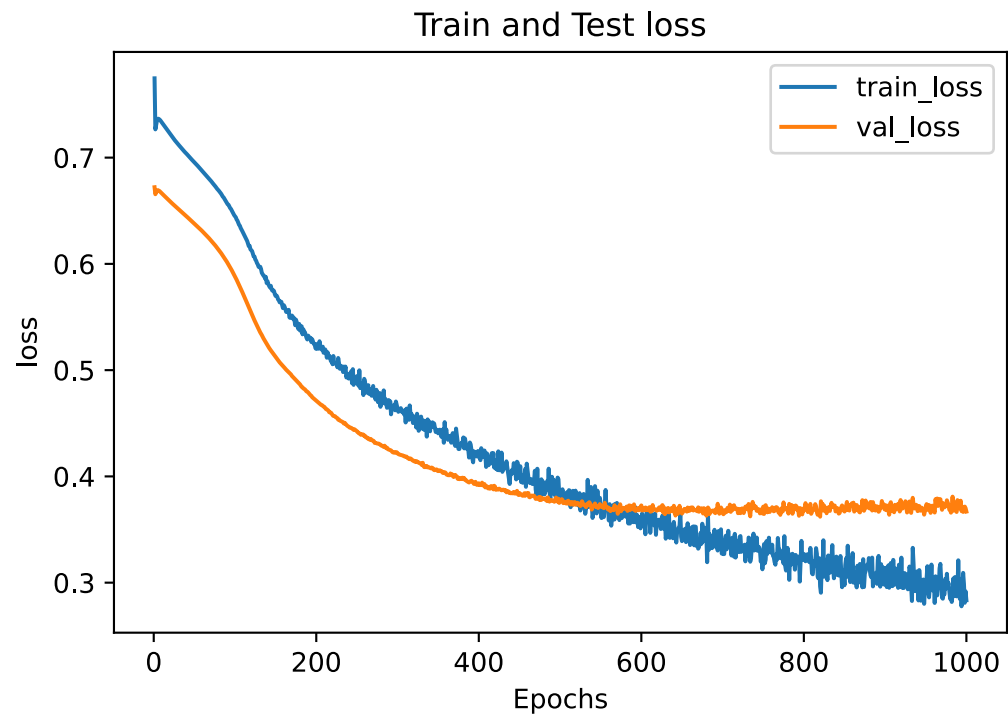
In [58]:
```
# Plot train and test accuracy

plot_metric(history, 'accuracy')
```


In [59]:
```
# Plot train and test loss

plot_metric(history, 'loss')
```

Train and Test loss

In [60]:
```python
# Obtain the polygenic score

from keras import backend as K

get_last_layer_output = K.function([model.layers[0].input],[model.layers[6].output])
```

In [61]:
```python
# Calculate AUC for training data

train_X_pred = get_last_layer_output([train_X.values])[0]

from sklearn import metrics

fpr, tpr, thresholds = metrics.roc_curve(train_Y, train_X_pred, pos_label=1)

metrics.auc(fpr, tpr)
```

Out[61]: 0.9742956025262499

In [62]:
```python
# Calculate AUC for test data
```

```python
test_X_pred = get_last_layer_output([test_X.values])[0]

from sklearn import metrics

fpr, tpr, thresholds = metrics.roc_curve(test_Y, test_X_pred, pos_label=1)

metrics.auc(fpr, tpr)
```

Out[62]: 0.9170423187705199

In [63]:
```python
# Output the score to file

# Score for the training dataset

train_out=pandas.DataFrame(np.array(train_X_pred)[:,:],columns=['Score'])
train_out['FID']=train_data['FID']
train_out['Phenotype']=train_data['Phenotype']
train_out.to_csv('train_score.csv',index=False)

# Score for the test dataset

test_out=pandas.DataFrame(np.array(train_X_pred)[:,:],columns=['Score'])
test_out['FID']=train_data['FID']
test_out['Phenotype']=test_data['Phenotype']
test_out.to_csv('test_score.csv',index=False)
```

In [69]:
```python
# Get the second last layer output

get_2ndLast_layer_output = K.function([model.layers[0].input],[model.layers[5].output])

# Scores for the training dataset
train_2ndLast_out = pandas.DataFrame(np.array(get_2ndLast_layer_output([train_X.values]))[0,:,:],
                            columns=['Pred_Factor1','Pred_Factor2','Pred_Factor3','Pred_Factor4','Pred_Factor5'])
train_2ndLast_out['FID']=train_data['FID']
train_2ndLast_out['Phenotype']=train_data['Phenotype']
train_2ndLast_out.to_csv('train_2ndLast_score.csv',index=False)

# Scores for the test dataset
test_2ndLast_out = pandas.DataFrame(np.array(get_2ndLast_layer_output([test_X.values]))[0,:,:],
                            columns=['Pred_Factor1','Pred_Factor2','Pred_Factor3','Pred_Factor4','Pred_Factor5'])
test_2ndLast_out['FID']=test_data['FID']
test_2ndLast_out['Phenotype']=test_data['Phenotype']
test_2ndLast_out.to_csv('test_2ndLast_score.csv',index=False)
```