# 00

August 24, 2021

[1]:
```
from tensorflow.python.client import device_lib
print(device_lib.list_local_devices())

import tensorflow as tf
import keras_preprocessing
from keras_preprocessing import image
from keras_preprocessing.image import ImageDataGenerator
import os, sys, glob

#https://stackoverflow.com/questions/45662253/can-i-run-keras-model-on-gpu


###
### INIT VARIABLES
###

# Base folder
DATA_FOLDER = 'E:\\TFM_MUESTRAS\\'

# Name of the test folder
TEST_FOLDER = "Test_003\\"

# Folder with city folders images
TRAINING_DIR = DATA_FOLDER + TEST_FOLDER + "images\\"

# New folder to be created with joined images
PROCESS_NAME = 'process_003'
EJECUTION_NAME = 'M05_1000e_80b_224i'

NEW_TRAINING_FOLDER = DATA_FOLDER + TEST_FOLDER + 'training_' + PROCESS_NAME
NEW_VALIDATION_FOLDER = DATA_FOLDER + TEST_FOLDER + 'validation_' + PROCESS_NAME



### PROCESS

batch_size = 50
```

```
image_size = 224 #150

training_datagen = ImageDataGenerator(
      rescale = 1./255,
            rotation_range=40,
      width_shift_range=0.2,
      height_shift_range=0.2,
      shear_range=0.2,
      zoom_range=0.2,
      horizontal_flip=True,
      fill_mode='nearest')


validation_datagen = ImageDataGenerator(rescale = 1./255)

train_generator = training_datagen.flow_from_directory(
        NEW_TRAINING_FOLDER,
        target_size=(image_size,image_size),
        class_mode='categorical',
  batch_size=batch_size,
  shuffle=True
)

validation_generator = validation_datagen.flow_from_directory(
        NEW_VALIDATION_FOLDER,
        target_size=(image_size,image_size),
        class_mode='categorical',
  batch_size=batch_size,
  shuffle=True
)


model = tf.keras.models.Sequential([
      tf.keras.layers.Conv2D(200, (3,3), activation='relu',␣
 ↪input_shape=(image_size, image_size, 3)),
      tf.keras.layers.MaxPooling2D(2, 2),

      tf.keras.layers.Conv2D(128, (3,3), activation='relu'),#,␣
 ↪input_shape=(image_size, image_size, 3)),
      tf.keras.layers.MaxPooling2D(2, 2),

      tf.keras.layers.Conv2D(64, (3,3), activation='relu'), #␣
 ↪input_shape=(image_size, image_size, 3)),
      tf.keras.layers.MaxPooling2D(2, 2),

      tf.keras.layers.Conv2D(32, (3,3), activation='relu'),
      tf.keras.layers.MaxPooling2D(2,2),
```

```
      tf.keras.layers.Flatten(),
      tf.keras.layers.Dropout(0.5),

      tf.keras.layers.Dense(200, activation='relu'),
      tf.keras.layers.Dense(128, activation='relu'),
      tf.keras.layers.Dense(64, activation='relu'),
      tf.keras.layers.Dense(4, activation='softmax')
  ])


model.summary()


from tensorflow.keras.utils import to_categorical

print (NEW_TRAINING_FOLDER)
print (NEW_VALIDATION_FOLDER)
training_files = glob.glob(NEW_TRAINING_FOLDER+"\\*\\*.tif")
validation_files = glob.glob(NEW_VALIDATION_FOLDER+"\\*\\*.tif")


total_count_training =len(training_files)
total_count_validation =len(validation_files)

print (total_count_training ,total_count_validation )


steps_per_epoch = total_count_training//batch_size
validation_steps = total_count_validation//batch_size
print("Validation steps:", validation_steps)
print("Steps per epoch: ", steps_per_epoch)


model.compile(
    loss = 'categorical_crossentropy',
    optimizer=tf.keras.optimizers.SGD(),
    metrics=['accuracy']
    )

#model = tf.keras.models.load_model('E:
 ↪\\TFM_URBANPROJECT\\desarrollo\\rps_process_003_200e_plus1layer_plussteps.
 ↪h5')



history = model.fit(
```

```
    train_generator,
    epochs=1000,
    steps_per_epoch=50,
    validation_data=validation_generator,
    verbose=1,
    validation_steps=30
    )

model.save("rps_"+PROCESS_NAME+EJECUTION_NAME+".h5")
```

```
[name: "/device:CPU:0"
device_type: "CPU"
memory_limit: 268435456
locality {
}
incarnation: 4371838241332281936
, name: "/device:GPU:0"
device_type: "GPU"
memory_limit: 6961823744
locality {
  bus_id: 1
  links {
  }
}
incarnation: 7800780588236220400
physical_device_desc: "device: 0, name: NVIDIA GeForce GTX 1070, pci bus id:
0000:01:00.0, compute capability: 6.1"
]
Found 9917 images belonging to 4 classes.
Found 2486 images belonging to 4 classes.
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 222, 222, 200)     5600
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 111, 111, 200)     0
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 109, 109, 128)     230528
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 54, 54, 128)       0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 52, 52, 64)        73792
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 26, 26, 64)        0
_________________________________________________________________
conv2d_3 (Conv2D)            (None, 24, 24, 32)        18464
_________________________________________________________________
```

```
max_pooling2d_3 (MaxPooling2 (None, 12, 12, 32)        0
_________________________________________________________________
flatten (Flatten)            (None, 4608)              0
_________________________________________________________________
dropout (Dropout)            (None, 4608)              0
_________________________________________________________________
dense (Dense)                (None, 200)               921800
_________________________________________________________________
dense_1 (Dense)              (None, 128)               25728
_________________________________________________________________
dense_2 (Dense)              (None, 64)                8256
_________________________________________________________________
dense_3 (Dense)              (None, 4)                 260
=================================================================
Total params: 1,284,428
Trainable params: 1,284,428
Non-trainable params: 0
_________________________________________________________________
E:\TFM_MUESTRAS\Test_003\training_process_003
E:\TFM_MUESTRAS\Test_003\validation_process_003
9917 2486
Validation steps: 49
Steps per epoch:  198
Epoch 1/1000
50/50 [==============================] - 58s 1s/step - loss: 1.3653 - accuracy:
0.2940 - val_loss: 1.3559 - val_accuracy: 0.2940
Epoch 2/1000
50/50 [==============================] - 51s 1s/step - loss: 1.3570 - accuracy:
0.2888 - val_loss: 1.3577 - val_accuracy: 0.2727
Epoch 3/1000
50/50 [==============================] - ETA: 0s - loss: 1.3614 - accuracy:
0.2816

C:\Users\oskmo\.conda\envs\masterall\lib\site-packages\PIL\Image.py:2855:
DecompressionBombWarning: Image size (171081905 pixels) exceeds limit of
89478485 pixels, could be decompression bomb DOS attack.
  warnings.warn(

50/50 [==============================] - 52s 1s/step - loss: 1.3614 - accuracy:
0.2816 - val_loss: 1.3613 - val_accuracy: 0.2713
Epoch 4/1000
50/50 [==============================] - 51s 1s/step - loss: 1.3561 - accuracy:
0.3024 - val_loss: 1.3549 - val_accuracy: 0.2933
Epoch 5/1000
50/50 [==============================] - 50s 992ms/step - loss: 1.3538 -
accuracy: 0.3104 - val_loss: 1.3527 - val_accuracy: 0.2933
Epoch 6/1000
50/50 [==============================] - 54s 1s/step - loss: 1.3547 - accuracy:
0.3016 - val_loss: 1.3468 - val_accuracy: 0.3060
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Epoch 7/1000
50/50 [==============================] - 51s 1s/step - loss: 1.3575 - accuracy:
0.3076 - val_loss: 1.3448 - val_accuracy: 0.2940
Epoch 8/1000
50/50 [==============================] - 49s 974ms/step - loss: 1.3439 -
accuracy: 0.3016 - val_loss: 1.3440 - val_accuracy: 0.3073
Epoch 9/1000
50/50 [==============================] - 51s 1s/step - loss: 1.3405 - accuracy:
0.3124 - val_loss: 1.3286 - val_accuracy: 0.3107
Epoch 10/1000
50/50 [==============================] - 54s 1s/step - loss: 1.3313 - accuracy:
0.3204 - val_loss: 1.3279 - val_accuracy: 0.3140
Epoch 11/1000
50/50 [==============================] - 49s 980ms/step - loss: 1.3312 -
accuracy: 0.3264 - val_loss: 1.3249 - val_accuracy: 0.3973
Epoch 12/1000
50/50 [==============================] - 49s 967ms/step - loss: 1.3319 -
accuracy: 0.3536 - val_loss: 1.3052 - val_accuracy: 0.4120
Epoch 13/1000
50/50 [==============================] - 59s 1s/step - loss: 1.3226 - accuracy:
0.3664 - val_loss: 1.2980 - val_accuracy: 0.4680
Epoch 14/1000
50/50 [==============================] - 63s 1s/step - loss: 1.3027 - accuracy:
0.3856 - val_loss: 1.2723 - val_accuracy: 0.4373
Epoch 15/1000
50/50 [==============================] - 55s 1s/step - loss: 1.3029 - accuracy:
0.3976 - val_loss: 1.2651 - val_accuracy: 0.3840
Epoch 16/1000
50/50 [==============================] - 52s 1s/step - loss: 1.2860 - accuracy:
0.4120 - val_loss: 1.3692 - val_accuracy: 0.2733
Epoch 17/1000
50/50 [==============================] - 53s 1s/step - loss: 1.2907 - accuracy:
0.4012 - val_loss: 1.2717 - val_accuracy: 0.3547
Epoch 18/1000
50/50 [==============================] - 52s 1s/step - loss: 1.2696 - accuracy:
0.4199 - val_loss: 1.3741 - val_accuracy: 0.2847
Epoch 19/1000
50/50 [==============================] - 53s 1s/step - loss: 1.2777 - accuracy:
0.4072 - val_loss: 1.1814 - val_accuracy: 0.4647
Epoch 20/1000
50/50 [==============================] - 54s 1s/step - loss: 1.2360 - accuracy:
0.4428 - val_loss: 1.1558 - val_accuracy: 0.5000
Epoch 21/1000
50/50 [==============================] - 56s 1s/step - loss: 1.2362 - accuracy:
0.4324 - val_loss: 1.2002 - val_accuracy: 0.4360
Epoch 22/1000
50/50 [==============================] - 53s 1s/step - loss: 1.1964 - accuracy:
0.4748 - val_loss: 1.1152 - val_accuracy: 0.5200
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Epoch 23/1000
50/50 [==============================] - 55s 1s/step - loss: 1.1666 - accuracy:
0.4836 - val_loss: 1.1047 - val_accuracy: 0.5373
Epoch 24/1000
50/50 [==============================] - 55s 1s/step - loss: 1.1384 - accuracy:
0.4952 - val_loss: 1.0982 - val_accuracy: 0.5607
Epoch 25/1000
50/50 [==============================] - 57s 1s/step - loss: 1.1740 - accuracy:
0.4775 - val_loss: 1.1415 - val_accuracy: 0.4913
Epoch 26/1000
50/50 [==============================] - 53s 1s/step - loss: 1.1630 - accuracy:
0.4872 - val_loss: 1.0875 - val_accuracy: 0.5480
Epoch 27/1000
50/50 [==============================] - 51s 1s/step - loss: 1.1061 - accuracy:
0.5176 - val_loss: 1.0316 - val_accuracy: 0.5733
Epoch 28/1000
50/50 [==============================] - 57s 1s/step - loss: 1.0714 - accuracy:
0.5272 - val_loss: 1.1510 - val_accuracy: 0.4947
Epoch 29/1000
50/50 [==============================] - 56s 1s/step - loss: 1.0738 - accuracy:
0.5294 - val_loss: 0.9953 - val_accuracy: 0.5833
Epoch 30/1000
50/50 [==============================] - 56s 1s/step - loss: 1.0659 - accuracy:
0.5376 - val_loss: 1.0574 - val_accuracy: 0.5047
Epoch 31/1000
50/50 [==============================] - 57s 1s/step - loss: 1.0152 - accuracy:
0.5664 - val_loss: 0.9880 - val_accuracy: 0.5833
Epoch 32/1000
50/50 [==============================] - 57s 1s/step - loss: 1.0299 - accuracy:
0.5504 - val_loss: 0.9883 - val_accuracy: 0.5513
Epoch 33/1000
50/50 [==============================] - 53s 1s/step - loss: 1.0222 - accuracy:
0.5552 - val_loss: 0.9407 - val_accuracy: 0.5813
Epoch 34/1000
50/50 [==============================] - 55s 1s/step - loss: 1.0101 - accuracy:
0.5659 - val_loss: 0.8946 - val_accuracy: 0.6187
Epoch 35/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.9679 -
accuracy: 0.5732 - val_loss: 0.9448 - val_accuracy: 0.5867
Epoch 36/1000
50/50 [==============================] - 52s 1s/step - loss: 0.9789 - accuracy:
0.5652 - val_loss: 0.8999 - val_accuracy: 0.5873
Epoch 37/1000
50/50 [==============================] - 50s 1s/step - loss: 0.9535 - accuracy:
0.5797 - val_loss: 1.0120 - val_accuracy: 0.5560
Epoch 38/1000
50/50 [==============================] - 51s 1s/step - loss: 0.9402 - accuracy:
0.5914 - val_loss: 0.8551 - val_accuracy: 0.6533
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Epoch 39/1000
50/50 [==============================] - 55s 1s/step - loss: 0.9135 - accuracy:
0.5976 - val_loss: 0.9064 - val_accuracy: 0.5773
Epoch 40/1000
50/50 [==============================] - 58s 1s/step - loss: 0.9171 - accuracy:
0.5888 - val_loss: 0.8483 - val_accuracy: 0.6327
Epoch 41/1000
50/50 [==============================] - 68s 1s/step - loss: 0.8977 - accuracy:
0.5972 - val_loss: 0.8060 - val_accuracy: 0.6373
Epoch 42/1000
50/50 [==============================] - 54s 1s/step - loss: 0.8560 - accuracy:
0.6153 - val_loss: 0.8461 - val_accuracy: 0.6287
Epoch 43/1000
50/50 [==============================] - 53s 1s/step - loss: 0.8688 - accuracy:
0.6132 - val_loss: 0.8283 - val_accuracy: 0.6313
Epoch 44/1000
50/50 [==============================] - 56s 1s/step - loss: 0.8775 - accuracy:
0.6232 - val_loss: 0.8184 - val_accuracy: 0.6527
Epoch 45/1000
50/50 [==============================] - 55s 1s/step - loss: 0.8429 - accuracy:
0.6198 - val_loss: 0.8853 - val_accuracy: 0.6100
Epoch 46/1000
50/50 [==============================] - 49s 976ms/step - loss: 0.8967 -
accuracy: 0.6088 - val_loss: 0.8212 - val_accuracy: 0.6627
Epoch 47/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.8416 -
accuracy: 0.6368 - val_loss: 1.0655 - val_accuracy: 0.5200
Epoch 48/1000
50/50 [==============================] - 48s 949ms/step - loss: 0.8584 -
accuracy: 0.6384 - val_loss: 0.7788 - val_accuracy: 0.6507
Epoch 49/1000
50/50 [==============================] - 47s 945ms/step - loss: 0.7881 -
accuracy: 0.6623 - val_loss: 0.8559 - val_accuracy: 0.6147
Epoch 50/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.8210 -
accuracy: 0.6536 - val_loss: 0.7385 - val_accuracy: 0.7020
Epoch 51/1000
50/50 [==============================] - 49s 976ms/step - loss: 0.8564 -
accuracy: 0.6308 - val_loss: 0.7245 - val_accuracy: 0.6920
Epoch 52/1000
50/50 [==============================] - 127s 3s/step - loss: 0.8052 - accuracy:
0.6596 - val_loss: 0.8303 - val_accuracy: 0.6460
Epoch 53/1000
50/50 [==============================] - 153s 3s/step - loss: 0.8207 - accuracy:
0.6417 - val_loss: 0.7610 - val_accuracy: 0.6887
Epoch 54/1000
50/50 [==============================] - 129s 3s/step - loss: 0.8104 - accuracy:
0.6484 - val_loss: 0.7319 - val_accuracy: 0.7013
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Epoch 55/1000
50/50 [==============================] - 127s 3s/step - loss: 0.7878 - accuracy:
0.6496 - val_loss: 0.8027 - val_accuracy: 0.6520
Epoch 56/1000
50/50 [==============================] - 130s 3s/step - loss: 0.7884 - accuracy:
0.6668 - val_loss: 0.7857 - val_accuracy: 0.6673
Epoch 57/1000
50/50 [==============================] - 64s 1s/step - loss: 0.8153 - accuracy:
0.6464 - val_loss: 0.7823 - val_accuracy: 0.6373
Epoch 58/1000
50/50 [==============================] - 51s 1s/step - loss: 0.7666 - accuracy:
0.6704 - val_loss: 0.7310 - val_accuracy: 0.6940
Epoch 59/1000
50/50 [==============================] - 57s 1s/step - loss: 0.7888 - accuracy:
0.6612 - val_loss: 1.2869 - val_accuracy: 0.4933
Epoch 60/1000
50/50 [==============================] - 49s 980ms/step - loss: 0.8475 -
accuracy: 0.6464 - val_loss: 0.6968 - val_accuracy: 0.7353
Epoch 61/1000
50/50 [==============================] - 51s 1s/step - loss: 0.7716 - accuracy:
0.6814 - val_loss: 0.7068 - val_accuracy: 0.7047
Epoch 62/1000
50/50 [==============================] - 51s 1s/step - loss: 0.7611 - accuracy:
0.6822 - val_loss: 0.9315 - val_accuracy: 0.6200
Epoch 63/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.8054 -
accuracy: 0.6388 - val_loss: 0.7657 - val_accuracy: 0.6893
Epoch 64/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.7624 -
accuracy: 0.6761 - val_loss: 0.7405 - val_accuracy: 0.6800
Epoch 65/1000
50/50 [==============================] - 52s 1s/step - loss: 0.7394 - accuracy:
0.6832 - val_loss: 0.7069 - val_accuracy: 0.7207
Epoch 66/1000
50/50 [==============================] - 50s 1s/step - loss: 0.7663 - accuracy:
0.6798 - val_loss: 0.7376 - val_accuracy: 0.6953
Epoch 67/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.7613 -
accuracy: 0.6700 - val_loss: 0.6955 - val_accuracy: 0.7200
Epoch 68/1000
50/50 [==============================] - 50s 1s/step - loss: 0.7512 - accuracy:
0.6883 - val_loss: 0.6668 - val_accuracy: 0.7340
Epoch 69/1000
50/50 [==============================] - 47s 948ms/step - loss: 0.7648 -
accuracy: 0.6808 - val_loss: 0.7760 - val_accuracy: 0.6687
Epoch 70/1000
50/50 [==============================] - 51s 1s/step - loss: 0.7528 - accuracy:
0.6838 - val_loss: 0.7068 - val_accuracy: 0.7127
```

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Epoch 71/1000
50/50 [==============================] - 56s 1s/step - loss: 0.7536 - accuracy:
0.6790 - val_loss: 0.7192 - val_accuracy: 0.7007
Epoch 72/1000
50/50 [==============================] - 51s 1s/step - loss: 0.7361 - accuracy:
0.6884 - val_loss: 0.7521 - val_accuracy: 0.6993
Epoch 73/1000
50/50 [==============================] - 52s 1s/step - loss: 0.7416 - accuracy:
0.6864 - val_loss: 0.7004 - val_accuracy: 0.7467
Epoch 74/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.7495 -
accuracy: 0.6784 - val_loss: 0.8755 - val_accuracy: 0.6293
Epoch 75/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.7292 -
accuracy: 0.6900 - val_loss: 0.6660 - val_accuracy: 0.7380
Epoch 76/1000
50/50 [==============================] - 50s 990ms/step - loss: 0.7504 -
accuracy: 0.6916 - val_loss: 0.6885 - val_accuracy: 0.7013
Epoch 77/1000
50/50 [==============================] - 47s 931ms/step - loss: 0.7203 -
accuracy: 0.7012 - val_loss: 0.7489 - val_accuracy: 0.6853
Epoch 78/1000
50/50 [==============================] - 49s 968ms/step - loss: 0.7467 -
accuracy: 0.6896 - val_loss: 0.6397 - val_accuracy: 0.7393
Epoch 79/1000
50/50 [==============================] - 50s 986ms/step - loss: 0.7602 -
accuracy: 0.6772 - val_loss: 0.6610 - val_accuracy: 0.7427
Epoch 80/1000
50/50 [==============================] - 50s 1000ms/step - loss: 0.7051 -
accuracy: 0.7132 - val_loss: 0.7107 - val_accuracy: 0.6953
Epoch 81/1000
50/50 [==============================] - 50s 1s/step - loss: 0.6952 - accuracy:
0.7116 - val_loss: 0.7067 - val_accuracy: 0.7113
Epoch 82/1000
50/50 [==============================] - 52s 1s/step - loss: 0.7443 - accuracy:
0.6852 - val_loss: 0.7483 - val_accuracy: 0.6927
Epoch 83/1000
50/50 [==============================] - 53s 1s/step - loss: 0.6955 - accuracy:
0.7040 - val_loss: 0.6371 - val_accuracy: 0.7327
Epoch 84/1000
50/50 [==============================] - 48s 964ms/step - loss: 0.7269 -
accuracy: 0.6924 - val_loss: 0.6946 - val_accuracy: 0.7213
Epoch 85/1000
50/50 [==============================] - 49s 991ms/step - loss: 0.7218 -
accuracy: 0.7036 - val_loss: 0.6468 - val_accuracy: 0.7340
Epoch 86/1000
50/50 [==============================] - 51s 1s/step - loss: 0.6985 - accuracy:
0.7068 - val_loss: 0.6125 - val_accuracy: 0.7520
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Epoch 87/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.7252 -
accuracy: 0.6940 - val_loss: 0.6329 - val_accuracy: 0.7407
Epoch 88/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.7084 -
accuracy: 0.7108 - val_loss: 0.6813 - val_accuracy: 0.7020
Epoch 89/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.7117 -
accuracy: 0.7084 - val_loss: 0.6499 - val_accuracy: 0.7527
Epoch 90/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.6933 -
accuracy: 0.7068 - val_loss: 0.7191 - val_accuracy: 0.6947
Epoch 91/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.7039 -
accuracy: 0.7076 - val_loss: 0.7563 - val_accuracy: 0.6847
Epoch 92/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.7175 -
accuracy: 0.6988 - val_loss: 0.6773 - val_accuracy: 0.7193
Epoch 93/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.6924 -
accuracy: 0.7056 - val_loss: 0.6576 - val_accuracy: 0.7280
Epoch 94/1000
50/50 [==============================] - 59s 1s/step - loss: 0.8026 - accuracy:
0.6692 - val_loss: 0.7301 - val_accuracy: 0.6840
Epoch 95/1000
50/50 [==============================] - 52s 1s/step - loss: 0.6693 - accuracy:
0.7148 - val_loss: 0.6122 - val_accuracy: 0.7507
Epoch 96/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.6790 -
accuracy: 0.7188 - val_loss: 0.6108 - val_accuracy: 0.7660
Epoch 97/1000
50/50 [==============================] - 52s 1s/step - loss: 0.6910 - accuracy:
0.7140 - val_loss: 0.6566 - val_accuracy: 0.7227
Epoch 98/1000
50/50 [==============================] - 52s 1s/step - loss: 0.7069 - accuracy:
0.7152 - val_loss: 0.6390 - val_accuracy: 0.7500
Epoch 99/1000
50/50 [==============================] - 50s 1s/step - loss: 0.6957 - accuracy:
0.7156 - val_loss: 0.6515 - val_accuracy: 0.7327
Epoch 100/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.6988 -
accuracy: 0.7112 - val_loss: 0.6306 - val_accuracy: 0.7380
Epoch 101/1000
50/50 [==============================] - 51s 1s/step - loss: 0.6668 - accuracy:
0.7268 - val_loss: 0.6318 - val_accuracy: 0.7380
Epoch 102/1000
50/50 [==============================] - 50s 1s/step - loss: 0.7001 - accuracy:
0.7056 - val_loss: 0.6289 - val_accuracy: 0.7393
```

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Epoch 103/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.7006 -
accuracy: 0.7077 - val_loss: 0.6670 - val_accuracy: 0.7220
Epoch 104/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.6700 -
accuracy: 0.7184 - val_loss: 0.6627 - val_accuracy: 0.7360
Epoch 105/1000
50/50 [==============================] - 49s 975ms/step - loss: 0.7535 -
accuracy: 0.6812 - val_loss: 0.6188 - val_accuracy: 0.7407
Epoch 106/1000
50/50 [==============================] - 63s 1s/step - loss: 0.6843 - accuracy:
0.7264 - val_loss: 0.6771 - val_accuracy: 0.7127
Epoch 107/1000
50/50 [==============================] - 51s 1s/step - loss: 0.6870 - accuracy:
0.7096 - val_loss: 0.6254 - val_accuracy: 0.7460
Epoch 108/1000
50/50 [==============================] - 49s 967ms/step - loss: 0.6765 -
accuracy: 0.7146 - val_loss: 0.6998 - val_accuracy: 0.7060
Epoch 109/1000
50/50 [==============================] - 50s 989ms/step - loss: 0.7231 -
accuracy: 0.7114 - val_loss: 0.6440 - val_accuracy: 0.7313
Epoch 110/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.6622 -
accuracy: 0.7192 - val_loss: 0.6804 - val_accuracy: 0.7073
Epoch 111/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.6775 -
accuracy: 0.7116 - val_loss: 0.5735 - val_accuracy: 0.7620
Epoch 112/1000
50/50 [==============================] - 50s 1s/step - loss: 0.6421 - accuracy:
0.7332 - val_loss: 0.7624 - val_accuracy: 0.6807
Epoch 113/1000
50/50 [==============================] - 50s 1s/step - loss: 0.6463 - accuracy:
0.7172 - val_loss: 0.6425 - val_accuracy: 0.7320
Epoch 114/1000
50/50 [==============================] - 49s 987ms/step - loss: 0.7378 -
accuracy: 0.6952 - val_loss: 0.6163 - val_accuracy: 0.7380
Epoch 115/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.6838 -
accuracy: 0.7144 - val_loss: 0.5936 - val_accuracy: 0.7627
Epoch 116/1000
50/50 [==============================] - 47s 939ms/step - loss: 0.6913 -
accuracy: 0.7158 - val_loss: 0.7523 - val_accuracy: 0.6687
Epoch 117/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.6735 -
accuracy: 0.7176 - val_loss: 0.7057 - val_accuracy: 0.7053
Epoch 118/1000
50/50 [==============================] - 50s 1s/step - loss: 0.6636 - accuracy:
0.7256 - val_loss: 0.6040 - val_accuracy: 0.7647
```

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Epoch 119/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.6828 -
accuracy: 0.7122 - val_loss: 0.6144 - val_accuracy: 0.7520
Epoch 120/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.6609 -
accuracy: 0.7144 - val_loss: 0.6819 - val_accuracy: 0.7073
Epoch 121/1000
50/50 [==============================] - 46s 922ms/step - loss: 0.6553 -
accuracy: 0.7292 - val_loss: 0.6808 - val_accuracy: 0.7140
Epoch 122/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.6444 -
accuracy: 0.7176 - val_loss: 0.8420 - val_accuracy: 0.6400
Epoch 123/1000
50/50 [==============================] - 48s 951ms/step - loss: 0.6618 -
accuracy: 0.7176 - val_loss: 0.6488 - val_accuracy: 0.7227
Epoch 124/1000
50/50 [==============================] - 48s 961ms/step - loss: 0.6711 -
accuracy: 0.7300 - val_loss: 0.6374 - val_accuracy: 0.7467
Epoch 125/1000
50/50 [==============================] - 50s 988ms/step - loss: 0.6457 -
accuracy: 0.7392 - val_loss: 0.6528 - val_accuracy: 0.7293
Epoch 126/1000
50/50 [==============================] - 47s 951ms/step - loss: 0.6525 -
accuracy: 0.7236 - val_loss: 0.6621 - val_accuracy: 0.7267
Epoch 127/1000
50/50 [==============================] - 47s 941ms/step - loss: 0.6242 -
accuracy: 0.7436 - val_loss: 0.6380 - val_accuracy: 0.7440
Epoch 128/1000
50/50 [==============================] - 51s 1s/step - loss: 0.6535 - accuracy:
0.7324 - val_loss: 0.6744 - val_accuracy: 0.7267
Epoch 129/1000
50/50 [==============================] - 46s 930ms/step - loss: 0.6526 -
accuracy: 0.7304 - val_loss: 0.6611 - val_accuracy: 0.7153
Epoch 130/1000
50/50 [==============================] - 46s 925ms/step - loss: 0.6484 -
accuracy: 0.7344 - val_loss: 0.6108 - val_accuracy: 0.7413
Epoch 131/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.6293 -
accuracy: 0.7304 - val_loss: 0.6066 - val_accuracy: 0.7360
Epoch 132/1000
50/50 [==============================] - 46s 904ms/step - loss: 0.6277 -
accuracy: 0.7410 - val_loss: 0.5997 - val_accuracy: 0.7593
Epoch 133/1000
50/50 [==============================] - 46s 926ms/step - loss: 0.6217 -
accuracy: 0.7416 - val_loss: 0.7153 - val_accuracy: 0.7027
Epoch 134/1000
50/50 [==============================] - 47s 942ms/step - loss: 0.6439 -
accuracy: 0.7304 - val_loss: 0.6998 - val_accuracy: 0.6980
```

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Epoch 135/1000
50/50 [==============================] - 48s 948ms/step - loss: 0.6440 -
accuracy: 0.7328 - val_loss: 0.6784 - val_accuracy: 0.7100
Epoch 136/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.6373 -
accuracy: 0.7304 - val_loss: 0.7039 - val_accuracy: 0.7060
Epoch 137/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.6353 -
accuracy: 0.7352 - val_loss: 0.9753 - val_accuracy: 0.6060
Epoch 138/1000
50/50 [==============================] - 48s 970ms/step - loss: 0.6635 -
accuracy: 0.7296 - val_loss: 0.6736 - val_accuracy: 0.7140
Epoch 139/1000
50/50 [==============================] - 47s 948ms/step - loss: 0.6278 -
accuracy: 0.7434 - val_loss: 0.7334 - val_accuracy: 0.6833
Epoch 140/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.6255 -
accuracy: 0.7479 - val_loss: 0.5742 - val_accuracy: 0.7620
Epoch 141/1000
50/50 [==============================] - 47s 939ms/step - loss: 0.6346 -
accuracy: 0.7352 - val_loss: 0.6653 - val_accuracy: 0.7080
Epoch 142/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.6251 -
accuracy: 0.7356 - val_loss: 0.6378 - val_accuracy: 0.7387
Epoch 143/1000
50/50 [==============================] - 48s 969ms/step - loss: 0.6538 -
accuracy: 0.7236 - val_loss: 0.6485 - val_accuracy: 0.7300
Epoch 144/1000
50/50 [==============================] - 48s 950ms/step - loss: 0.6282 -
accuracy: 0.7336 - val_loss: 0.5590 - val_accuracy: 0.7653
Epoch 145/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.6405 -
accuracy: 0.7396 - val_loss: 0.6119 - val_accuracy: 0.7560
Epoch 146/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.6249 -
accuracy: 0.7504 - val_loss: 0.6576 - val_accuracy: 0.7093
Epoch 147/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.6195 -
accuracy: 0.7438 - val_loss: 0.5495 - val_accuracy: 0.7813
Epoch 148/1000
50/50 [==============================] - 49s 979ms/step - loss: 0.6033 -
accuracy: 0.7515 - val_loss: 0.6410 - val_accuracy: 0.7413
Epoch 149/1000
50/50 [==============================] - 47s 947ms/step - loss: 0.6632 -
accuracy: 0.7168 - val_loss: 0.5484 - val_accuracy: 0.7693
Epoch 150/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.6248 -
accuracy: 0.7392 - val_loss: 0.5858 - val_accuracy: 0.7427
```

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Epoch 151/1000
50/50 [==============================] - 47s 919ms/step - loss: 0.6498 -
accuracy: 0.7336 - val_loss: 0.6501 - val_accuracy: 0.7207
Epoch 152/1000
50/50 [==============================] - 47s 931ms/step - loss: 0.6350 -
accuracy: 0.7404 - val_loss: 0.6335 - val_accuracy: 0.7313
Epoch 153/1000
50/50 [==============================] - 46s 914ms/step - loss: 0.6371 -
accuracy: 0.7328 - val_loss: 0.6710 - val_accuracy: 0.7140
Epoch 154/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.5779 -
accuracy: 0.7584 - val_loss: 0.6173 - val_accuracy: 0.7320
Epoch 155/1000
50/50 [==============================] - 46s 918ms/step - loss: 0.6275 -
accuracy: 0.7332 - val_loss: 0.6267 - val_accuracy: 0.7387
Epoch 156/1000
50/50 [==============================] - 52s 1s/step - loss: 0.6287 - accuracy:
0.7400 - val_loss: 0.5634 - val_accuracy: 0.7687
Epoch 157/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.6085 -
accuracy: 0.7424 - val_loss: 0.6204 - val_accuracy: 0.7347
Epoch 158/1000
50/50 [==============================] - 50s 1s/step - loss: 0.6121 - accuracy:
0.7512 - val_loss: 0.6465 - val_accuracy: 0.7247
Epoch 159/1000
50/50 [==============================] - 48s 962ms/step - loss: 0.6329 -
accuracy: 0.7304 - val_loss: 0.6833 - val_accuracy: 0.6887
Epoch 160/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.6237 -
accuracy: 0.7332 - val_loss: 0.5864 - val_accuracy: 0.7547
Epoch 161/1000
50/50 [==============================] - 46s 910ms/step - loss: 0.6364 -
accuracy: 0.7344 - val_loss: 0.6411 - val_accuracy: 0.7320
Epoch 162/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.6210 -
accuracy: 0.7400 - val_loss: 0.5728 - val_accuracy: 0.7587
Epoch 163/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.5970 -
accuracy: 0.7540 - val_loss: 1.0214 - val_accuracy: 0.5453
Epoch 164/1000
50/50 [==============================] - 47s 939ms/step - loss: 0.6209 -
accuracy: 0.7440 - val_loss: 0.8401 - val_accuracy: 0.6573
Epoch 165/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.5876 -
accuracy: 0.7532 - val_loss: 0.7387 - val_accuracy: 0.7000
Epoch 166/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.5899 -
accuracy: 0.7584 - val_loss: 0.6276 - val_accuracy: 0.7367
```

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Epoch 167/1000
50/50 [==============================] - 48s 968ms/step - loss: 0.6042 -
accuracy: 0.7422 - val_loss: 0.5933 - val_accuracy: 0.7633
Epoch 168/1000
50/50 [==============================] - 48s 971ms/step - loss: 0.6085 -
accuracy: 0.7544 - val_loss: 0.5794 - val_accuracy: 0.7500
Epoch 169/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.6018 -
accuracy: 0.7580 - val_loss: 0.6724 - val_accuracy: 0.7193
Epoch 170/1000
50/50 [==============================] - 47s 944ms/step - loss: 0.5938 -
accuracy: 0.7507 - val_loss: 0.6272 - val_accuracy: 0.7520
Epoch 171/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.6032 -
accuracy: 0.7460 - val_loss: 0.6208 - val_accuracy: 0.7393
Epoch 172/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.5952 -
accuracy: 0.7572 - val_loss: 0.7191 - val_accuracy: 0.7087
Epoch 173/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.6089 -
accuracy: 0.7402 - val_loss: 0.5501 - val_accuracy: 0.7647
Epoch 174/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.5535 -
accuracy: 0.7752 - val_loss: 0.6050 - val_accuracy: 0.7533
Epoch 175/1000
50/50 [==============================] - 47s 943ms/step - loss: 0.5876 -
accuracy: 0.7515 - val_loss: 0.6720 - val_accuracy: 0.7180
Epoch 176/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5919 - accuracy:
0.7528 - val_loss: 0.7126 - val_accuracy: 0.7153
Epoch 177/1000
50/50 [==============================] - 47s 945ms/step - loss: 0.6118 -
accuracy: 0.7444 - val_loss: 0.5943 - val_accuracy: 0.7493
Epoch 178/1000
50/50 [==============================] - 46s 929ms/step - loss: 0.5948 -
accuracy: 0.7584 - val_loss: 0.6184 - val_accuracy: 0.7507
Epoch 179/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.5886 -
accuracy: 0.7511 - val_loss: 0.6823 - val_accuracy: 0.7153
Epoch 180/1000
50/50 [==============================] - 47s 931ms/step - loss: 0.5796 -
accuracy: 0.7572 - val_loss: 0.6336 - val_accuracy: 0.7280
Epoch 181/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.6013 -
accuracy: 0.7438 - val_loss: 0.5993 - val_accuracy: 0.7593
Epoch 182/1000
50/50 [==============================] - 46s 925ms/step - loss: 0.5774 -
accuracy: 0.7660 - val_loss: 0.8429 - val_accuracy: 0.6593
```

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Epoch 183/1000
50/50 [==============================] - 46s 919ms/step - loss: 0.5684 -
accuracy: 0.7584 - val_loss: 0.6081 - val_accuracy: 0.7513
Epoch 184/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.6101 -
accuracy: 0.7448 - val_loss: 0.5941 - val_accuracy: 0.7613
Epoch 185/1000
50/50 [==============================] - 49s 980ms/step - loss: 0.6093 -
accuracy: 0.7426 - val_loss: 0.7618 - val_accuracy: 0.7007
Epoch 186/1000
50/50 [==============================] - 47s 934ms/step - loss: 0.5799 -
accuracy: 0.7564 - val_loss: 0.5430 - val_accuracy: 0.7740
Epoch 187/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.5980 -
accuracy: 0.7442 - val_loss: 0.5570 - val_accuracy: 0.7600
Epoch 188/1000
50/50 [==============================] - 47s 947ms/step - loss: 0.5741 -
accuracy: 0.7568 - val_loss: 0.7126 - val_accuracy: 0.7047
Epoch 189/1000
50/50 [==============================] - 47s 934ms/step - loss: 0.5844 -
accuracy: 0.7644 - val_loss: 0.5687 - val_accuracy: 0.7647
Epoch 190/1000
50/50 [==============================] - 48s 961ms/step - loss: 0.5890 -
accuracy: 0.7516 - val_loss: 0.5617 - val_accuracy: 0.7627
Epoch 191/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.5690 -
accuracy: 0.7732 - val_loss: 0.6135 - val_accuracy: 0.7480
Epoch 192/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.6083 -
accuracy: 0.7348 - val_loss: 0.5635 - val_accuracy: 0.7580
Epoch 193/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.6083 -
accuracy: 0.7568 - val_loss: 0.7277 - val_accuracy: 0.7187
Epoch 194/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.5620 -
accuracy: 0.7648 - val_loss: 0.5728 - val_accuracy: 0.7707
Epoch 195/1000
50/50 [==============================] - 47s 937ms/step - loss: 0.6075 -
accuracy: 0.7450 - val_loss: 0.5947 - val_accuracy: 0.7513
Epoch 196/1000
50/50 [==============================] - 46s 915ms/step - loss: 0.5685 -
accuracy: 0.7708 - val_loss: 0.6747 - val_accuracy: 0.7313
Epoch 197/1000
50/50 [==============================] - 47s 950ms/step - loss: 0.5598 -
accuracy: 0.7472 - val_loss: 0.5857 - val_accuracy: 0.7673
Epoch 198/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.5939 -
accuracy: 0.7516 - val_loss: 0.6479 - val_accuracy: 0.7400
```

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Epoch 199/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.6158 -
accuracy: 0.7450 - val_loss: 0.6230 - val_accuracy: 0.7453
Epoch 200/1000
50/50 [==============================] - 45s 901ms/step - loss: 0.5770 -
accuracy: 0.7657 - val_loss: 0.5507 - val_accuracy: 0.7633
Epoch 201/1000
50/50 [==============================] - 49s 977ms/step - loss: 0.5888 -
accuracy: 0.7552 - val_loss: 0.5651 - val_accuracy: 0.7753
Epoch 202/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.5584 -
accuracy: 0.7708 - val_loss: 0.5695 - val_accuracy: 0.7680
Epoch 203/1000
50/50 [==============================] - 48s 968ms/step - loss: 0.5686 -
accuracy: 0.7692 - val_loss: 0.7045 - val_accuracy: 0.6980
Epoch 204/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.5946 -
accuracy: 0.7476 - val_loss: 0.5812 - val_accuracy: 0.7560
Epoch 205/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.5643 -
accuracy: 0.7668 - val_loss: 0.5987 - val_accuracy: 0.7347
Epoch 206/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.5459 -
accuracy: 0.7756 - val_loss: 0.5499 - val_accuracy: 0.7833
Epoch 207/1000
50/50 [==============================] - 49s 973ms/step - loss: 0.5638 -
accuracy: 0.7714 - val_loss: 0.5672 - val_accuracy: 0.7693
Epoch 208/1000
50/50 [==============================] - 47s 939ms/step - loss: 0.5786 -
accuracy: 0.7636 - val_loss: 0.5386 - val_accuracy: 0.7727
Epoch 209/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.5743 -
accuracy: 0.7596 - val_loss: 0.6525 - val_accuracy: 0.7353
Epoch 210/1000
50/50 [==============================] - 47s 934ms/step - loss: 0.5812 -
accuracy: 0.7596 - val_loss: 0.6811 - val_accuracy: 0.7367
Epoch 211/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.6050 -
accuracy: 0.7480 - val_loss: 0.5681 - val_accuracy: 0.7587
Epoch 212/1000
50/50 [==============================] - 47s 931ms/step - loss: 0.5827 -
accuracy: 0.7560 - val_loss: 0.5457 - val_accuracy: 0.7867
Epoch 213/1000
50/50 [==============================] - 46s 916ms/step - loss: 0.5878 -
accuracy: 0.7487 - val_loss: 0.6062 - val_accuracy: 0.7407
Epoch 214/1000
50/50 [==============================] - 47s 948ms/step - loss: 0.5713 -
accuracy: 0.7652 - val_loss: 0.5648 - val_accuracy: 0.7733
```

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Epoch 215/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.5449 -
accuracy: 0.7752 - val_loss: 0.5999 - val_accuracy: 0.7447
Epoch 216/1000
50/50 [==============================] - 47s 940ms/step - loss: 0.5748 -
accuracy: 0.7580 - val_loss: 0.5765 - val_accuracy: 0.7753
Epoch 217/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.5867 -
accuracy: 0.7616 - val_loss: 0.5963 - val_accuracy: 0.7520
Epoch 218/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.5772 -
accuracy: 0.7556 - val_loss: 0.5555 - val_accuracy: 0.7840
Epoch 219/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.5832 -
accuracy: 0.7664 - val_loss: 0.5847 - val_accuracy: 0.7527
Epoch 220/1000
50/50 [==============================] - 48s 969ms/step - loss: 0.5775 -
accuracy: 0.7492 - val_loss: 0.5800 - val_accuracy: 0.7573
Epoch 221/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.5714 -
accuracy: 0.7700 - val_loss: 0.7439 - val_accuracy: 0.6880
Epoch 222/1000
50/50 [==============================] - 47s 944ms/step - loss: 0.5608 -
accuracy: 0.7716 - val_loss: 0.5582 - val_accuracy: 0.7733
Epoch 223/1000
50/50 [==============================] - 46s 928ms/step - loss: 0.5696 -
accuracy: 0.7724 - val_loss: 0.5806 - val_accuracy: 0.7673
Epoch 224/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.5615 -
accuracy: 0.7657 - val_loss: 0.5773 - val_accuracy: 0.7613
Epoch 225/1000
50/50 [==============================] - 45s 905ms/step - loss: 0.5823 -
accuracy: 0.7636 - val_loss: 0.5706 - val_accuracy: 0.7607
Epoch 226/1000
50/50 [==============================] - 48s 967ms/step - loss: 0.5613 -
accuracy: 0.7596 - val_loss: 0.6372 - val_accuracy: 0.7200
Epoch 227/1000
50/50 [==============================] - 47s 944ms/step - loss: 0.5640 -
accuracy: 0.7684 - val_loss: 0.5942 - val_accuracy: 0.7627
Epoch 228/1000
50/50 [==============================] - 102s 2s/step - loss: 0.5610 - accuracy:
0.7720 - val_loss: 0.5571 - val_accuracy: 0.7813
Epoch 229/1000
50/50 [==============================] - 149s 3s/step - loss: 0.5700 - accuracy:
0.7660 - val_loss: 0.7296 - val_accuracy: 0.6933
Epoch 230/1000
50/50 [==============================] - 129s 3s/step - loss: 0.5732 - accuracy:
0.7608 - val_loss: 0.6084 - val_accuracy: 0.7547
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Epoch 231/1000
50/50 [==============================] - 126s 3s/step - loss: 0.5542 - accuracy:
0.7700 - val_loss: 0.6730 - val_accuracy: 0.7467
Epoch 232/1000
50/50 [==============================] - 129s 3s/step - loss: 0.5604 - accuracy:
0.7629 - val_loss: 0.5730 - val_accuracy: 0.7707
Epoch 233/1000
50/50 [==============================] - 141s 3s/step - loss: 0.5469 - accuracy:
0.7742 - val_loss: 0.5218 - val_accuracy: 0.7840
Epoch 234/1000
50/50 [==============================] - 54s 1s/step - loss: 0.5558 - accuracy:
0.7758 - val_loss: 0.5528 - val_accuracy: 0.7840
Epoch 235/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5562 - accuracy:
0.7788 - val_loss: 0.7100 - val_accuracy: 0.7280
Epoch 236/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.5535 -
accuracy: 0.7732 - val_loss: 0.5088 - val_accuracy: 0.7940
Epoch 237/1000
50/50 [==============================] - 49s 971ms/step - loss: 0.5827 -
accuracy: 0.7604 - val_loss: 0.6330 - val_accuracy: 0.7373
Epoch 238/1000
50/50 [==============================] - 48s 968ms/step - loss: 0.5556 -
accuracy: 0.7728 - val_loss: 0.6138 - val_accuracy: 0.7593
Epoch 239/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5440 - accuracy:
0.7696 - val_loss: 0.5000 - val_accuracy: 0.8020
Epoch 240/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.5472 -
accuracy: 0.7792 - val_loss: 0.5652 - val_accuracy: 0.7687
Epoch 241/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.5364 -
accuracy: 0.7796 - val_loss: 0.5090 - val_accuracy: 0.7900
Epoch 242/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5599 - accuracy:
0.7688 - val_loss: 0.5123 - val_accuracy: 0.7867
Epoch 243/1000
50/50 [==============================] - 50s 991ms/step - loss: 0.5765 -
accuracy: 0.7568 - val_loss: 0.5445 - val_accuracy: 0.7647
Epoch 244/1000
50/50 [==============================] - 49s 973ms/step - loss: 0.5454 -
accuracy: 0.7665 - val_loss: 0.6185 - val_accuracy: 0.7433
Epoch 245/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5505 - accuracy:
0.7628 - val_loss: 0.6100 - val_accuracy: 0.7507
Epoch 246/1000
50/50 [==============================] - 53s 1s/step - loss: 0.5798 - accuracy:
0.7548 - val_loss: 0.5465 - val_accuracy: 0.7760
```

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Epoch 247/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5270 - accuracy:
0.7872 - val_loss: 0.5186 - val_accuracy: 0.7833
Epoch 248/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5221 - accuracy:
0.7848 - val_loss: 0.7203 - val_accuracy: 0.7267
Epoch 249/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5495 - accuracy:
0.7792 - val_loss: 0.5403 - val_accuracy: 0.7687
Epoch 250/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.5749 -
accuracy: 0.7584 - val_loss: 0.5684 - val_accuracy: 0.7720
Epoch 251/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5471 - accuracy:
0.7628 - val_loss: 0.5252 - val_accuracy: 0.7793
Epoch 252/1000
50/50 [==============================] - 50s 999ms/step - loss: 0.5510 -
accuracy: 0.7680 - val_loss: 0.4910 - val_accuracy: 0.7900
Epoch 253/1000
50/50 [==============================] - 49s 984ms/step - loss: 0.5362 -
accuracy: 0.7740 - val_loss: 0.6032 - val_accuracy: 0.7500
Epoch 254/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5324 - accuracy:
0.7836 - val_loss: 0.6551 - val_accuracy: 0.7487
Epoch 255/1000
50/50 [==============================] - 49s 989ms/step - loss: 0.5587 -
accuracy: 0.7677 - val_loss: 0.5810 - val_accuracy: 0.7627
Epoch 256/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5320 - accuracy:
0.7787 - val_loss: 0.6790 - val_accuracy: 0.7273
Epoch 257/1000
50/50 [==============================] - 57s 1s/step - loss: 0.5762 - accuracy:
0.7556 - val_loss: 0.5795 - val_accuracy: 0.7627
Epoch 258/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5405 - accuracy:
0.7820 - val_loss: 0.7282 - val_accuracy: 0.7147
Epoch 259/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.5375 -
accuracy: 0.7656 - val_loss: 0.5820 - val_accuracy: 0.7713
Epoch 260/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.5401 -
accuracy: 0.7704 - val_loss: 0.5633 - val_accuracy: 0.7700
Epoch 261/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5428 - accuracy:
0.7734 - val_loss: 0.6252 - val_accuracy: 0.7507
Epoch 262/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5476 - accuracy:
0.7728 - val_loss: 0.5887 - val_accuracy: 0.7687
```

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Epoch 263/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5298 - accuracy:
0.7848 - val_loss: 0.6519 - val_accuracy: 0.7587
Epoch 264/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5240 - accuracy:
0.7872 - val_loss: 0.7688 - val_accuracy: 0.7113
Epoch 265/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5238 - accuracy:
0.7868 - val_loss: 0.6824 - val_accuracy: 0.7253
Epoch 266/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.5131 -
accuracy: 0.7936 - val_loss: 0.5659 - val_accuracy: 0.7753
Epoch 267/1000
50/50 [==============================] - 49s 979ms/step - loss: 0.5448 -
accuracy: 0.7718 - val_loss: 0.5479 - val_accuracy: 0.7727
Epoch 268/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5297 - accuracy:
0.7876 - val_loss: 0.5621 - val_accuracy: 0.7780
Epoch 269/1000
50/50 [==============================] - 57s 1s/step - loss: 0.5161 - accuracy:
0.7921 - val_loss: 0.5713 - val_accuracy: 0.7680
Epoch 270/1000
50/50 [==============================] - 49s 984ms/step - loss: 0.5227 -
accuracy: 0.7844 - val_loss: 0.5930 - val_accuracy: 0.7627
Epoch 271/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.5474 -
accuracy: 0.7839 - val_loss: 0.5901 - val_accuracy: 0.7707
Epoch 272/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5472 - accuracy:
0.7760 - val_loss: 0.5250 - val_accuracy: 0.7847
Epoch 273/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.5197 -
accuracy: 0.7820 - val_loss: 0.5764 - val_accuracy: 0.7660
Epoch 274/1000
50/50 [==============================] - 50s 995ms/step - loss: 0.5605 -
accuracy: 0.7768 - val_loss: 0.5887 - val_accuracy: 0.7680
Epoch 275/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5236 - accuracy:
0.7734 - val_loss: 0.6239 - val_accuracy: 0.7673
Epoch 276/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.5538 -
accuracy: 0.7736 - val_loss: 0.5682 - val_accuracy: 0.7813
Epoch 277/1000
50/50 [==============================] - 53s 1s/step - loss: 0.5189 - accuracy:
0.7864 - val_loss: 0.5447 - val_accuracy: 0.7693
Epoch 278/1000
50/50 [==============================] - 58s 1s/step - loss: 0.5277 - accuracy:
0.7835 - val_loss: 0.5983 - val_accuracy: 0.7580
```

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Epoch 279/1000
50/50 [==============================] - 48s 966ms/step - loss: 0.5442 -
accuracy: 0.7738 - val_loss: 0.6497 - val_accuracy: 0.7513
Epoch 280/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5436 - accuracy:
0.7656 - val_loss: 0.6304 - val_accuracy: 0.7627
Epoch 281/1000
50/50 [==============================] - 57s 1s/step - loss: 0.5391 - accuracy:
0.7744 - val_loss: 0.5033 - val_accuracy: 0.7940
Epoch 282/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5094 - accuracy:
0.7864 - val_loss: 0.5834 - val_accuracy: 0.7707
Epoch 283/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.5312 -
accuracy: 0.7685 - val_loss: 0.6337 - val_accuracy: 0.7387
Epoch 284/1000
50/50 [==============================] - 50s 995ms/step - loss: 0.5208 -
accuracy: 0.7816 - val_loss: 0.5062 - val_accuracy: 0.7820
Epoch 285/1000
50/50 [==============================] - 50s 999ms/step - loss: 0.5149 -
accuracy: 0.7764 - val_loss: 0.5545 - val_accuracy: 0.7727
Epoch 286/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5257 - accuracy:
0.7828 - val_loss: 0.5212 - val_accuracy: 0.7813
Epoch 287/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5292 - accuracy:
0.7839 - val_loss: 0.5371 - val_accuracy: 0.7733
Epoch 288/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.5189 -
accuracy: 0.7888 - val_loss: 0.6373 - val_accuracy: 0.7567
Epoch 289/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5154 - accuracy:
0.7856 - val_loss: 0.6633 - val_accuracy: 0.7440
Epoch 290/1000
50/50 [==============================] - 48s 970ms/step - loss: 0.5216 -
accuracy: 0.7808 - val_loss: 0.5829 - val_accuracy: 0.7633
Epoch 291/1000
50/50 [==============================] - 48s 967ms/step - loss: 0.5382 -
accuracy: 0.7844 - val_loss: 0.5325 - val_accuracy: 0.7760
Epoch 292/1000
50/50 [==============================] - 47s 947ms/step - loss: 0.5118 -
accuracy: 0.7924 - val_loss: 0.6187 - val_accuracy: 0.7587
Epoch 293/1000
50/50 [==============================] - 53s 1s/step - loss: 0.5144 - accuracy:
0.7928 - val_loss: 0.7045 - val_accuracy: 0.7320
Epoch 294/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.5176 -
accuracy: 0.7796 - val_loss: 0.7049 - val_accuracy: 0.7333
```

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Epoch 295/1000
50/50 [==============================] - 49s 977ms/step - loss: 0.5265 -
accuracy: 0.7864 - val_loss: 0.6315 - val_accuracy: 0.7533
Epoch 296/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5005 - accuracy:
0.7916 - val_loss: 0.6336 - val_accuracy: 0.7520
Epoch 297/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.5151 -
accuracy: 0.7994 - val_loss: 0.5264 - val_accuracy: 0.8020
Epoch 298/1000
50/50 [==============================] - 47s 943ms/step - loss: 0.4994 -
accuracy: 0.7888 - val_loss: 0.5560 - val_accuracy: 0.7920
Epoch 299/1000
50/50 [==============================] - 46s 925ms/step - loss: 0.5185 -
accuracy: 0.7864 - val_loss: 0.6319 - val_accuracy: 0.7453
Epoch 300/1000
50/50 [==============================] - 48s 946ms/step - loss: 0.4921 -
accuracy: 0.8064 - val_loss: 0.6191 - val_accuracy: 0.7640
Epoch 301/1000
50/50 [==============================] - 48s 951ms/step - loss: 0.5121 -
accuracy: 0.7960 - val_loss: 0.5963 - val_accuracy: 0.7713
Epoch 302/1000
50/50 [==============================] - 50s 989ms/step - loss: 0.5169 -
accuracy: 0.7852 - val_loss: 0.5713 - val_accuracy: 0.7713
Epoch 303/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.5157 -
accuracy: 0.7824 - val_loss: 0.5932 - val_accuracy: 0.7520
Epoch 304/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.5246 -
accuracy: 0.7832 - val_loss: 0.5693 - val_accuracy: 0.7720
Epoch 305/1000
50/50 [==============================] - 53s 1s/step - loss: 0.5082 - accuracy:
0.7900 - val_loss: 0.5038 - val_accuracy: 0.7940
Epoch 306/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.5196 -
accuracy: 0.7920 - val_loss: 0.5672 - val_accuracy: 0.7647
Epoch 307/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.5136 -
accuracy: 0.7892 - val_loss: 0.6108 - val_accuracy: 0.7633
Epoch 308/1000
50/50 [==============================] - 48s 966ms/step - loss: 0.5106 -
accuracy: 0.7908 - val_loss: 0.5302 - val_accuracy: 0.7867
Epoch 309/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.5294 -
accuracy: 0.7820 - val_loss: 0.5920 - val_accuracy: 0.7513
Epoch 310/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.5058 -
accuracy: 0.7900 - val_loss: 0.6934 - val_accuracy: 0.7233
```

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Epoch 311/1000
50/50 [==============================] - 47s 944ms/step - loss: 0.5218 -
accuracy: 0.7780 - val_loss: 0.5607 - val_accuracy: 0.7793
Epoch 312/1000
50/50 [==============================] - 48s 967ms/step - loss: 0.5051 -
accuracy: 0.7812 - val_loss: 0.5084 - val_accuracy: 0.7960
Epoch 313/1000
50/50 [==============================] - 46s 929ms/step - loss: 0.5157 -
accuracy: 0.7884 - val_loss: 0.7219 - val_accuracy: 0.7167
Epoch 314/1000
50/50 [==============================] - 50s 998ms/step - loss: 0.4717 -
accuracy: 0.8006 - val_loss: 0.5279 - val_accuracy: 0.7887
Epoch 315/1000
50/50 [==============================] - 48s 966ms/step - loss: 0.4928 -
accuracy: 0.8028 - val_loss: 0.8348 - val_accuracy: 0.7060
Epoch 316/1000
50/50 [==============================] - 47s 951ms/step - loss: 0.5234 -
accuracy: 0.7820 - val_loss: 0.5942 - val_accuracy: 0.7540
Epoch 317/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.5413 -
accuracy: 0.7775 - val_loss: 0.5480 - val_accuracy: 0.7787
Epoch 318/1000
50/50 [==============================] - 48s 951ms/step - loss: 0.4821 -
accuracy: 0.8056 - val_loss: 0.6299 - val_accuracy: 0.7580
Epoch 319/1000
50/50 [==============================] - 48s 967ms/step - loss: 0.5209 -
accuracy: 0.7787 - val_loss: 0.6132 - val_accuracy: 0.7613
Epoch 320/1000
50/50 [==============================] - 48s 950ms/step - loss: 0.5051 -
accuracy: 0.7900 - val_loss: 0.5854 - val_accuracy: 0.7680
Epoch 321/1000
50/50 [==============================] - 47s 941ms/step - loss: 0.5170 -
accuracy: 0.7892 - val_loss: 0.5591 - val_accuracy: 0.7707
Epoch 322/1000
50/50 [==============================] - 50s 991ms/step - loss: 0.5214 -
accuracy: 0.7944 - val_loss: 0.5779 - val_accuracy: 0.7740
Epoch 323/1000
50/50 [==============================] - 48s 969ms/step - loss: 0.5270 -
accuracy: 0.7800 - val_loss: 0.6605 - val_accuracy: 0.7500
Epoch 324/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.5064 -
accuracy: 0.7916 - val_loss: 0.6034 - val_accuracy: 0.7567
Epoch 325/1000
50/50 [==============================] - 47s 949ms/step - loss: 0.5308 -
accuracy: 0.7832 - val_loss: 0.5568 - val_accuracy: 0.7820
Epoch 326/1000
50/50 [==============================] - 47s 931ms/step - loss: 0.5175 -
accuracy: 0.7876 - val_loss: 0.5134 - val_accuracy: 0.7867
```

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Epoch 327/1000
50/50 [==============================] - 48s 964ms/step - loss: 0.4942 -
accuracy: 0.7908 - val_loss: 0.6844 - val_accuracy: 0.7373
Epoch 328/1000
50/50 [==============================] - 47s 951ms/step - loss: 0.5006 -
accuracy: 0.7956 - val_loss: 0.6142 - val_accuracy: 0.7613
Epoch 329/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.5245 -
accuracy: 0.7812 - val_loss: 0.4771 - val_accuracy: 0.8113
Epoch 330/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4694 - accuracy:
0.8020 - val_loss: 0.5762 - val_accuracy: 0.7807
Epoch 331/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.5305 -
accuracy: 0.7736 - val_loss: 0.5754 - val_accuracy: 0.7667
Epoch 332/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.5269 -
accuracy: 0.7756 - val_loss: 0.5594 - val_accuracy: 0.7673
Epoch 333/1000
50/50 [==============================] - 50s 995ms/step - loss: 0.5120 -
accuracy: 0.7936 - val_loss: 0.5746 - val_accuracy: 0.7687
Epoch 334/1000
50/50 [==============================] - 49s 977ms/step - loss: 0.5003 -
accuracy: 0.7912 - val_loss: 0.5569 - val_accuracy: 0.7727
Epoch 335/1000
50/50 [==============================] - 49s 973ms/step - loss: 0.5190 -
accuracy: 0.7812 - val_loss: 0.5695 - val_accuracy: 0.7740
Epoch 336/1000
50/50 [==============================] - 46s 913ms/step - loss: 0.5212 -
accuracy: 0.7872 - val_loss: 0.5501 - val_accuracy: 0.7820
Epoch 337/1000
50/50 [==============================] - 49s 980ms/step - loss: 0.5049 -
accuracy: 0.7868 - val_loss: 0.5921 - val_accuracy: 0.7667
Epoch 338/1000
50/50 [==============================] - 48s 962ms/step - loss: 0.4864 -
accuracy: 0.8012 - val_loss: 0.5812 - val_accuracy: 0.7647
Epoch 339/1000
50/50 [==============================] - 48s 961ms/step - loss: 0.5013 -
accuracy: 0.7912 - val_loss: 0.6036 - val_accuracy: 0.7667
Epoch 340/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.5158 -
accuracy: 0.7836 - val_loss: 0.6242 - val_accuracy: 0.7680
Epoch 341/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.5147 -
accuracy: 0.7888 - val_loss: 0.5549 - val_accuracy: 0.7753
Epoch 342/1000
50/50 [==============================] - 49s 975ms/step - loss: 0.5174 -
accuracy: 0.7908 - val_loss: 0.5966 - val_accuracy: 0.7673
```

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Epoch 343/1000
50/50 [==============================] - 48s 958ms/step - loss: 0.5180 -
accuracy: 0.7944 - val_loss: 0.6122 - val_accuracy: 0.7813
Epoch 344/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.5171 -
accuracy: 0.7933 - val_loss: 0.5862 - val_accuracy: 0.7640
Epoch 345/1000
50/50 [==============================] - 47s 948ms/step - loss: 0.4888 -
accuracy: 0.7936 - val_loss: 0.5765 - val_accuracy: 0.7760
Epoch 346/1000
50/50 [==============================] - 46s 916ms/step - loss: 0.5008 -
accuracy: 0.7960 - val_loss: 0.7134 - val_accuracy: 0.7520
Epoch 347/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.5144 -
accuracy: 0.7856 - val_loss: 0.6666 - val_accuracy: 0.7367
Epoch 348/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.4923 -
accuracy: 0.8064 - val_loss: 0.5417 - val_accuracy: 0.7713
Epoch 349/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.4904 -
accuracy: 0.7920 - val_loss: 0.5206 - val_accuracy: 0.7993
Epoch 350/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.4760 -
accuracy: 0.7952 - val_loss: 0.6978 - val_accuracy: 0.7327
Epoch 351/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.5173 -
accuracy: 0.7836 - val_loss: 0.5770 - val_accuracy: 0.7620
Epoch 352/1000
50/50 [==============================] - 48s 967ms/step - loss: 0.5123 -
accuracy: 0.7945 - val_loss: 0.5418 - val_accuracy: 0.7753
Epoch 353/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.4820 -
accuracy: 0.7972 - val_loss: 0.6408 - val_accuracy: 0.7507
Epoch 354/1000
50/50 [==============================] - 47s 934ms/step - loss: 0.5048 -
accuracy: 0.7932 - val_loss: 0.6246 - val_accuracy: 0.7507
Epoch 355/1000
50/50 [==============================] - 50s 999ms/step - loss: 0.5039 -
accuracy: 0.7920 - val_loss: 0.5071 - val_accuracy: 0.7980
Epoch 356/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.4884 -
accuracy: 0.8075 - val_loss: 0.6659 - val_accuracy: 0.7507
Epoch 357/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.5243 -
accuracy: 0.7848 - val_loss: 0.5683 - val_accuracy: 0.7747
Epoch 358/1000
50/50 [==============================] - 46s 928ms/step - loss: 0.4723 -
accuracy: 0.8000 - val_loss: 0.5287 - val_accuracy: 0.7813
```

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Epoch 359/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.4952 -
accuracy: 0.8008 - val_loss: 0.6527 - val_accuracy: 0.7520
Epoch 360/1000
50/50 [==============================] - 49s 969ms/step - loss: 0.4938 -
accuracy: 0.8052 - val_loss: 0.6383 - val_accuracy: 0.7453
Epoch 361/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.5065 -
accuracy: 0.7988 - val_loss: 0.5664 - val_accuracy: 0.7800
Epoch 362/1000
50/50 [==============================] - 50s 991ms/step - loss: 0.4991 -
accuracy: 0.7989 - val_loss: 0.6064 - val_accuracy: 0.7640
Epoch 363/1000
50/50 [==============================] - 130s 3s/step - loss: 0.4887 - accuracy:
0.7964 - val_loss: 0.5057 - val_accuracy: 0.7927
Epoch 364/1000
50/50 [==============================] - 156s 3s/step - loss: 0.4985 - accuracy:
0.8028 - val_loss: 0.5675 - val_accuracy: 0.7813
Epoch 365/1000
50/50 [==============================] - 133s 3s/step - loss: 0.5012 - accuracy:
0.7872 - val_loss: 0.4830 - val_accuracy: 0.7900
Epoch 366/1000
50/50 [==============================] - 131s 3s/step - loss: 0.5145 - accuracy:
0.7876 - val_loss: 0.5807 - val_accuracy: 0.7740
Epoch 367/1000
50/50 [==============================] - 128s 3s/step - loss: 0.4948 - accuracy:
0.8012 - val_loss: 0.8626 - val_accuracy: 0.7087
Epoch 368/1000
50/50 [==============================] - 136s 3s/step - loss: 0.4918 - accuracy:
0.8016 - val_loss: 0.6070 - val_accuracy: 0.7740
Epoch 369/1000
50/50 [==============================] - 159s 3s/step - loss: 0.4675 - accuracy:
0.8156 - val_loss: 0.5843 - val_accuracy: 0.7733
Epoch 370/1000
50/50 [==============================] - 134s 3s/step - loss: 0.4888 - accuracy:
0.8032 - val_loss: 0.4827 - val_accuracy: 0.8080
Epoch 371/1000
50/50 [==============================] - 127s 3s/step - loss: 0.5046 - accuracy:
0.8016 - val_loss: 0.5915 - val_accuracy: 0.7627
Epoch 372/1000
50/50 [==============================] - 72s 1s/step - loss: 0.4632 - accuracy:
0.7996 - val_loss: 0.5894 - val_accuracy: 0.7813
Epoch 373/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5157 - accuracy:
0.7928 - val_loss: 0.5206 - val_accuracy: 0.7987
Epoch 374/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4847 - accuracy:
0.8076 - val_loss: 0.4946 - val_accuracy: 0.8020
```

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Epoch 375/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4986 - accuracy:
0.7964 - val_loss: 0.5240 - val_accuracy: 0.7907
Epoch 376/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5327 - accuracy:
0.7783 - val_loss: 0.6438 - val_accuracy: 0.7613
Epoch 377/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4823 - accuracy:
0.8016 - val_loss: 0.6900 - val_accuracy: 0.7493
Epoch 378/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4858 - accuracy:
0.8072 - val_loss: 0.5906 - val_accuracy: 0.7560
Epoch 379/1000
50/50 [==============================] - 49s 975ms/step - loss: 0.4909 -
accuracy: 0.7992 - val_loss: 0.5178 - val_accuracy: 0.7927
Epoch 380/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.4708 -
accuracy: 0.8111 - val_loss: 0.5497 - val_accuracy: 0.7813
Epoch 381/1000
50/50 [==============================] - 50s 999ms/step - loss: 0.4830 -
accuracy: 0.7996 - val_loss: 0.5868 - val_accuracy: 0.7720
Epoch 382/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5055 - accuracy:
0.7956 - val_loss: 0.5328 - val_accuracy: 0.7900
Epoch 383/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4886 - accuracy:
0.8006 - val_loss: 0.4956 - val_accuracy: 0.8027
Epoch 384/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.4909 -
accuracy: 0.8018 - val_loss: 0.6476 - val_accuracy: 0.7527
Epoch 385/1000
50/50 [==============================] - 49s 976ms/step - loss: 0.4995 -
accuracy: 0.7944 - val_loss: 0.6832 - val_accuracy: 0.7460
Epoch 386/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4753 - accuracy:
0.8012 - val_loss: 0.7197 - val_accuracy: 0.7420
Epoch 387/1000
50/50 [==============================] - 58s 1s/step - loss: 0.4873 - accuracy:
0.8016 - val_loss: 0.5657 - val_accuracy: 0.7860
Epoch 388/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4866 - accuracy:
0.7984 - val_loss: 1.1019 - val_accuracy: 0.6567
Epoch 389/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.4900 -
accuracy: 0.7952 - val_loss: 0.6141 - val_accuracy: 0.7507
Epoch 390/1000
50/50 [==============================] - 48s 958ms/step - loss: 0.4926 -
accuracy: 0.8088 - val_loss: 0.5532 - val_accuracy: 0.7793
```

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Epoch 391/1000
50/50 [==============================] - 49s 980ms/step - loss: 0.4854 -
accuracy: 0.8040 - val_loss: 0.5754 - val_accuracy: 0.7733
Epoch 392/1000
50/50 [==============================] - 50s 991ms/step - loss: 0.4944 -
accuracy: 0.7928 - val_loss: 0.5957 - val_accuracy: 0.7673
Epoch 393/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.4894 -
accuracy: 0.7973 - val_loss: 0.5351 - val_accuracy: 0.7960
Epoch 394/1000
50/50 [==============================] - 50s 983ms/step - loss: 0.4898 -
accuracy: 0.7888 - val_loss: 0.6238 - val_accuracy: 0.7640
Epoch 395/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.4914 -
accuracy: 0.8014 - val_loss: 0.5368 - val_accuracy: 0.7860
Epoch 396/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4913 - accuracy:
0.7957 - val_loss: 0.6407 - val_accuracy: 0.7580
Epoch 397/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4581 - accuracy:
0.8076 - val_loss: 0.5692 - val_accuracy: 0.7793
Epoch 398/1000
50/50 [==============================] - 59s 1s/step - loss: 0.4886 - accuracy:
0.7940 - val_loss: 0.5979 - val_accuracy: 0.7687
Epoch 399/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4802 - accuracy:
0.7980 - val_loss: 0.5607 - val_accuracy: 0.7793
Epoch 400/1000
50/50 [==============================] - 50s 1s/step - loss: 0.5130 - accuracy:
0.7896 - val_loss: 0.6534 - val_accuracy: 0.7507
Epoch 401/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4729 - accuracy:
0.8060 - val_loss: 0.5541 - val_accuracy: 0.7807
Epoch 402/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4785 - accuracy:
0.7989 - val_loss: 0.8041 - val_accuracy: 0.6913
Epoch 403/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4928 - accuracy:
0.7928 - val_loss: 0.5629 - val_accuracy: 0.7680
Epoch 404/1000
50/50 [==============================] - 48s 964ms/step - loss: 0.4991 -
accuracy: 0.8028 - val_loss: 0.4839 - val_accuracy: 0.7960
Epoch 405/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4957 - accuracy:
0.7964 - val_loss: 0.6103 - val_accuracy: 0.7520
Epoch 406/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4911 - accuracy:
0.7968 - val_loss: 0.5276 - val_accuracy: 0.7927
```

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Epoch 407/1000
50/50 [==============================] - 49s 979ms/step - loss: 0.5041 -
accuracy: 0.8004 - val_loss: 0.4736 - val_accuracy: 0.8040
Epoch 408/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4835 - accuracy:
0.8002 - val_loss: 0.5386 - val_accuracy: 0.7793
Epoch 409/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4826 - accuracy:
0.8008 - val_loss: 0.4921 - val_accuracy: 0.8100
Epoch 410/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4771 - accuracy:
0.8038 - val_loss: 0.5406 - val_accuracy: 0.7853
Epoch 411/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4823 - accuracy:
0.8107 - val_loss: 0.6465 - val_accuracy: 0.7400
Epoch 412/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4781 - accuracy:
0.7994 - val_loss: 0.4890 - val_accuracy: 0.8020
Epoch 413/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.4870 -
accuracy: 0.8024 - val_loss: 0.6097 - val_accuracy: 0.7673
Epoch 414/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.4853 -
accuracy: 0.7952 - val_loss: 0.5373 - val_accuracy: 0.7940
Epoch 415/1000
50/50 [==============================] - 51s 1s/step - loss: 0.5009 - accuracy:
0.7964 - val_loss: 0.5412 - val_accuracy: 0.7920
Epoch 416/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4733 - accuracy:
0.7981 - val_loss: 0.6149 - val_accuracy: 0.7487
Epoch 417/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4913 - accuracy:
0.8014 - val_loss: 0.4824 - val_accuracy: 0.8047
Epoch 418/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.4917 -
accuracy: 0.8056 - val_loss: 0.5254 - val_accuracy: 0.7940
Epoch 419/1000
50/50 [==============================] - 49s 975ms/step - loss: 0.4938 -
accuracy: 0.7848 - val_loss: 0.4921 - val_accuracy: 0.7993
Epoch 420/1000
50/50 [==============================] - 49s 970ms/step - loss: 0.4528 -
accuracy: 0.8136 - val_loss: 0.5262 - val_accuracy: 0.8007
Epoch 421/1000
50/50 [==============================] - 48s 947ms/step - loss: 0.4947 -
accuracy: 0.7944 - val_loss: 0.6266 - val_accuracy: 0.7613
Epoch 422/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4899 - accuracy:
0.8028 - val_loss: 0.5687 - val_accuracy: 0.7767
```

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Epoch 423/1000
50/50 [==============================] - 47s 944ms/step - loss: 0.4624 -
accuracy: 0.8058 - val_loss: 0.5180 - val_accuracy: 0.7993
Epoch 424/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.4637 -
accuracy: 0.8148 - val_loss: 0.5249 - val_accuracy: 0.7860
Epoch 425/1000
50/50 [==============================] - 47s 942ms/step - loss: 0.4772 -
accuracy: 0.8038 - val_loss: 0.5972 - val_accuracy: 0.7680
Epoch 426/1000
50/50 [==============================] - 48s 958ms/step - loss: 0.4906 -
accuracy: 0.8012 - val_loss: 0.5847 - val_accuracy: 0.7693
Epoch 427/1000
50/50 [==============================] - 47s 949ms/step - loss: 0.4701 -
accuracy: 0.8014 - val_loss: 0.5205 - val_accuracy: 0.8007
Epoch 428/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.4876 -
accuracy: 0.8076 - val_loss: 0.4556 - val_accuracy: 0.8180
Epoch 429/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.4914 -
accuracy: 0.8010 - val_loss: 0.4887 - val_accuracy: 0.8020
Epoch 430/1000
50/50 [==============================] - 48s 958ms/step - loss: 0.4888 -
accuracy: 0.8006 - val_loss: 0.5537 - val_accuracy: 0.7873
Epoch 431/1000
50/50 [==============================] - 46s 906ms/step - loss: 0.4655 -
accuracy: 0.8034 - val_loss: 0.5179 - val_accuracy: 0.7880
Epoch 432/1000
50/50 [==============================] - 46s 925ms/step - loss: 0.4786 -
accuracy: 0.8084 - val_loss: 0.5303 - val_accuracy: 0.7947
Epoch 433/1000
50/50 [==============================] - 48s 968ms/step - loss: 0.4782 -
accuracy: 0.8068 - val_loss: 0.5473 - val_accuracy: 0.7833
Epoch 434/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.4580 -
accuracy: 0.8184 - val_loss: 0.6663 - val_accuracy: 0.7533
Epoch 435/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4890 - accuracy:
0.7940 - val_loss: 0.5098 - val_accuracy: 0.7953
Epoch 436/1000
50/50 [==============================] - 48s 961ms/step - loss: 0.4619 -
accuracy: 0.8180 - val_loss: 0.6278 - val_accuracy: 0.7620
Epoch 437/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.4684 -
accuracy: 0.8132 - val_loss: 0.6073 - val_accuracy: 0.7647
Epoch 438/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.4853 -
accuracy: 0.8064 - val_loss: 0.5474 - val_accuracy: 0.7913
```

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Epoch 439/1000
50/50 [==============================] - 47s 940ms/step - loss: 0.4787 -
accuracy: 0.8088 - val_loss: 0.4936 - val_accuracy: 0.8107
Epoch 440/1000
50/50 [==============================] - 49s 970ms/step - loss: 0.4602 -
accuracy: 0.8080 - val_loss: 0.5451 - val_accuracy: 0.7773
Epoch 441/1000
50/50 [==============================] - 49s 988ms/step - loss: 0.4966 -
accuracy: 0.7924 - val_loss: 0.4959 - val_accuracy: 0.8033
Epoch 442/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.4651 -
accuracy: 0.8156 - val_loss: 0.5845 - val_accuracy: 0.7847
Epoch 443/1000
50/50 [==============================] - 48s 966ms/step - loss: 0.4829 -
accuracy: 0.7968 - val_loss: 0.5924 - val_accuracy: 0.7800
Epoch 444/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.4763 -
accuracy: 0.8016 - val_loss: 0.5147 - val_accuracy: 0.7927
Epoch 445/1000
50/50 [==============================] - 47s 936ms/step - loss: 0.4714 -
accuracy: 0.8119 - val_loss: 0.5074 - val_accuracy: 0.7933
Epoch 446/1000
50/50 [==============================] - 45s 906ms/step - loss: 0.4575 -
accuracy: 0.8143 - val_loss: 0.5552 - val_accuracy: 0.7860
Epoch 447/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.4870 -
accuracy: 0.8004 - val_loss: 0.5657 - val_accuracy: 0.7747
Epoch 448/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4776 - accuracy:
0.8020 - val_loss: 0.6897 - val_accuracy: 0.7493
Epoch 449/1000
50/50 [==============================] - 49s 987ms/step - loss: 0.4572 -
accuracy: 0.8128 - val_loss: 0.4872 - val_accuracy: 0.8027
Epoch 450/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.4731 -
accuracy: 0.8064 - val_loss: 0.7180 - val_accuracy: 0.7393
Epoch 451/1000
50/50 [==============================] - 47s 933ms/step - loss: 0.4923 -
accuracy: 0.7945 - val_loss: 0.5132 - val_accuracy: 0.7967
Epoch 452/1000
50/50 [==============================] - 46s 915ms/step - loss: 0.4659 -
accuracy: 0.8088 - val_loss: 0.6248 - val_accuracy: 0.7680
Epoch 453/1000
50/50 [==============================] - 47s 941ms/step - loss: 0.4732 -
accuracy: 0.8048 - val_loss: 0.5831 - val_accuracy: 0.7567
Epoch 454/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.4734 -
accuracy: 0.8080 - val_loss: 0.5643 - val_accuracy: 0.7827
```

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Epoch 455/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.4553 -
accuracy: 0.8116 - val_loss: 0.5273 - val_accuracy: 0.8020
Epoch 456/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.4788 -
accuracy: 0.8140 - val_loss: 0.5772 - val_accuracy: 0.7740
Epoch 457/1000
50/50 [==============================] - 49s 973ms/step - loss: 0.4599 -
accuracy: 0.8096 - val_loss: 0.5397 - val_accuracy: 0.7913
Epoch 458/1000
50/50 [==============================] - 46s 921ms/step - loss: 0.4729 -
accuracy: 0.7994 - val_loss: 0.4946 - val_accuracy: 0.8040
Epoch 459/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.4820 -
accuracy: 0.7980 - val_loss: 0.4753 - val_accuracy: 0.8047
Epoch 460/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.4731 -
accuracy: 0.8012 - val_loss: 0.5759 - val_accuracy: 0.7853
Epoch 461/1000
50/50 [==============================] - 47s 945ms/step - loss: 0.4625 -
accuracy: 0.8152 - val_loss: 0.6684 - val_accuracy: 0.7547
Epoch 462/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.4482 -
accuracy: 0.8144 - val_loss: 0.6450 - val_accuracy: 0.7547
Epoch 463/1000
50/50 [==============================] - 47s 934ms/step - loss: 0.4849 -
accuracy: 0.8104 - val_loss: 0.4996 - val_accuracy: 0.7967
Epoch 464/1000
50/50 [==============================] - 47s 950ms/step - loss: 0.4799 -
accuracy: 0.8116 - val_loss: 0.5339 - val_accuracy: 0.7933
Epoch 465/1000
50/50 [==============================] - 46s 921ms/step - loss: 0.4536 -
accuracy: 0.8156 - val_loss: 0.5402 - val_accuracy: 0.7827
Epoch 466/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4623 - accuracy:
0.8212 - val_loss: 0.5019 - val_accuracy: 0.7993
Epoch 467/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.4602 -
accuracy: 0.8128 - val_loss: 0.5654 - val_accuracy: 0.7760
Epoch 468/1000
50/50 [==============================] - 49s 971ms/step - loss: 0.4725 -
accuracy: 0.8056 - val_loss: 0.4660 - val_accuracy: 0.8187
Epoch 469/1000
50/50 [==============================] - 48s 970ms/step - loss: 0.4571 -
accuracy: 0.8103 - val_loss: 0.5897 - val_accuracy: 0.7780
Epoch 470/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.4620 -
accuracy: 0.8128 - val_loss: 0.5590 - val_accuracy: 0.7833
```

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Epoch 471/1000
50/50 [==============================] - 47s 941ms/step - loss: 0.4690 -
accuracy: 0.7988 - val_loss: 0.5094 - val_accuracy: 0.7907
Epoch 472/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.4539 -
accuracy: 0.8152 - val_loss: 0.5729 - val_accuracy: 0.7807
Epoch 473/1000
50/50 [==============================] - 47s 944ms/step - loss: 0.4462 -
accuracy: 0.8172 - val_loss: 0.5588 - val_accuracy: 0.7880
Epoch 474/1000
50/50 [==============================] - 47s 935ms/step - loss: 0.4517 -
accuracy: 0.8136 - val_loss: 0.5966 - val_accuracy: 0.7767
Epoch 475/1000
50/50 [==============================] - 46s 914ms/step - loss: 0.4825 -
accuracy: 0.8054 - val_loss: 0.6396 - val_accuracy: 0.7533
Epoch 476/1000
50/50 [==============================] - 48s 964ms/step - loss: 0.4535 -
accuracy: 0.8115 - val_loss: 0.5775 - val_accuracy: 0.7973
Epoch 477/1000
50/50 [==============================] - 48s 969ms/step - loss: 0.4498 -
accuracy: 0.8120 - val_loss: 0.4698 - val_accuracy: 0.8080
Epoch 478/1000
50/50 [==============================] - 46s 912ms/step - loss: 0.4708 -
accuracy: 0.8084 - val_loss: 0.5866 - val_accuracy: 0.7693
Epoch 479/1000
50/50 [==============================] - 48s 951ms/step - loss: 0.4498 -
accuracy: 0.8112 - val_loss: 0.4978 - val_accuracy: 0.8007
Epoch 480/1000
50/50 [==============================] - 47s 943ms/step - loss: 0.4349 -
accuracy: 0.8084 - val_loss: 0.5003 - val_accuracy: 0.8013
Epoch 481/1000
50/50 [==============================] - 49s 973ms/step - loss: 0.4420 -
accuracy: 0.8200 - val_loss: 0.7426 - val_accuracy: 0.7433
Epoch 482/1000
50/50 [==============================] - 49s 971ms/step - loss: 0.4787 -
accuracy: 0.8050 - val_loss: 0.4625 - val_accuracy: 0.8133
Epoch 483/1000
50/50 [==============================] - 47s 932ms/step - loss: 0.4573 -
accuracy: 0.8148 - val_loss: 0.6322 - val_accuracy: 0.7620
Epoch 484/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.4606 -
accuracy: 0.8168 - val_loss: 0.5747 - val_accuracy: 0.7867
Epoch 485/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.4578 -
accuracy: 0.8104 - val_loss: 0.6329 - val_accuracy: 0.7733
Epoch 486/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.4587 -
accuracy: 0.8103 - val_loss: 0.5164 - val_accuracy: 0.8053
```

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Epoch 487/1000
50/50 [==============================] - 50s 995ms/step - loss: 0.4351 -
accuracy: 0.8152 - val_loss: 0.6583 - val_accuracy: 0.7707
Epoch 488/1000
50/50 [==============================] - 47s 950ms/step - loss: 0.4515 -
accuracy: 0.8168 - val_loss: 0.5897 - val_accuracy: 0.7707
Epoch 489/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.4478 -
accuracy: 0.8176 - val_loss: 0.5350 - val_accuracy: 0.8027
Epoch 490/1000
50/50 [==============================] - 47s 936ms/step - loss: 0.4488 -
accuracy: 0.8192 - val_loss: 0.4695 - val_accuracy: 0.8140
Epoch 491/1000
50/50 [==============================] - 49s 969ms/step - loss: 0.4699 -
accuracy: 0.8127 - val_loss: 0.4795 - val_accuracy: 0.7953
Epoch 492/1000
50/50 [==============================] - 47s 944ms/step - loss: 0.4782 -
accuracy: 0.8032 - val_loss: 0.5392 - val_accuracy: 0.7893
Epoch 493/1000
50/50 [==============================] - 49s 976ms/step - loss: 0.4457 -
accuracy: 0.8204 - val_loss: 0.5906 - val_accuracy: 0.7793
Epoch 494/1000
50/50 [==============================] - 86s 2s/step - loss: 0.4740 - accuracy:
0.8112 - val_loss: 0.5847 - val_accuracy: 0.7753
Epoch 495/1000
50/50 [==============================] - 154s 3s/step - loss: 0.4618 - accuracy:
0.8212 - val_loss: 0.6399 - val_accuracy: 0.7700
Epoch 496/1000
50/50 [==============================] - 129s 3s/step - loss: 0.4460 - accuracy:
0.8136 - val_loss: 0.5820 - val_accuracy: 0.7913
Epoch 497/1000
50/50 [==============================] - 132s 3s/step - loss: 0.4759 - accuracy:
0.8124 - val_loss: 0.5549 - val_accuracy: 0.7813
Epoch 498/1000
50/50 [==============================] - 127s 3s/step - loss: 0.4519 - accuracy:
0.8092 - val_loss: 0.5162 - val_accuracy: 0.7953
Epoch 499/1000
50/50 [==============================] - 157s 3s/step - loss: 0.4464 - accuracy:
0.8148 - val_loss: 0.5169 - val_accuracy: 0.7973
Epoch 500/1000
50/50 [==============================] - 103s 2s/step - loss: 0.4483 - accuracy:
0.8124 - val_loss: 0.5924 - val_accuracy: 0.7900
Epoch 501/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4670 - accuracy:
0.8100 - val_loss: 0.6372 - val_accuracy: 0.7553
Epoch 502/1000
50/50 [==============================] - 49s 971ms/step - loss: 0.4617 -
accuracy: 0.8180 - val_loss: 0.6004 - val_accuracy: 0.7653
```

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Epoch 503/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4773 - accuracy:
0.8018 - val_loss: 0.4888 - val_accuracy: 0.8053
Epoch 504/1000
50/50 [==============================] - 49s 988ms/step - loss: 0.4408 -
accuracy: 0.8184 - val_loss: 0.5488 - val_accuracy: 0.7880
Epoch 505/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4674 - accuracy:
0.8128 - val_loss: 0.6108 - val_accuracy: 0.7613
Epoch 506/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4673 - accuracy:
0.8112 - val_loss: 0.5231 - val_accuracy: 0.7867
Epoch 507/1000
50/50 [==============================] - 52s 1s/step - loss: 0.5057 - accuracy:
0.7952 - val_loss: 0.5294 - val_accuracy: 0.7987
Epoch 508/1000
50/50 [==============================] - 49s 971ms/step - loss: 0.4406 -
accuracy: 0.8224 - val_loss: 0.5949 - val_accuracy: 0.7680
Epoch 509/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4510 - accuracy:
0.8168 - val_loss: 0.5015 - val_accuracy: 0.8020
Epoch 510/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4666 - accuracy:
0.8160 - val_loss: 0.4755 - val_accuracy: 0.8160
Epoch 511/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4799 - accuracy:
0.8052 - val_loss: 0.5625 - val_accuracy: 0.7967
Epoch 512/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4465 - accuracy:
0.8172 - val_loss: 0.4978 - val_accuracy: 0.8073
Epoch 513/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4489 - accuracy:
0.8143 - val_loss: 0.5644 - val_accuracy: 0.7920
Epoch 514/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4602 - accuracy:
0.8088 - val_loss: 0.5266 - val_accuracy: 0.7973
Epoch 515/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.4416 -
accuracy: 0.8224 - val_loss: 0.5316 - val_accuracy: 0.7973
Epoch 516/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4363 - accuracy:
0.8184 - val_loss: 0.6000 - val_accuracy: 0.7853
Epoch 517/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4492 - accuracy:
0.8152 - val_loss: 0.4864 - val_accuracy: 0.8047
Epoch 518/1000
50/50 [==============================] - 50s 991ms/step - loss: 0.4508 -
accuracy: 0.8124 - val_loss: 0.5649 - val_accuracy: 0.7840
```

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Epoch 519/1000
50/50 [==============================] - 50s 990ms/step - loss: 0.4396 -
accuracy: 0.8228 - val_loss: 0.6034 - val_accuracy: 0.7747
Epoch 520/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.4556 -
accuracy: 0.8216 - val_loss: 0.5895 - val_accuracy: 0.7800
Epoch 521/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4483 - accuracy:
0.8160 - val_loss: 0.4481 - val_accuracy: 0.8193
Epoch 522/1000
50/50 [==============================] - 59s 1s/step - loss: 0.4380 - accuracy:
0.8276 - val_loss: 0.5524 - val_accuracy: 0.7913
Epoch 523/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4461 - accuracy:
0.8268 - val_loss: 0.5869 - val_accuracy: 0.7727
Epoch 524/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.4581 -
accuracy: 0.8128 - val_loss: 0.5383 - val_accuracy: 0.7893
Epoch 525/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4478 - accuracy:
0.8168 - val_loss: 0.5452 - val_accuracy: 0.7933
Epoch 526/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.4658 -
accuracy: 0.8123 - val_loss: 0.5054 - val_accuracy: 0.8073
Epoch 527/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4637 - accuracy:
0.8091 - val_loss: 0.6237 - val_accuracy: 0.7647
Epoch 528/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4792 - accuracy:
0.8044 - val_loss: 0.4823 - val_accuracy: 0.8073
Epoch 529/1000
50/50 [==============================] - 49s 973ms/step - loss: 0.4415 -
accuracy: 0.8143 - val_loss: 0.4722 - val_accuracy: 0.8153
Epoch 530/1000
50/50 [==============================] - 50s 988ms/step - loss: 0.4536 -
accuracy: 0.8196 - val_loss: 0.6156 - val_accuracy: 0.7600
Epoch 531/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4580 - accuracy:
0.8168 - val_loss: 0.4878 - val_accuracy: 0.8093
Epoch 532/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4380 - accuracy:
0.8268 - val_loss: 0.4944 - val_accuracy: 0.7993
Epoch 533/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4383 - accuracy:
0.8184 - val_loss: 0.6433 - val_accuracy: 0.7593
Epoch 534/1000
50/50 [==============================] - 58s 1s/step - loss: 0.4695 - accuracy:
0.8068 - val_loss: 0.5089 - val_accuracy: 0.8093
```

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Epoch 535/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4577 - accuracy:
0.8248 - val_loss: 0.5670 - val_accuracy: 0.7873
Epoch 536/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4490 - accuracy:
0.8196 - val_loss: 0.5219 - val_accuracy: 0.8040
Epoch 537/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4582 - accuracy:
0.8172 - val_loss: 0.5274 - val_accuracy: 0.7980
Epoch 538/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4285 - accuracy:
0.8216 - val_loss: 0.5096 - val_accuracy: 0.8040
Epoch 539/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.4254 -
accuracy: 0.8212 - val_loss: 0.5670 - val_accuracy: 0.7840
Epoch 540/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4392 - accuracy:
0.8256 - val_loss: 0.5927 - val_accuracy: 0.7740
Epoch 541/1000
50/50 [==============================] - 50s 1000ms/step - loss: 0.4625 -
accuracy: 0.8168 - val_loss: 0.5229 - val_accuracy: 0.7960
Epoch 542/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.4488 -
accuracy: 0.8248 - val_loss: 0.4771 - val_accuracy: 0.8153
Epoch 543/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4494 - accuracy:
0.8192 - val_loss: 0.5336 - val_accuracy: 0.7940
Epoch 544/1000
50/50 [==============================] - 49s 968ms/step - loss: 0.4575 -
accuracy: 0.8176 - val_loss: 0.5238 - val_accuracy: 0.7993
Epoch 545/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4250 - accuracy:
0.8276 - val_loss: 0.5128 - val_accuracy: 0.8007
Epoch 546/1000
50/50 [==============================] - 57s 1s/step - loss: 0.4183 - accuracy:
0.8280 - val_loss: 0.5810 - val_accuracy: 0.7907
Epoch 547/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4671 - accuracy:
0.8116 - val_loss: 0.6341 - val_accuracy: 0.7633
Epoch 548/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.4555 -
accuracy: 0.8164 - val_loss: 0.4859 - val_accuracy: 0.8093
Epoch 549/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4459 - accuracy:
0.8233 - val_loss: 0.4449 - val_accuracy: 0.8273
Epoch 550/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4389 - accuracy:
0.8200 - val_loss: 0.5666 - val_accuracy: 0.7893
```

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Epoch 551/1000
50/50 [==============================] - 50s 989ms/step - loss: 0.4241 -
accuracy: 0.8268 - val_loss: 0.7627 - val_accuracy: 0.7273
Epoch 552/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.4316 -
accuracy: 0.8380 - val_loss: 0.5536 - val_accuracy: 0.7907
Epoch 553/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4423 - accuracy:
0.8184 - val_loss: 0.5350 - val_accuracy: 0.7980
Epoch 554/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.4253 -
accuracy: 0.8304 - val_loss: 0.5745 - val_accuracy: 0.7840
Epoch 555/1000
50/50 [==============================] - 48s 951ms/step - loss: 0.4352 -
accuracy: 0.8348 - val_loss: 0.5396 - val_accuracy: 0.7967
Epoch 556/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.4302 -
accuracy: 0.8256 - val_loss: 0.5243 - val_accuracy: 0.8127
Epoch 557/1000
50/50 [==============================] - 44s 879ms/step - loss: 0.4728 -
accuracy: 0.8068 - val_loss: 0.5118 - val_accuracy: 0.8007
Epoch 558/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.4729 -
accuracy: 0.8124 - val_loss: 0.5186 - val_accuracy: 0.7960
Epoch 559/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.4489 -
accuracy: 0.8192 - val_loss: 0.5288 - val_accuracy: 0.7940
Epoch 560/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.4276 -
accuracy: 0.8200 - val_loss: 0.5272 - val_accuracy: 0.7967
Epoch 561/1000
50/50 [==============================] - 47s 945ms/step - loss: 0.4437 -
accuracy: 0.8176 - val_loss: 0.4730 - val_accuracy: 0.8120
Epoch 562/1000
50/50 [==============================] - 49s 988ms/step - loss: 0.4203 -
accuracy: 0.8292 - val_loss: 0.4919 - val_accuracy: 0.8013
Epoch 563/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.4117 -
accuracy: 0.8372 - val_loss: 0.6187 - val_accuracy: 0.7747
Epoch 564/1000
50/50 [==============================] - 46s 918ms/step - loss: 0.4486 -
accuracy: 0.8152 - val_loss: 0.4754 - val_accuracy: 0.8213
Epoch 565/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.4517 -
accuracy: 0.8168 - val_loss: 0.5456 - val_accuracy: 0.7967
Epoch 566/1000
50/50 [==============================] - 49s 977ms/step - loss: 0.4271 -
accuracy: 0.8241 - val_loss: 0.4896 - val_accuracy: 0.8053
```

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Epoch 567/1000
50/50 [==============================] - 49s 980ms/step - loss: 0.4109 -
accuracy: 0.8350 - val_loss: 0.4990 - val_accuracy: 0.8200
Epoch 568/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.4406 -
accuracy: 0.8192 - val_loss: 0.4351 - val_accuracy: 0.8233
Epoch 569/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.4599 -
accuracy: 0.8056 - val_loss: 0.6044 - val_accuracy: 0.7740
Epoch 570/1000
50/50 [==============================] - 50s 995ms/step - loss: 0.4428 -
accuracy: 0.8200 - val_loss: 0.5471 - val_accuracy: 0.7840
Epoch 571/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.4298 -
accuracy: 0.8232 - val_loss: 0.7198 - val_accuracy: 0.7620
Epoch 572/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.4437 -
accuracy: 0.8204 - val_loss: 0.5133 - val_accuracy: 0.7980
Epoch 573/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.4168 -
accuracy: 0.8408 - val_loss: 0.5717 - val_accuracy: 0.7860
Epoch 574/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.4527 -
accuracy: 0.8196 - val_loss: 0.5063 - val_accuracy: 0.7993
Epoch 575/1000
50/50 [==============================] - 48s 962ms/step - loss: 0.4316 -
accuracy: 0.8196 - val_loss: 0.5868 - val_accuracy: 0.7793
Epoch 576/1000
50/50 [==============================] - 47s 940ms/step - loss: 0.4216 -
accuracy: 0.8236 - val_loss: 0.5409 - val_accuracy: 0.8080
Epoch 577/1000
50/50 [==============================] - 49s 965ms/step - loss: 0.4387 -
accuracy: 0.8237 - val_loss: 0.6375 - val_accuracy: 0.7727
Epoch 578/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.4264 -
accuracy: 0.8300 - val_loss: 0.4695 - val_accuracy: 0.8147
Epoch 579/1000
50/50 [==============================] - 47s 943ms/step - loss: 0.4487 -
accuracy: 0.8244 - val_loss: 0.5951 - val_accuracy: 0.7773
Epoch 580/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.4462 -
accuracy: 0.8216 - val_loss: 0.5372 - val_accuracy: 0.7960
Epoch 581/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.4415 -
accuracy: 0.8224 - val_loss: 0.5531 - val_accuracy: 0.7947
Epoch 582/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.4221 -
accuracy: 0.8292 - val_loss: 0.5966 - val_accuracy: 0.7807
```

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Epoch 583/1000
50/50 [==============================] - 50s 985ms/step - loss: 0.4622 -
accuracy: 0.8144 - val_loss: 0.5429 - val_accuracy: 0.7993
Epoch 584/1000
50/50 [==============================] - 48s 961ms/step - loss: 0.4432 -
accuracy: 0.8248 - val_loss: 0.5506 - val_accuracy: 0.7940
Epoch 585/1000
50/50 [==============================] - 48s 970ms/step - loss: 0.4418 -
accuracy: 0.8280 - val_loss: 0.5632 - val_accuracy: 0.7993
Epoch 586/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.4253 -
accuracy: 0.8280 - val_loss: 0.5958 - val_accuracy: 0.7713
Epoch 587/1000
50/50 [==============================] - 46s 921ms/step - loss: 0.4531 -
accuracy: 0.8220 - val_loss: 0.5294 - val_accuracy: 0.7947
Epoch 588/1000
50/50 [==============================] - 47s 950ms/step - loss: 0.4412 -
accuracy: 0.8132 - val_loss: 0.4819 - val_accuracy: 0.8080
Epoch 589/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.4421 -
accuracy: 0.8272 - val_loss: 0.5658 - val_accuracy: 0.7840
Epoch 590/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.4497 -
accuracy: 0.8164 - val_loss: 0.4903 - val_accuracy: 0.8073
Epoch 591/1000
50/50 [==============================] - 50s 999ms/step - loss: 0.4441 -
accuracy: 0.8277 - val_loss: 0.6594 - val_accuracy: 0.7573
Epoch 592/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.4341 -
accuracy: 0.8208 - val_loss: 0.5244 - val_accuracy: 0.7960
Epoch 593/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.4225 -
accuracy: 0.8272 - val_loss: 0.4987 - val_accuracy: 0.7980
Epoch 594/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.4521 -
accuracy: 0.8196 - val_loss: 0.5238 - val_accuracy: 0.7920
Epoch 595/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4397 - accuracy:
0.8280 - val_loss: 0.5366 - val_accuracy: 0.7927
Epoch 596/1000
50/50 [==============================] - 48s 964ms/step - loss: 0.4266 -
accuracy: 0.8208 - val_loss: 0.4960 - val_accuracy: 0.8180
Epoch 597/1000
50/50 [==============================] - 46s 921ms/step - loss: 0.4399 -
accuracy: 0.8200 - val_loss: 0.5150 - val_accuracy: 0.7980
Epoch 598/1000
50/50 [==============================] - 50s 990ms/step - loss: 0.4731 -
accuracy: 0.8088 - val_loss: 0.4526 - val_accuracy: 0.8120
```

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Epoch 599/1000
50/50 [==============================] - 49s 965ms/step - loss: 0.4397 -
accuracy: 0.8225 - val_loss: 0.4978 - val_accuracy: 0.8053
Epoch 600/1000
50/50 [==============================] - 50s 988ms/step - loss: 0.4161 -
accuracy: 0.8261 - val_loss: 0.4958 - val_accuracy: 0.8027
Epoch 601/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.4481 -
accuracy: 0.8168 - val_loss: 0.5626 - val_accuracy: 0.7780
Epoch 602/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.4243 -
accuracy: 0.8320 - val_loss: 0.4445 - val_accuracy: 0.8193
Epoch 603/1000
50/50 [==============================] - 49s 967ms/step - loss: 0.4469 -
accuracy: 0.8268 - val_loss: 0.5227 - val_accuracy: 0.8027
Epoch 604/1000
50/50 [==============================] - 46s 919ms/step - loss: 0.4389 -
accuracy: 0.8200 - val_loss: 0.4961 - val_accuracy: 0.8080
Epoch 605/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.4222 -
accuracy: 0.8306 - val_loss: 0.4676 - val_accuracy: 0.8093
Epoch 606/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.4587 -
accuracy: 0.8148 - val_loss: 0.5310 - val_accuracy: 0.7980
Epoch 607/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.4526 -
accuracy: 0.8144 - val_loss: 0.4998 - val_accuracy: 0.8053
Epoch 608/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.4310 -
accuracy: 0.8320 - val_loss: 0.5569 - val_accuracy: 0.7893
Epoch 609/1000
50/50 [==============================] - 47s 945ms/step - loss: 0.4442 -
accuracy: 0.8232 - val_loss: 0.5288 - val_accuracy: 0.7873
Epoch 610/1000
50/50 [==============================] - 49s 965ms/step - loss: 0.4305 -
accuracy: 0.8280 - val_loss: 0.4916 - val_accuracy: 0.8167
Epoch 611/1000
50/50 [==============================] - 47s 930ms/step - loss: 0.4361 -
accuracy: 0.8310 - val_loss: 0.7069 - val_accuracy: 0.7453
Epoch 612/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4165 - accuracy:
0.8260 - val_loss: 0.5697 - val_accuracy: 0.7913
Epoch 613/1000
50/50 [==============================] - 48s 962ms/step - loss: 0.4311 -
accuracy: 0.8276 - val_loss: 0.4869 - val_accuracy: 0.8047
Epoch 614/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.4429 -
accuracy: 0.8139 - val_loss: 0.4669 - val_accuracy: 0.8220
```

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Epoch 615/1000
50/50 [==============================] - 48s 959ms/step - loss: 0.4379 -
accuracy: 0.8256 - val_loss: 0.5037 - val_accuracy: 0.8020
Epoch 616/1000
50/50 [==============================] - 48s 962ms/step - loss: 0.4366 -
accuracy: 0.8249 - val_loss: 0.4636 - val_accuracy: 0.8127
Epoch 617/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.4359 -
accuracy: 0.8276 - val_loss: 0.5032 - val_accuracy: 0.8093
Epoch 618/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.4320 -
accuracy: 0.8296 - val_loss: 0.5142 - val_accuracy: 0.8027
Epoch 619/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.4422 -
accuracy: 0.8240 - val_loss: 0.4858 - val_accuracy: 0.7940
Epoch 620/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.4343 -
accuracy: 0.8212 - val_loss: 0.5270 - val_accuracy: 0.8000
Epoch 621/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4068 - accuracy:
0.8411 - val_loss: 0.5423 - val_accuracy: 0.7947
Epoch 622/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.4187 -
accuracy: 0.8260 - val_loss: 0.4830 - val_accuracy: 0.8007
Epoch 623/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.4361 -
accuracy: 0.8232 - val_loss: 0.4624 - val_accuracy: 0.8053
Epoch 624/1000
50/50 [==============================] - 49s 968ms/step - loss: 0.4389 -
accuracy: 0.8188 - val_loss: 0.5303 - val_accuracy: 0.7947
Epoch 625/1000
50/50 [==============================] - 48s 967ms/step - loss: 0.4326 -
accuracy: 0.8245 - val_loss: 0.5378 - val_accuracy: 0.7973
Epoch 626/1000
50/50 [==============================] - 50s 998ms/step - loss: 0.4326 -
accuracy: 0.8312 - val_loss: 0.5239 - val_accuracy: 0.7987
Epoch 627/1000
50/50 [==============================] - 48s 950ms/step - loss: 0.4428 -
accuracy: 0.8180 - val_loss: 0.4904 - val_accuracy: 0.8060
Epoch 628/1000
50/50 [==============================] - 48s 947ms/step - loss: 0.4292 -
accuracy: 0.8276 - val_loss: 0.4226 - val_accuracy: 0.8313
Epoch 629/1000
50/50 [==============================] - 347s 7s/step - loss: 0.4301 - accuracy:
0.8249 - val_loss: 0.6058 - val_accuracy: 0.7707
Epoch 630/1000
50/50 [==============================] - 127s 3s/step - loss: 0.4543 - accuracy:
0.8196 - val_loss: 0.5132 - val_accuracy: 0.7953
```

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Epoch 631/1000
50/50 [==============================] - 128s 3s/step - loss: 0.4281 - accuracy:
0.8240 - val_loss: 0.5136 - val_accuracy: 0.8000
Epoch 632/1000
50/50 [==============================] - 128s 3s/step - loss: 0.4273 - accuracy:
0.8269 - val_loss: 0.4816 - val_accuracy: 0.8213
Epoch 633/1000
50/50 [==============================] - 152s 3s/step - loss: 0.4265 - accuracy:
0.8232 - val_loss: 0.6644 - val_accuracy: 0.7533
Epoch 634/1000
50/50 [==============================] - 131s 3s/step - loss: 0.4467 - accuracy:
0.8249 - val_loss: 0.4686 - val_accuracy: 0.8160
Epoch 635/1000
50/50 [==============================] - 139s 3s/step - loss: 0.4281 - accuracy:
0.8288 - val_loss: 0.5519 - val_accuracy: 0.8000
Epoch 636/1000
50/50 [==============================] - 132s 3s/step - loss: 0.4299 - accuracy:
0.8228 - val_loss: 0.4818 - val_accuracy: 0.8073
Epoch 637/1000
50/50 [==============================] - 95s 2s/step - loss: 0.4231 - accuracy:
0.8244 - val_loss: 0.5446 - val_accuracy: 0.7913
Epoch 638/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4311 - accuracy:
0.8216 - val_loss: 0.4306 - val_accuracy: 0.8273
Epoch 639/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4573 - accuracy:
0.8184 - val_loss: 0.5742 - val_accuracy: 0.7900
Epoch 640/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4306 - accuracy:
0.8156 - val_loss: 0.5054 - val_accuracy: 0.7940
Epoch 641/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4260 - accuracy:
0.8348 - val_loss: 0.5935 - val_accuracy: 0.7787
Epoch 642/1000
50/50 [==============================] - 49s 987ms/step - loss: 0.4223 -
accuracy: 0.8316 - val_loss: 0.4979 - val_accuracy: 0.8100
Epoch 643/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4341 - accuracy:
0.8172 - val_loss: 0.4277 - val_accuracy: 0.8253
Epoch 644/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4388 - accuracy:
0.8196 - val_loss: 0.4801 - val_accuracy: 0.8220
Epoch 645/1000
50/50 [==============================] - 74s 1s/step - loss: 0.4377 - accuracy:
0.8196 - val_loss: 0.5194 - val_accuracy: 0.7973
Epoch 646/1000
50/50 [==============================] - 67s 1s/step - loss: 0.4125 - accuracy:
0.8240 - val_loss: 0.5125 - val_accuracy: 0.8020
```

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Epoch 647/1000
50/50 [==============================] - 60s 1s/step - loss: 0.4460 - accuracy:
0.8128 - val_loss: 0.5487 - val_accuracy: 0.8000
Epoch 648/1000
50/50 [==============================] - 60s 1s/step - loss: 0.4194 - accuracy:
0.8269 - val_loss: 0.5207 - val_accuracy: 0.7933
Epoch 649/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4207 - accuracy:
0.8328 - val_loss: 0.6357 - val_accuracy: 0.7740
Epoch 650/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4443 - accuracy:
0.8208 - val_loss: 0.4898 - val_accuracy: 0.8067
Epoch 651/1000
50/50 [==============================] - 57s 1s/step - loss: 0.4246 - accuracy:
0.8296 - val_loss: 0.5393 - val_accuracy: 0.7973
Epoch 652/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4074 - accuracy:
0.8456 - val_loss: 0.4827 - val_accuracy: 0.8153
Epoch 653/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4549 - accuracy:
0.8143 - val_loss: 0.4743 - val_accuracy: 0.8160
Epoch 654/1000
50/50 [==============================] - 57s 1s/step - loss: 0.4171 - accuracy:
0.8320 - val_loss: 0.5550 - val_accuracy: 0.7947
Epoch 655/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4105 - accuracy:
0.8360 - val_loss: 0.5444 - val_accuracy: 0.7893
Epoch 656/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4164 - accuracy:
0.8288 - val_loss: 0.6766 - val_accuracy: 0.7587
Epoch 657/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4214 - accuracy:
0.8292 - val_loss: 0.5409 - val_accuracy: 0.7967
Epoch 658/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4327 - accuracy:
0.8257 - val_loss: 0.4521 - val_accuracy: 0.8140
Epoch 659/1000
50/50 [==============================] - 67s 1s/step - loss: 0.4347 - accuracy:
0.8280 - val_loss: 0.5362 - val_accuracy: 0.8040
Epoch 660/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4393 - accuracy:
0.8225 - val_loss: 0.4227 - val_accuracy: 0.8327
Epoch 661/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4244 - accuracy:
0.8208 - val_loss: 0.4523 - val_accuracy: 0.8253
Epoch 662/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4110 - accuracy:
0.8260 - val_loss: 0.5389 - val_accuracy: 0.7893
```

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Epoch 663/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4648 - accuracy:
0.8139 - val_loss: 0.5169 - val_accuracy: 0.8087
Epoch 664/1000
50/50 [==============================] - 59s 1s/step - loss: 0.4155 - accuracy:
0.8256 - val_loss: 0.5903 - val_accuracy: 0.7900
Epoch 665/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4328 - accuracy:
0.8176 - val_loss: 0.5146 - val_accuracy: 0.8053
Epoch 666/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4188 - accuracy:
0.8334 - val_loss: 0.5060 - val_accuracy: 0.8007
Epoch 667/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4133 - accuracy:
0.8372 - val_loss: 0.5039 - val_accuracy: 0.8093
Epoch 668/1000
50/50 [==============================] - 60s 1s/step - loss: 0.4082 - accuracy:
0.8356 - val_loss: 0.5203 - val_accuracy: 0.7993
Epoch 669/1000
50/50 [==============================] - 77s 2s/step - loss: 0.4263 - accuracy:
0.8316 - val_loss: 0.5890 - val_accuracy: 0.7853
Epoch 670/1000
50/50 [==============================] - 76s 2s/step - loss: 0.4346 - accuracy:
0.8200 - val_loss: 0.4540 - val_accuracy: 0.8213
Epoch 671/1000
50/50 [==============================] - 65s 1s/step - loss: 0.4333 - accuracy:
0.8252 - val_loss: 0.4885 - val_accuracy: 0.8060
Epoch 672/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4345 - accuracy:
0.8277 - val_loss: 0.5060 - val_accuracy: 0.8080
Epoch 673/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4050 - accuracy:
0.8328 - val_loss: 0.6013 - val_accuracy: 0.7753
Epoch 674/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4436 - accuracy:
0.8192 - val_loss: 0.5215 - val_accuracy: 0.8040
Epoch 675/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4382 - accuracy:
0.8180 - val_loss: 0.5911 - val_accuracy: 0.7793
Epoch 676/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4000 - accuracy:
0.8358 - val_loss: 0.5234 - val_accuracy: 0.8067
Epoch 677/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4297 - accuracy:
0.8265 - val_loss: 0.4992 - val_accuracy: 0.8080
Epoch 678/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4027 - accuracy:
0.8452 - val_loss: 0.4779 - val_accuracy: 0.8127
```

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Epoch 679/1000
50/50 [==============================] - 60s 1s/step - loss: 0.4074 - accuracy:
0.8288 - val_loss: 0.5282 - val_accuracy: 0.7967
Epoch 680/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4151 - accuracy:
0.8360 - val_loss: 0.5464 - val_accuracy: 0.7927
Epoch 681/1000
50/50 [==============================] - 56s 1s/step - loss: 0.3949 - accuracy:
0.8412 - val_loss: 0.4797 - val_accuracy: 0.8067
Epoch 682/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4351 - accuracy:
0.8288 - val_loss: 0.4685 - val_accuracy: 0.8133
Epoch 683/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4040 - accuracy:
0.8316 - val_loss: 0.5260 - val_accuracy: 0.7973
Epoch 684/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4152 - accuracy:
0.8392 - val_loss: 0.6136 - val_accuracy: 0.7693
Epoch 685/1000
50/50 [==============================] - 57s 1s/step - loss: 0.4271 - accuracy:
0.8344 - val_loss: 0.4864 - val_accuracy: 0.8213
Epoch 686/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4139 - accuracy:
0.8404 - val_loss: 0.5941 - val_accuracy: 0.7867
Epoch 687/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4214 - accuracy:
0.8288 - val_loss: 0.7338 - val_accuracy: 0.7347
Epoch 688/1000
50/50 [==============================] - 54s 1s/step - loss: 0.3992 - accuracy:
0.8396 - val_loss: 0.5210 - val_accuracy: 0.7907
Epoch 689/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4212 - accuracy:
0.8320 - val_loss: 0.5368 - val_accuracy: 0.7920
Epoch 690/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4199 - accuracy:
0.8308 - val_loss: 0.4789 - val_accuracy: 0.8140
Epoch 691/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4297 - accuracy:
0.8260 - val_loss: 0.5085 - val_accuracy: 0.8040
Epoch 692/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4155 - accuracy:
0.8408 - val_loss: 0.5860 - val_accuracy: 0.7947
Epoch 693/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4260 - accuracy:
0.8273 - val_loss: 0.4386 - val_accuracy: 0.8227
Epoch 694/1000
50/50 [==============================] - 54s 1s/step - loss: 0.3794 - accuracy:
0.8407 - val_loss: 0.4982 - val_accuracy: 0.7993
```

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Epoch 695/1000
50/50 [==============================] - 57s 1s/step - loss: 0.4012 - accuracy:
0.8360 - val_loss: 0.5385 - val_accuracy: 0.7987
Epoch 696/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4036 - accuracy:
0.8358 - val_loss: 0.7140 - val_accuracy: 0.7607
Epoch 697/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4163 - accuracy:
0.8328 - val_loss: 0.4513 - val_accuracy: 0.8187
Epoch 698/1000
50/50 [==============================] - 74s 1s/step - loss: 0.4267 - accuracy:
0.8272 - val_loss: 0.5351 - val_accuracy: 0.8107
Epoch 699/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4151 - accuracy:
0.8362 - val_loss: 0.5746 - val_accuracy: 0.7900
Epoch 700/1000
50/50 [==============================] - 59s 1s/step - loss: 0.4134 - accuracy:
0.8416 - val_loss: 0.4984 - val_accuracy: 0.8120
Epoch 701/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4055 - accuracy:
0.8364 - val_loss: 0.5257 - val_accuracy: 0.8113
Epoch 702/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4207 - accuracy:
0.8320 - val_loss: 0.4599 - val_accuracy: 0.8160
Epoch 703/1000
50/50 [==============================] - 57s 1s/step - loss: 0.4091 - accuracy:
0.8296 - val_loss: 0.5280 - val_accuracy: 0.8113
Epoch 704/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4124 - accuracy:
0.8348 - val_loss: 0.4953 - val_accuracy: 0.8047
Epoch 705/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4059 - accuracy:
0.8380 - val_loss: 0.4962 - val_accuracy: 0.8113
Epoch 706/1000
50/50 [==============================] - 67s 1s/step - loss: 0.4131 - accuracy:
0.8310 - val_loss: 0.5107 - val_accuracy: 0.7967
Epoch 707/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4378 - accuracy:
0.8216 - val_loss: 0.4738 - val_accuracy: 0.8113
Epoch 708/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4125 - accuracy:
0.8424 - val_loss: 0.5130 - val_accuracy: 0.8120
Epoch 709/1000
50/50 [==============================] - 62s 1s/step - loss: 0.4194 - accuracy:
0.8276 - val_loss: 0.5294 - val_accuracy: 0.7853
Epoch 710/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4416 - accuracy:
0.8112 - val_loss: 0.4787 - val_accuracy: 0.8153
```

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Epoch 711/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4108 - accuracy:
0.8400 - val_loss: 0.4997 - val_accuracy: 0.8080
Epoch 712/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4282 - accuracy:
0.8148 - val_loss: 0.6052 - val_accuracy: 0.7667
Epoch 713/1000
50/50 [==============================] - 52s 1s/step - loss: 0.3922 - accuracy:
0.8448 - val_loss: 0.4685 - val_accuracy: 0.8227
Epoch 714/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4238 - accuracy:
0.8228 - val_loss: 0.4766 - val_accuracy: 0.8127
Epoch 715/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4095 - accuracy:
0.8300 - val_loss: 0.5103 - val_accuracy: 0.8127
Epoch 716/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4200 - accuracy:
0.8304 - val_loss: 0.5047 - val_accuracy: 0.8060
Epoch 717/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4121 - accuracy:
0.8316 - val_loss: 0.5496 - val_accuracy: 0.8007
Epoch 718/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4175 - accuracy:
0.8316 - val_loss: 0.5004 - val_accuracy: 0.8080
Epoch 719/1000
50/50 [==============================] - 49s 970ms/step - loss: 0.3920 -
accuracy: 0.8420 - val_loss: 0.5622 - val_accuracy: 0.8013
Epoch 720/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.4217 -
accuracy: 0.8260 - val_loss: 0.4814 - val_accuracy: 0.8093
Epoch 721/1000
50/50 [==============================] - 50s 990ms/step - loss: 0.4265 -
accuracy: 0.8293 - val_loss: 0.4846 - val_accuracy: 0.8133
Epoch 722/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4256 - accuracy:
0.8376 - val_loss: 0.4200 - val_accuracy: 0.8273
Epoch 723/1000
50/50 [==============================] - 49s 980ms/step - loss: 0.3974 -
accuracy: 0.8352 - val_loss: 0.4662 - val_accuracy: 0.8207
Epoch 724/1000
50/50 [==============================] - 46s 929ms/step - loss: 0.3818 -
accuracy: 0.8476 - val_loss: 0.5011 - val_accuracy: 0.8200
Epoch 725/1000
50/50 [==============================] - 86s 2s/step - loss: 0.4298 - accuracy:
0.8281 - val_loss: 0.4643 - val_accuracy: 0.8240
Epoch 726/1000
50/50 [==============================] - 140s 3s/step - loss: 0.4147 - accuracy:
0.8268 - val_loss: 0.4611 - val_accuracy: 0.8233
```

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Epoch 727/1000
50/50 [==============================] - 116s 2s/step - loss: 0.4333 - accuracy:
0.8240 - val_loss: 0.4738 - val_accuracy: 0.8173
Epoch 728/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4049 - accuracy:
0.8392 - val_loss: 0.4567 - val_accuracy: 0.8193
Epoch 729/1000
50/50 [==============================] - 55s 1s/step - loss: 0.3854 - accuracy:
0.8396 - val_loss: 0.5961 - val_accuracy: 0.7833
Epoch 730/1000
50/50 [==============================] - 59s 1s/step - loss: 0.4137 - accuracy:
0.8245 - val_loss: 0.5271 - val_accuracy: 0.8013
Epoch 731/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4161 - accuracy:
0.8244 - val_loss: 0.5143 - val_accuracy: 0.8027
Epoch 732/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4100 - accuracy:
0.8292 - val_loss: 0.5297 - val_accuracy: 0.8067
Epoch 733/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4095 - accuracy:
0.8360 - val_loss: 0.5216 - val_accuracy: 0.8053
Epoch 734/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4190 - accuracy:
0.8220 - val_loss: 0.5242 - val_accuracy: 0.8000
Epoch 735/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4051 - accuracy:
0.8300 - val_loss: 0.4580 - val_accuracy: 0.8280
Epoch 736/1000
50/50 [==============================] - 52s 1s/step - loss: 0.4160 - accuracy:
0.8289 - val_loss: 0.5438 - val_accuracy: 0.7933
Epoch 737/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4127 - accuracy:
0.8362 - val_loss: 0.5302 - val_accuracy: 0.7873
Epoch 738/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4247 - accuracy:
0.8264 - val_loss: 0.5262 - val_accuracy: 0.7953
Epoch 739/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4167 - accuracy:
0.8240 - val_loss: 0.4635 - val_accuracy: 0.8100
Epoch 740/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4343 - accuracy:
0.8281 - val_loss: 0.5091 - val_accuracy: 0.8080
Epoch 741/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4055 - accuracy:
0.8332 - val_loss: 0.4548 - val_accuracy: 0.8133
Epoch 742/1000
50/50 [==============================] - 55s 1s/step - loss: 0.4122 - accuracy:
0.8225 - val_loss: 0.5150 - val_accuracy: 0.8040
```

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Epoch 743/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4176 - accuracy:
0.8316 - val_loss: 0.4868 - val_accuracy: 0.8033
Epoch 744/1000
50/50 [==============================] - 49s 987ms/step - loss: 0.4073 -
accuracy: 0.8340 - val_loss: 0.5527 - val_accuracy: 0.8053
Epoch 745/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4022 - accuracy:
0.8388 - val_loss: 0.4779 - val_accuracy: 0.8100
Epoch 746/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4157 - accuracy:
0.8318 - val_loss: 0.5363 - val_accuracy: 0.8053
Epoch 747/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4051 - accuracy:
0.8380 - val_loss: 0.4687 - val_accuracy: 0.8193
Epoch 748/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4055 - accuracy:
0.8348 - val_loss: 0.4376 - val_accuracy: 0.8353
Epoch 749/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4130 - accuracy:
0.8344 - val_loss: 0.4747 - val_accuracy: 0.8140
Epoch 750/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4020 - accuracy:
0.8387 - val_loss: 0.4692 - val_accuracy: 0.8160
Epoch 751/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4202 - accuracy:
0.8288 - val_loss: 0.5211 - val_accuracy: 0.7853
Epoch 752/1000
50/50 [==============================] - 56s 1s/step - loss: 0.3920 - accuracy:
0.8354 - val_loss: 0.4787 - val_accuracy: 0.8167
Epoch 753/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4131 - accuracy:
0.8292 - val_loss: 0.5839 - val_accuracy: 0.7753
Epoch 754/1000
50/50 [==============================] - 54s 1s/step - loss: 0.4095 - accuracy:
0.8336 - val_loss: 0.6022 - val_accuracy: 0.7680
Epoch 755/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.4086 -
accuracy: 0.8312 - val_loss: 0.4587 - val_accuracy: 0.8187
Epoch 756/1000
50/50 [==============================] - 48s 948ms/step - loss: 0.4077 -
accuracy: 0.8424 - val_loss: 0.5630 - val_accuracy: 0.7927
Epoch 757/1000
50/50 [==============================] - 46s 903ms/step - loss: 0.3886 -
accuracy: 0.8484 - val_loss: 0.5331 - val_accuracy: 0.8047
Epoch 758/1000
50/50 [==============================] - 47s 932ms/step - loss: 0.3914 -
accuracy: 0.8379 - val_loss: 0.4801 - val_accuracy: 0.8140
```

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Epoch 759/1000
50/50 [==============================] - 47s 948ms/step - loss: 0.4135 -
accuracy: 0.8308 - val_loss: 0.4735 - val_accuracy: 0.8127
Epoch 760/1000
50/50 [==============================] - 117s 2s/step - loss: 0.4189 - accuracy:
0.8340 - val_loss: 0.4726 - val_accuracy: 0.8273
Epoch 761/1000
50/50 [==============================] - 123s 2s/step - loss: 0.3747 - accuracy:
0.8476 - val_loss: 0.4928 - val_accuracy: 0.8173
Epoch 762/1000
50/50 [==============================] - 139s 3s/step - loss: 0.4122 - accuracy:
0.8324 - val_loss: 0.4533 - val_accuracy: 0.8227
Epoch 763/1000
50/50 [==============================] - 126s 2s/step - loss: 0.3908 - accuracy:
0.8427 - val_loss: 0.5507 - val_accuracy: 0.7973
Epoch 764/1000
50/50 [==============================] - 126s 2s/step - loss: 0.4055 - accuracy:
0.8399 - val_loss: 0.5409 - val_accuracy: 0.7940
Epoch 765/1000
50/50 [==============================] - 131s 3s/step - loss: 0.3675 - accuracy:
0.8572 - val_loss: 0.5179 - val_accuracy: 0.8187
Epoch 766/1000
50/50 [==============================] - 147s 3s/step - loss: 0.3961 - accuracy:
0.8500 - val_loss: 0.5419 - val_accuracy: 0.7993
Epoch 767/1000
50/50 [==============================] - 106s 2s/step - loss: 0.4226 - accuracy:
0.8332 - val_loss: 0.4688 - val_accuracy: 0.8100
Epoch 768/1000
50/50 [==============================] - 50s 998ms/step - loss: 0.4115 -
accuracy: 0.8375 - val_loss: 0.5310 - val_accuracy: 0.7953
Epoch 769/1000
50/50 [==============================] - 50s 990ms/step - loss: 0.3796 -
accuracy: 0.8496 - val_loss: 0.4331 - val_accuracy: 0.8273
Epoch 770/1000
50/50 [==============================] - 56s 1s/step - loss: 0.4006 - accuracy:
0.8284 - val_loss: 0.6433 - val_accuracy: 0.7660
Epoch 771/1000
50/50 [==============================] - 47s 937ms/step - loss: 0.3818 -
accuracy: 0.8368 - val_loss: 0.4540 - val_accuracy: 0.8267
Epoch 772/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.3744 -
accuracy: 0.8392 - val_loss: 0.5587 - val_accuracy: 0.7940
Epoch 773/1000
50/50 [==============================] - 47s 941ms/step - loss: 0.4175 -
accuracy: 0.8310 - val_loss: 0.5057 - val_accuracy: 0.8140
Epoch 774/1000
50/50 [==============================] - 47s 930ms/step - loss: 0.4009 -
accuracy: 0.8376 - val_loss: 0.5188 - val_accuracy: 0.8087
```

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Epoch 775/1000
50/50 [==============================] - 86s 2s/step - loss: 0.3967 - accuracy:
0.8379 - val_loss: 0.4600 - val_accuracy: 0.8127
Epoch 776/1000
50/50 [==============================] - 141s 3s/step - loss: 0.4109 - accuracy:
0.8293 - val_loss: 0.6164 - val_accuracy: 0.7773
Epoch 777/1000
50/50 [==============================] - 125s 2s/step - loss: 0.4009 - accuracy:
0.8332 - val_loss: 0.5110 - val_accuracy: 0.8047
Epoch 778/1000
50/50 [==============================] - 116s 2s/step - loss: 0.3979 - accuracy:
0.8344 - val_loss: 0.5272 - val_accuracy: 0.8067
Epoch 779/1000
50/50 [==============================] - 115s 2s/step - loss: 0.3984 - accuracy:
0.8404 - val_loss: 0.5076 - val_accuracy: 0.8053
Epoch 780/1000
50/50 [==============================] - 96s 2s/step - loss: 0.3978 - accuracy:
0.8412 - val_loss: 0.5965 - val_accuracy: 0.7800
Epoch 781/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.4120 -
accuracy: 0.8364 - val_loss: 0.5392 - val_accuracy: 0.8047
Epoch 782/1000
50/50 [==============================] - 53s 1s/step - loss: 0.4277 - accuracy:
0.8268 - val_loss: 0.5918 - val_accuracy: 0.7847
Epoch 783/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.4035 -
accuracy: 0.8348 - val_loss: 0.9770 - val_accuracy: 0.7073
Epoch 784/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4160 - accuracy:
0.8269 - val_loss: 0.4727 - val_accuracy: 0.8140
Epoch 785/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.3964 -
accuracy: 0.8444 - val_loss: 0.5127 - val_accuracy: 0.8040
Epoch 786/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.3991 -
accuracy: 0.8419 - val_loss: 0.5438 - val_accuracy: 0.8027
Epoch 787/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.4031 -
accuracy: 0.8344 - val_loss: 0.4888 - val_accuracy: 0.8160
Epoch 788/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4002 - accuracy:
0.8448 - val_loss: 0.4855 - val_accuracy: 0.8113
Epoch 789/1000
50/50 [==============================] - 47s 941ms/step - loss: 0.4242 -
accuracy: 0.8257 - val_loss: 0.5331 - val_accuracy: 0.8020
Epoch 790/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.4059 -
accuracy: 0.8318 - val_loss: 0.4557 - val_accuracy: 0.8180
```

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Epoch 791/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.3993 -
accuracy: 0.8400 - val_loss: 0.4987 - val_accuracy: 0.8167
Epoch 792/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.4126 -
accuracy: 0.8268 - val_loss: 0.6372 - val_accuracy: 0.7667
Epoch 793/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3976 - accuracy:
0.8408 - val_loss: 0.5418 - val_accuracy: 0.8080
Epoch 794/1000
50/50 [==============================] - 58s 1s/step - loss: 0.3882 - accuracy:
0.8424 - val_loss: 0.5948 - val_accuracy: 0.7880
Epoch 795/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.4104 -
accuracy: 0.8296 - val_loss: 0.5387 - val_accuracy: 0.8000
Epoch 796/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.3787 -
accuracy: 0.8423 - val_loss: 0.5058 - val_accuracy: 0.8073
Epoch 797/1000
50/50 [==============================] - 51s 1s/step - loss: 0.4141 - accuracy:
0.8344 - val_loss: 0.5069 - val_accuracy: 0.8100
Epoch 798/1000
50/50 [==============================] - 49s 977ms/step - loss: 0.4023 -
accuracy: 0.8416 - val_loss: 0.5171 - val_accuracy: 0.7960
Epoch 799/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3822 - accuracy:
0.8432 - val_loss: 0.5677 - val_accuracy: 0.7933
Epoch 800/1000
50/50 [==============================] - 49s 984ms/step - loss: 0.3967 -
accuracy: 0.8396 - val_loss: 0.4592 - val_accuracy: 0.8153
Epoch 801/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.4010 -
accuracy: 0.8306 - val_loss: 0.4982 - val_accuracy: 0.8113
Epoch 802/1000
50/50 [==============================] - 50s 1000ms/step - loss: 0.3879 -
accuracy: 0.8460 - val_loss: 0.6024 - val_accuracy: 0.7860
Epoch 803/1000
50/50 [==============================] - 48s 961ms/step - loss: 0.4067 -
accuracy: 0.8407 - val_loss: 0.5569 - val_accuracy: 0.7960
Epoch 804/1000
50/50 [==============================] - 49s 968ms/step - loss: 0.3980 -
accuracy: 0.8387 - val_loss: 0.6067 - val_accuracy: 0.7793
Epoch 805/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.3965 -
accuracy: 0.8411 - val_loss: 0.4218 - val_accuracy: 0.8267
Epoch 806/1000
50/50 [==============================] - 55s 1s/step - loss: 0.3954 - accuracy:
0.8338 - val_loss: 0.4623 - val_accuracy: 0.8120
```

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Epoch 807/1000
50/50 [==============================] - 48s 968ms/step - loss: 0.4149 -
accuracy: 0.8252 - val_loss: 0.4378 - val_accuracy: 0.8320
Epoch 808/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.3685 -
accuracy: 0.8572 - val_loss: 0.4577 - val_accuracy: 0.8280
Epoch 809/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3982 - accuracy:
0.8280 - val_loss: 0.4707 - val_accuracy: 0.8120
Epoch 810/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.3959 -
accuracy: 0.8428 - val_loss: 0.5713 - val_accuracy: 0.7933
Epoch 811/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.3731 -
accuracy: 0.8520 - val_loss: 0.4771 - val_accuracy: 0.8200
Epoch 812/1000
50/50 [==============================] - 50s 1s/step - loss: 0.4034 - accuracy:
0.8364 - val_loss: 0.5566 - val_accuracy: 0.7967
Epoch 813/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.3696 -
accuracy: 0.8496 - val_loss: 0.5890 - val_accuracy: 0.8013
Epoch 814/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.3750 -
accuracy: 0.8432 - val_loss: 0.5550 - val_accuracy: 0.8000
Epoch 815/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.4015 -
accuracy: 0.8364 - val_loss: 0.4663 - val_accuracy: 0.8233
Epoch 816/1000
50/50 [==============================] - 53s 1s/step - loss: 0.3882 - accuracy:
0.8448 - val_loss: 0.5337 - val_accuracy: 0.8060
Epoch 817/1000
50/50 [==============================] - 47s 942ms/step - loss: 0.3752 -
accuracy: 0.8512 - val_loss: 0.4292 - val_accuracy: 0.8360
Epoch 818/1000
50/50 [==============================] - 50s 994ms/step - loss: 0.3935 -
accuracy: 0.8342 - val_loss: 0.4379 - val_accuracy: 0.8260
Epoch 819/1000
50/50 [==============================] - 47s 947ms/step - loss: 0.3935 -
accuracy: 0.8435 - val_loss: 0.4928 - val_accuracy: 0.8160
Epoch 820/1000
50/50 [==============================] - 48s 953ms/step - loss: 0.3629 -
accuracy: 0.8508 - val_loss: 0.5864 - val_accuracy: 0.7827
Epoch 821/1000
50/50 [==============================] - 46s 922ms/step - loss: 0.4151 -
accuracy: 0.8342 - val_loss: 0.5119 - val_accuracy: 0.7960
Epoch 822/1000
50/50 [==============================] - 121s 2s/step - loss: 0.3623 - accuracy:
0.8504 - val_loss: 0.4560 - val_accuracy: 0.8220
```

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Epoch 823/1000
50/50 [==============================] - 118s 2s/step - loss: 0.4127 - accuracy:
0.8428 - val_loss: 0.4900 - val_accuracy: 0.8213
Epoch 824/1000
50/50 [==============================] - 121s 2s/step - loss: 0.3900 - accuracy:
0.8476 - val_loss: 0.5082 - val_accuracy: 0.8187
Epoch 825/1000
50/50 [==============================] - 138s 3s/step - loss: 0.3880 - accuracy:
0.8508 - val_loss: 0.5074 - val_accuracy: 0.8093
Epoch 826/1000
50/50 [==============================] - 115s 2s/step - loss: 0.3783 - accuracy:
0.8537 - val_loss: 0.4368 - val_accuracy: 0.8360
Epoch 827/1000
50/50 [==============================] - 117s 2s/step - loss: 0.4057 - accuracy:
0.8314 - val_loss: 0.4772 - val_accuracy: 0.8187
Epoch 828/1000
50/50 [==============================] - 120s 2s/step - loss: 0.4162 - accuracy:
0.8285 - val_loss: 0.4923 - val_accuracy: 0.8120
Epoch 829/1000
50/50 [==============================] - 113s 2s/step - loss: 0.4012 - accuracy:
0.8340 - val_loss: 0.5238 - val_accuracy: 0.7960
Epoch 830/1000
50/50 [==============================] - 148s 3s/step - loss: 0.3869 - accuracy:
0.8492 - val_loss: 0.4754 - val_accuracy: 0.8207
Epoch 831/1000
50/50 [==============================] - 131s 3s/step - loss: 0.3977 - accuracy:
0.8436 - val_loss: 0.4316 - val_accuracy: 0.8247
Epoch 832/1000
50/50 [==============================] - 135s 3s/step - loss: 0.3842 - accuracy:
0.8508 - val_loss: 0.4667 - val_accuracy: 0.8167
Epoch 833/1000
50/50 [==============================] - 127s 3s/step - loss: 0.3975 - accuracy:
0.8360 - val_loss: 0.4696 - val_accuracy: 0.8193
Epoch 834/1000
50/50 [==============================] - 139s 3s/step - loss: 0.4008 - accuracy:
0.8320 - val_loss: 0.5440 - val_accuracy: 0.8073
Epoch 835/1000
50/50 [==============================] - 125s 2s/step - loss: 0.4246 - accuracy:
0.8280 - val_loss: 0.4730 - val_accuracy: 0.8173
Epoch 836/1000
50/50 [==============================] - 119s 2s/step - loss: 0.3940 - accuracy:
0.8408 - val_loss: 0.4553 - val_accuracy: 0.8253
Epoch 837/1000
50/50 [==============================] - 128s 3s/step - loss: 0.3949 - accuracy:
0.8364 - val_loss: 0.4879 - val_accuracy: 0.8187
Epoch 838/1000
50/50 [==============================] - 125s 2s/step - loss: 0.3953 - accuracy:
0.8423 - val_loss: 0.4668 - val_accuracy: 0.8213
```

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Epoch 839/1000
50/50 [==============================] - 147s 3s/step - loss: 0.3656 - accuracy:
0.8476 - val_loss: 0.5741 - val_accuracy: 0.7840
Epoch 840/1000
50/50 [==============================] - 131s 3s/step - loss: 0.3765 - accuracy:
0.8444 - val_loss: 0.5941 - val_accuracy: 0.7867
Epoch 841/1000
50/50 [==============================] - 130s 3s/step - loss: 0.3691 - accuracy:
0.8568 - val_loss: 0.4839 - val_accuracy: 0.8107
Epoch 842/1000
50/50 [==============================] - 120s 2s/step - loss: 0.3709 - accuracy:
0.8588 - val_loss: 0.4782 - val_accuracy: 0.8207
Epoch 843/1000
50/50 [==============================] - 67s 1s/step - loss: 0.3864 - accuracy:
0.8456 - val_loss: 0.5755 - val_accuracy: 0.7933
Epoch 844/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3782 - accuracy:
0.8500 - val_loss: 0.5467 - val_accuracy: 0.7920
Epoch 845/1000
50/50 [==============================] - 56s 1s/step - loss: 0.3947 - accuracy:
0.8448 - val_loss: 0.5126 - val_accuracy: 0.8120
Epoch 846/1000
50/50 [==============================] - 47s 948ms/step - loss: 0.3944 -
accuracy: 0.8403 - val_loss: 0.6969 - val_accuracy: 0.7533
Epoch 847/1000
50/50 [==============================] - 49s 984ms/step - loss: 0.3781 -
accuracy: 0.8472 - val_loss: 0.5086 - val_accuracy: 0.8100
Epoch 848/1000
50/50 [==============================] - 50s 1000ms/step - loss: 0.4021 -
accuracy: 0.8376 - val_loss: 0.5049 - val_accuracy: 0.8153
Epoch 849/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.3858 -
accuracy: 0.8464 - val_loss: 0.4912 - val_accuracy: 0.8253
Epoch 850/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3931 - accuracy:
0.8372 - val_loss: 0.5335 - val_accuracy: 0.8080
Epoch 851/1000
50/50 [==============================] - 48s 965ms/step - loss: 0.3997 -
accuracy: 0.8379 - val_loss: 0.4132 - val_accuracy: 0.8313
Epoch 852/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.3703 -
accuracy: 0.8516 - val_loss: 0.5728 - val_accuracy: 0.7927
Epoch 853/1000
50/50 [==============================] - 50s 988ms/step - loss: 0.4021 -
accuracy: 0.8380 - val_loss: 0.4756 - val_accuracy: 0.8240
Epoch 854/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3987 - accuracy:
0.8368 - val_loss: 0.5052 - val_accuracy: 0.8160
```

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Epoch 855/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3757 - accuracy:
0.8512 - val_loss: 0.5006 - val_accuracy: 0.8193
Epoch 856/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.4017 -
accuracy: 0.8408 - val_loss: 0.4476 - val_accuracy: 0.8307
Epoch 857/1000
50/50 [==============================] - 57s 1s/step - loss: 0.3911 - accuracy:
0.8440 - val_loss: 0.5350 - val_accuracy: 0.8100
Epoch 858/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.3942 -
accuracy: 0.8380 - val_loss: 0.4829 - val_accuracy: 0.8127
Epoch 859/1000
50/50 [==============================] - 47s 940ms/step - loss: 0.3897 -
accuracy: 0.8428 - val_loss: 0.5538 - val_accuracy: 0.8000
Epoch 860/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3881 - accuracy:
0.8516 - val_loss: 0.4538 - val_accuracy: 0.8280
Epoch 861/1000
50/50 [==============================] - 47s 949ms/step - loss: 0.3848 -
accuracy: 0.8440 - val_loss: 0.4554 - val_accuracy: 0.8240
Epoch 862/1000
50/50 [==============================] - 48s 947ms/step - loss: 0.3929 -
accuracy: 0.8420 - val_loss: 0.5030 - val_accuracy: 0.8033
Epoch 863/1000
50/50 [==============================] - 48s 970ms/step - loss: 0.4121 -
accuracy: 0.8310 - val_loss: 0.4671 - val_accuracy: 0.8167
Epoch 864/1000
50/50 [==============================] - 47s 937ms/step - loss: 0.3996 -
accuracy: 0.8379 - val_loss: 0.4992 - val_accuracy: 0.8027
Epoch 865/1000
50/50 [==============================] - 47s 942ms/step - loss: 0.4077 -
accuracy: 0.8375 - val_loss: 0.4472 - val_accuracy: 0.8253
Epoch 866/1000
50/50 [==============================] - 45s 900ms/step - loss: 0.3738 -
accuracy: 0.8464 - val_loss: 0.5364 - val_accuracy: 0.8073
Epoch 867/1000
50/50 [==============================] - 47s 941ms/step - loss: 0.3769 -
accuracy: 0.8468 - val_loss: 0.5195 - val_accuracy: 0.8053
Epoch 868/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.4196 -
accuracy: 0.8304 - val_loss: 0.5309 - val_accuracy: 0.8047
Epoch 869/1000
50/50 [==============================] - 49s 983ms/step - loss: 0.3722 -
accuracy: 0.8444 - val_loss: 0.4723 - val_accuracy: 0.8220
Epoch 870/1000
50/50 [==============================] - 46s 914ms/step - loss: 0.3889 -
accuracy: 0.8358 - val_loss: 0.4793 - val_accuracy: 0.8193
```

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Epoch 871/1000
50/50 [==============================] - 46s 919ms/step - loss: 0.3820 -
accuracy: 0.8488 - val_loss: 0.4861 - val_accuracy: 0.8200
Epoch 872/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.4052 -
accuracy: 0.8360 - val_loss: 0.4596 - val_accuracy: 0.8167
Epoch 873/1000
50/50 [==============================] - 48s 949ms/step - loss: 0.3869 -
accuracy: 0.8420 - val_loss: 0.5216 - val_accuracy: 0.8100
Epoch 874/1000
50/50 [==============================] - 46s 926ms/step - loss: 0.3954 -
accuracy: 0.8448 - val_loss: 0.5827 - val_accuracy: 0.7973
Epoch 875/1000
50/50 [==============================] - 46s 925ms/step - loss: 0.3684 -
accuracy: 0.8620 - val_loss: 0.5079 - val_accuracy: 0.8153
Epoch 876/1000
50/50 [==============================] - 46s 929ms/step - loss: 0.3711 -
accuracy: 0.8512 - val_loss: 0.4861 - val_accuracy: 0.8120
Epoch 877/1000
50/50 [==============================] - 47s 932ms/step - loss: 0.3858 -
accuracy: 0.8557 - val_loss: 0.5219 - val_accuracy: 0.8060
Epoch 878/1000
50/50 [==============================] - 47s 937ms/step - loss: 0.3636 -
accuracy: 0.8496 - val_loss: 0.4821 - val_accuracy: 0.8200
Epoch 879/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.4085 -
accuracy: 0.8352 - val_loss: 0.4133 - val_accuracy: 0.8440
Epoch 880/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.3788 -
accuracy: 0.8500 - val_loss: 0.4576 - val_accuracy: 0.8273
Epoch 881/1000
50/50 [==============================] - 47s 947ms/step - loss: 0.3805 -
accuracy: 0.8456 - val_loss: 0.5055 - val_accuracy: 0.8107
Epoch 882/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.3782 -
accuracy: 0.8428 - val_loss: 0.5767 - val_accuracy: 0.7853
Epoch 883/1000
50/50 [==============================] - 45s 906ms/step - loss: 0.3954 -
accuracy: 0.8364 - val_loss: 0.4989 - val_accuracy: 0.8187
Epoch 884/1000
50/50 [==============================] - 47s 934ms/step - loss: 0.3856 -
accuracy: 0.8431 - val_loss: 0.4998 - val_accuracy: 0.8240
Epoch 885/1000
50/50 [==============================] - 47s 937ms/step - loss: 0.3790 -
accuracy: 0.8504 - val_loss: 0.4673 - val_accuracy: 0.8320
Epoch 886/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.3866 -
accuracy: 0.8419 - val_loss: 0.4510 - val_accuracy: 0.8220
```

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Epoch 887/1000
50/50 [==============================] - 72s 1s/step - loss: 0.3779 - accuracy:
0.8452 - val_loss: 0.5025 - val_accuracy: 0.8087
Epoch 888/1000
50/50 [==============================] - 127s 3s/step - loss: 0.3930 - accuracy:
0.8396 - val_loss: 0.4541 - val_accuracy: 0.8247
Epoch 889/1000
50/50 [==============================] - 128s 3s/step - loss: 0.3799 - accuracy:
0.8416 - val_loss: 0.4469 - val_accuracy: 0.8340
Epoch 890/1000
50/50 [==============================] - 149s 3s/step - loss: 0.3613 - accuracy:
0.8528 - val_loss: 0.4339 - val_accuracy: 0.8313
Epoch 891/1000
50/50 [==============================] - 124s 2s/step - loss: 0.3796 - accuracy:
0.8516 - val_loss: 0.4949 - val_accuracy: 0.8087
Epoch 892/1000
50/50 [==============================] - 127s 3s/step - loss: 0.3643 - accuracy:
0.8528 - val_loss: 0.4626 - val_accuracy: 0.8160
Epoch 893/1000
50/50 [==============================] - 132s 3s/step - loss: 0.3810 - accuracy:
0.8444 - val_loss: 0.4715 - val_accuracy: 0.8200
Epoch 894/1000
50/50 [==============================] - 128s 3s/step - loss: 0.3995 - accuracy:
0.8384 - val_loss: 0.4547 - val_accuracy: 0.8227
Epoch 895/1000
50/50 [==============================] - 150s 3s/step - loss: 0.3892 - accuracy:
0.8411 - val_loss: 0.6704 - val_accuracy: 0.7647
Epoch 896/1000
50/50 [==============================] - 126s 3s/step - loss: 0.3786 - accuracy:
0.8432 - val_loss: 0.4702 - val_accuracy: 0.8207
Epoch 897/1000
50/50 [==============================] - 50s 968ms/step - loss: 0.3590 -
accuracy: 0.8568 - val_loss: 0.5465 - val_accuracy: 0.8053
Epoch 898/1000
50/50 [==============================] - 52s 1s/step - loss: 0.3600 - accuracy:
0.8528 - val_loss: 0.4682 - val_accuracy: 0.8240
Epoch 899/1000
50/50 [==============================] - 49s 991ms/step - loss: 0.3956 -
accuracy: 0.8388 - val_loss: 0.5321 - val_accuracy: 0.8073
Epoch 900/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.3726 -
accuracy: 0.8476 - val_loss: 0.5988 - val_accuracy: 0.7807
Epoch 901/1000
50/50 [==============================] - 48s 952ms/step - loss: 0.3761 -
accuracy: 0.8496 - val_loss: 0.4086 - val_accuracy: 0.8367
Epoch 902/1000
50/50 [==============================] - 54s 1s/step - loss: 0.3724 - accuracy:
0.8428 - val_loss: 0.5063 - val_accuracy: 0.8153
```

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Epoch 903/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3846 - accuracy:
0.8500 - val_loss: 0.5431 - val_accuracy: 0.7947
Epoch 904/1000
50/50 [==============================] - 48s 956ms/step - loss: 0.4022 -
accuracy: 0.8408 - val_loss: 0.4202 - val_accuracy: 0.8413
Epoch 905/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3771 - accuracy:
0.8520 - val_loss: 0.4525 - val_accuracy: 0.8373
Epoch 906/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3913 - accuracy:
0.8396 - val_loss: 0.4067 - val_accuracy: 0.8327
Epoch 907/1000
50/50 [==============================] - 49s 965ms/step - loss: 0.3839 -
accuracy: 0.8480 - val_loss: 0.4947 - val_accuracy: 0.8173
Epoch 908/1000
50/50 [==============================] - 47s 940ms/step - loss: 0.3841 -
accuracy: 0.8472 - val_loss: 0.5308 - val_accuracy: 0.8113
Epoch 909/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3954 - accuracy:
0.8348 - val_loss: 0.4801 - val_accuracy: 0.8167
Epoch 910/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3779 - accuracy:
0.8484 - val_loss: 0.4745 - val_accuracy: 0.8193
Epoch 911/1000
50/50 [==============================] - 49s 970ms/step - loss: 0.3843 -
accuracy: 0.8456 - val_loss: 0.4723 - val_accuracy: 0.8160
Epoch 912/1000
50/50 [==============================] - 50s 995ms/step - loss: 0.3723 -
accuracy: 0.8500 - val_loss: 0.5122 - val_accuracy: 0.8107
Epoch 913/1000
50/50 [==============================] - 48s 960ms/step - loss: 0.3556 -
accuracy: 0.8504 - val_loss: 0.5310 - val_accuracy: 0.8007
Epoch 914/1000
50/50 [==============================] - 57s 1s/step - loss: 0.3813 - accuracy:
0.8408 - val_loss: 0.4136 - val_accuracy: 0.8353
Epoch 915/1000
50/50 [==============================] - 49s 980ms/step - loss: 0.3713 -
accuracy: 0.8504 - val_loss: 0.5416 - val_accuracy: 0.8087
Epoch 916/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3661 - accuracy:
0.8488 - val_loss: 0.5493 - val_accuracy: 0.7980
Epoch 917/1000
50/50 [==============================] - 49s 985ms/step - loss: 0.3615 -
accuracy: 0.8608 - val_loss: 0.4619 - val_accuracy: 0.8200
Epoch 918/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.3854 -
accuracy: 0.8492 - val_loss: 0.4496 - val_accuracy: 0.8253
```

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Epoch 919/1000
50/50 [==============================] - 52s 1s/step - loss: 0.3684 - accuracy:
0.8520 - val_loss: 0.5564 - val_accuracy: 0.7987
Epoch 920/1000
50/50 [==============================] - 49s 990ms/step - loss: 0.3904 -
accuracy: 0.8428 - val_loss: 0.5057 - val_accuracy: 0.8133
Epoch 921/1000
50/50 [==============================] - 50s 992ms/step - loss: 0.3566 -
accuracy: 0.8524 - val_loss: 0.4895 - val_accuracy: 0.8187
Epoch 922/1000
50/50 [==============================] - 49s 978ms/step - loss: 0.3674 -
accuracy: 0.8544 - val_loss: 0.5111 - val_accuracy: 0.8220
Epoch 923/1000
50/50 [==============================] - 49s 970ms/step - loss: 0.3562 -
accuracy: 0.8577 - val_loss: 0.5211 - val_accuracy: 0.8120
Epoch 924/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.3838 -
accuracy: 0.8488 - val_loss: 0.4660 - val_accuracy: 0.8227
Epoch 925/1000
50/50 [==============================] - 52s 1s/step - loss: 0.3924 - accuracy:
0.8412 - val_loss: 0.4864 - val_accuracy: 0.8167
Epoch 926/1000
50/50 [==============================] - 60s 1s/step - loss: 0.3740 - accuracy:
0.8496 - val_loss: 0.5695 - val_accuracy: 0.7973
Epoch 927/1000
50/50 [==============================] - 49s 979ms/step - loss: 0.3805 -
accuracy: 0.8380 - val_loss: 0.5589 - val_accuracy: 0.7907
Epoch 928/1000
50/50 [==============================] - 48s 957ms/step - loss: 0.3849 -
accuracy: 0.8428 - val_loss: 0.4451 - val_accuracy: 0.8267
Epoch 929/1000
50/50 [==============================] - 50s 989ms/step - loss: 0.3865 -
accuracy: 0.8488 - val_loss: 0.5986 - val_accuracy: 0.7880
Epoch 930/1000
50/50 [==============================] - 50s 983ms/step - loss: 0.3717 -
accuracy: 0.8533 - val_loss: 0.4697 - val_accuracy: 0.8220
Epoch 931/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.3933 -
accuracy: 0.8412 - val_loss: 0.4871 - val_accuracy: 0.8133
Epoch 932/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3717 - accuracy:
0.8528 - val_loss: 0.4948 - val_accuracy: 0.8153
Epoch 933/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3732 - accuracy:
0.8544 - val_loss: 0.4435 - val_accuracy: 0.8353
Epoch 934/1000
50/50 [==============================] - 50s 996ms/step - loss: 0.3922 -
accuracy: 0.8376 - val_loss: 0.5362 - val_accuracy: 0.8080
```

```
Epoch 935/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3757 - accuracy:
0.8529 - val_loss: 0.6004 - val_accuracy: 0.7740
Epoch 936/1000
50/50 [==============================] - 49s 976ms/step - loss: 0.3811 -
accuracy: 0.8427 - val_loss: 0.4939 - val_accuracy: 0.8153
Epoch 937/1000
50/50 [==============================] - 49s 982ms/step - loss: 0.3742 -
accuracy: 0.8448 - val_loss: 0.5577 - val_accuracy: 0.8000
Epoch 938/1000
50/50 [==============================] - 58s 1s/step - loss: 0.3804 - accuracy:
0.8440 - val_loss: 0.4922 - val_accuracy: 0.8240
Epoch 939/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3633 - accuracy:
0.8524 - val_loss: 0.4288 - val_accuracy: 0.8287
Epoch 940/1000
50/50 [==============================] - 48s 963ms/step - loss: 0.3773 -
accuracy: 0.8480 - val_loss: 0.5633 - val_accuracy: 0.7933
Epoch 941/1000
50/50 [==============================] - 49s 977ms/step - loss: 0.3516 -
accuracy: 0.8572 - val_loss: 0.5552 - val_accuracy: 0.7987
Epoch 942/1000
50/50 [==============================] - 49s 989ms/step - loss: 0.4119 -
accuracy: 0.8318 - val_loss: 0.4572 - val_accuracy: 0.8253
Epoch 943/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.3896 -
accuracy: 0.8356 - val_loss: 0.4610 - val_accuracy: 0.8160
Epoch 944/1000
50/50 [==============================] - 47s 946ms/step - loss: 0.3637 -
accuracy: 0.8500 - val_loss: 0.4386 - val_accuracy: 0.8400
Epoch 945/1000
50/50 [==============================] - 47s 945ms/step - loss: 0.3613 -
accuracy: 0.8540 - val_loss: 0.5295 - val_accuracy: 0.8120
Epoch 946/1000
50/50 [==============================] - 47s 947ms/step - loss: 0.3733 -
accuracy: 0.8412 - val_loss: 0.4750 - val_accuracy: 0.8213
Epoch 947/1000
50/50 [==============================] - 48s 968ms/step - loss: 0.3702 -
accuracy: 0.8524 - val_loss: 0.4911 - val_accuracy: 0.8207
Epoch 948/1000
50/50 [==============================] - 49s 972ms/step - loss: 0.3598 -
accuracy: 0.8496 - val_loss: 0.5545 - val_accuracy: 0.8060
Epoch 949/1000
50/50 [==============================] - 47s 943ms/step - loss: 0.3819 -
accuracy: 0.8468 - val_loss: 0.4823 - val_accuracy: 0.8240
Epoch 950/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3602 - accuracy:
0.8439 - val_loss: 0.5052 - val_accuracy: 0.8200
```

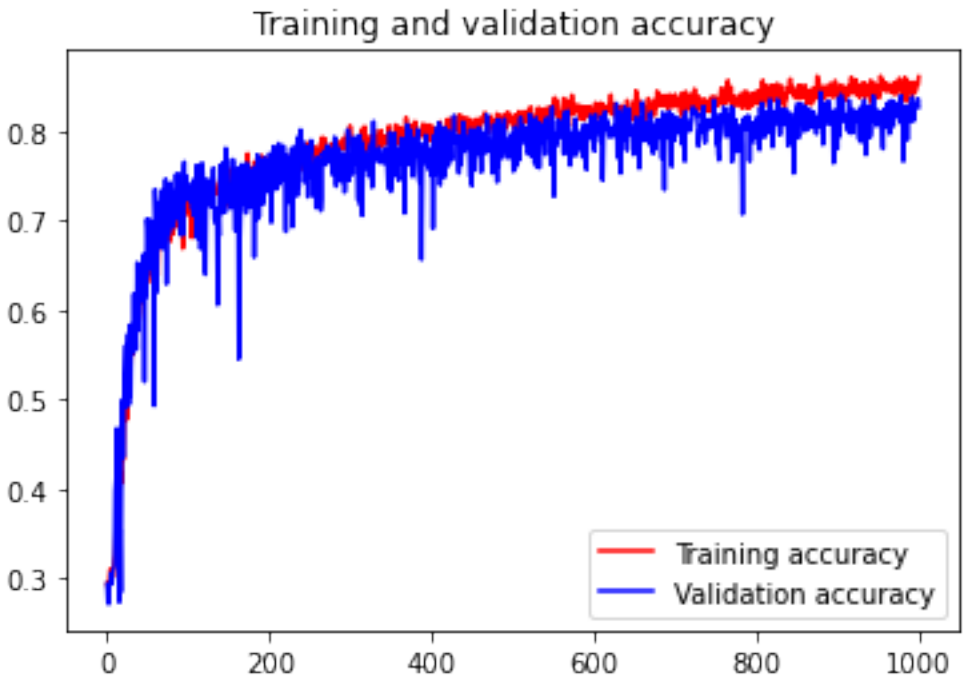
```
Epoch 951/1000
50/50 [==============================] - 47s 931ms/step - loss: 0.4035 -
accuracy: 0.8376 - val_loss: 0.4976 - val_accuracy: 0.8147
Epoch 952/1000
50/50 [==============================] - 47s 938ms/step - loss: 0.3611 -
accuracy: 0.8525 - val_loss: 0.4697 - val_accuracy: 0.8213
Epoch 953/1000
50/50 [==============================] - 50s 993ms/step - loss: 0.3527 -
accuracy: 0.8620 - val_loss: 0.4892 - val_accuracy: 0.8127
Epoch 954/1000
50/50 [==============================] - 48s 968ms/step - loss: 0.3503 -
accuracy: 0.8561 - val_loss: 0.4638 - val_accuracy: 0.8213
Epoch 955/1000
50/50 [==============================] - 46s 921ms/step - loss: 0.3493 -
accuracy: 0.8573 - val_loss: 0.5132 - val_accuracy: 0.8027
Epoch 956/1000
50/50 [==============================] - 48s 949ms/step - loss: 0.3672 -
accuracy: 0.8529 - val_loss: 0.6021 - val_accuracy: 0.7807
Epoch 957/1000
50/50 [==============================] - 46s 923ms/step - loss: 0.3883 -
accuracy: 0.8472 - val_loss: 0.4732 - val_accuracy: 0.8247
Epoch 958/1000
50/50 [==============================] - 50s 986ms/step - loss: 0.3759 -
accuracy: 0.8524 - val_loss: 0.4864 - val_accuracy: 0.8193
Epoch 959/1000
50/50 [==============================] - 66s 1s/step - loss: 0.3778 - accuracy:
0.8448 - val_loss: 0.5001 - val_accuracy: 0.8120
Epoch 960/1000
50/50 [==============================] - 128s 3s/step - loss: 0.3665 - accuracy:
0.8544 - val_loss: 0.5188 - val_accuracy: 0.8047
Epoch 961/1000
50/50 [==============================] - 155s 3s/step - loss: 0.3554 - accuracy:
0.8488 - val_loss: 0.4668 - val_accuracy: 0.8313
Epoch 962/1000
50/50 [==============================] - 134s 3s/step - loss: 0.3896 - accuracy:
0.8468 - val_loss: 0.5208 - val_accuracy: 0.8093
Epoch 963/1000
50/50 [==============================] - 131s 3s/step - loss: 0.3628 - accuracy:
0.8480 - val_loss: 0.4846 - val_accuracy: 0.8233
Epoch 964/1000
50/50 [==============================] - 151s 3s/step - loss: 0.3695 - accuracy:
0.8456 - val_loss: 0.5348 - val_accuracy: 0.7973
Epoch 965/1000
50/50 [==============================] - 100s 2s/step - loss: 0.3662 - accuracy:
0.8528 - val_loss: 0.4414 - val_accuracy: 0.8340
Epoch 966/1000
50/50 [==============================] - 49s 986ms/step - loss: 0.3847 -
accuracy: 0.8440 - val_loss: 0.4789 - val_accuracy: 0.8153
```

```
Epoch 967/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3773 - accuracy:
0.8512 - val_loss: 0.4493 - val_accuracy: 0.8347
Epoch 968/1000
50/50 [==============================] - 49s 984ms/step - loss: 0.3669 -
accuracy: 0.8496 - val_loss: 0.4874 - val_accuracy: 0.8187
Epoch 969/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3846 - accuracy:
0.8423 - val_loss: 0.5477 - val_accuracy: 0.8060
Epoch 970/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3741 - accuracy:
0.8548 - val_loss: 0.4254 - val_accuracy: 0.8327
Epoch 971/1000
50/50 [==============================] - 48s 962ms/step - loss: 0.3677 -
accuracy: 0.8548 - val_loss: 0.4743 - val_accuracy: 0.8233
Epoch 972/1000
50/50 [==============================] - 50s 997ms/step - loss: 0.3708 -
accuracy: 0.8419 - val_loss: 0.4449 - val_accuracy: 0.8313
Epoch 973/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3894 - accuracy:
0.8443 - val_loss: 0.4477 - val_accuracy: 0.8207
Epoch 974/1000
50/50 [==============================] - 50s 984ms/step - loss: 0.3699 -
accuracy: 0.8460 - val_loss: 0.4666 - val_accuracy: 0.8160
Epoch 975/1000
50/50 [==============================] - 57s 1s/step - loss: 0.3826 - accuracy:
0.8533 - val_loss: 0.5092 - val_accuracy: 0.8260
Epoch 976/1000
50/50 [==============================] - 49s 974ms/step - loss: 0.3419 -
accuracy: 0.8596 - val_loss: 0.4674 - val_accuracy: 0.8273
Epoch 977/1000
50/50 [==============================] - 50s 1s/step - loss: 0.3899 - accuracy:
0.8452 - val_loss: 0.5288 - val_accuracy: 0.8100
Epoch 978/1000
50/50 [==============================] - 53s 1s/step - loss: 0.3707 - accuracy:
0.8472 - val_loss: 0.4438 - val_accuracy: 0.8400
Epoch 979/1000
50/50 [==============================] - 48s 955ms/step - loss: 0.3747 -
accuracy: 0.8480 - val_loss: 0.5139 - val_accuracy: 0.8180
Epoch 980/1000
50/50 [==============================] - 48s 961ms/step - loss: 0.3486 -
accuracy: 0.8556 - val_loss: 0.5242 - val_accuracy: 0.8193
Epoch 981/1000
50/50 [==============================] - 48s 954ms/step - loss: 0.3567 -
accuracy: 0.8464 - val_loss: 0.6536 - val_accuracy: 0.7667
Epoch 982/1000
50/50 [==============================] - 47s 943ms/step - loss: 0.3694 -
accuracy: 0.8411 - val_loss: 0.4674 - val_accuracy: 0.8287
```

```
Epoch 983/1000
50/50 [==============================] - 47s 940ms/step - loss: 0.3673 -
accuracy: 0.8604 - val_loss: 0.4975 - val_accuracy: 0.8240
Epoch 984/1000
50/50 [==============================] - 47s 940ms/step - loss: 0.3634 -
accuracy: 0.8532 - val_loss: 0.5502 - val_accuracy: 0.7967
Epoch 985/1000
50/50 [==============================] - 47s 930ms/step - loss: 0.3925 -
accuracy: 0.8336 - val_loss: 0.4799 - val_accuracy: 0.8233
Epoch 986/1000
50/50 [==============================] - 48s 949ms/step - loss: 0.3636 -
accuracy: 0.8557 - val_loss: 0.5796 - val_accuracy: 0.7907
Epoch 987/1000
50/50 [==============================] - 107s 2s/step - loss: 0.3493 - accuracy:
0.8553 - val_loss: 0.5144 - val_accuracy: 0.8187
Epoch 988/1000
50/50 [==============================] - 125s 2s/step - loss: 0.3723 - accuracy:
0.8520 - val_loss: 0.4878 - val_accuracy: 0.8293
Epoch 989/1000
50/50 [==============================] - 125s 3s/step - loss: 0.3553 - accuracy:
0.8524 - val_loss: 0.5222 - val_accuracy: 0.8127
Epoch 990/1000
50/50 [==============================] - 127s 3s/step - loss: 0.3705 - accuracy:
0.8452 - val_loss: 0.4787 - val_accuracy: 0.8247
Epoch 991/1000
50/50 [==============================] - 127s 3s/step - loss: 0.3661 - accuracy:
0.8553 - val_loss: 0.4582 - val_accuracy: 0.8253
Epoch 992/1000
50/50 [==============================] - 148s 3s/step - loss: 0.3904 - accuracy:
0.8368 - val_loss: 0.4189 - val_accuracy: 0.8387
Epoch 993/1000
50/50 [==============================] - 123s 2s/step - loss: 0.3700 - accuracy:
0.8456 - val_loss: 0.5105 - val_accuracy: 0.8113
Epoch 994/1000
50/50 [==============================] - 125s 2s/step - loss: 0.3712 - accuracy:
0.8537 - val_loss: 0.5084 - val_accuracy: 0.8140
Epoch 995/1000
50/50 [==============================] - 60s 1s/step - loss: 0.3714 - accuracy:
0.8460 - val_loss: 0.4447 - val_accuracy: 0.8220
Epoch 996/1000
50/50 [==============================] - 51s 1s/step - loss: 0.3721 - accuracy:
0.8448 - val_loss: 0.4812 - val_accuracy: 0.8300
Epoch 997/1000
50/50 [==============================] - 60s 1s/step - loss: 0.3655 - accuracy:
0.8488 - val_loss: 0.4619 - val_accuracy: 0.8307
Epoch 998/1000
50/50 [==============================] - 48s 946ms/step - loss: 0.3612 -
accuracy: 0.8556 - val_loss: 0.4725 - val_accuracy: 0.8307
```

```
Epoch 999/1000
50/50 [==============================] - 57s 1s/step - loss: 0.3758 - accuracy:
0.8524 - val_loss: 0.4249 - val_accuracy: 0.8367
Epoch 1000/1000
50/50 [==============================] - 49s 981ms/step - loss: 0.3539 -
accuracy: 0.8612 - val_loss: 0.4647 - val_accuracy: 0.8273
```

[5]:
```python
# Mostrar grafico
import matplotlib.pyplot as plt
acc = history.history['accuracy']
val_acc = history.history['val_accuracy']
loss = history.history['loss']
val_loss = history.history['val_loss']

epochs = range(len(acc))

plt.plot(epochs, acc, 'r', label='Training accuracy')
plt.plot(epochs, val_acc, 'b', label='Validation accuracy')
plt.title('Training and validation accuracy')
plt.legend(loc=0)
plt.figure()


plt.show()
```

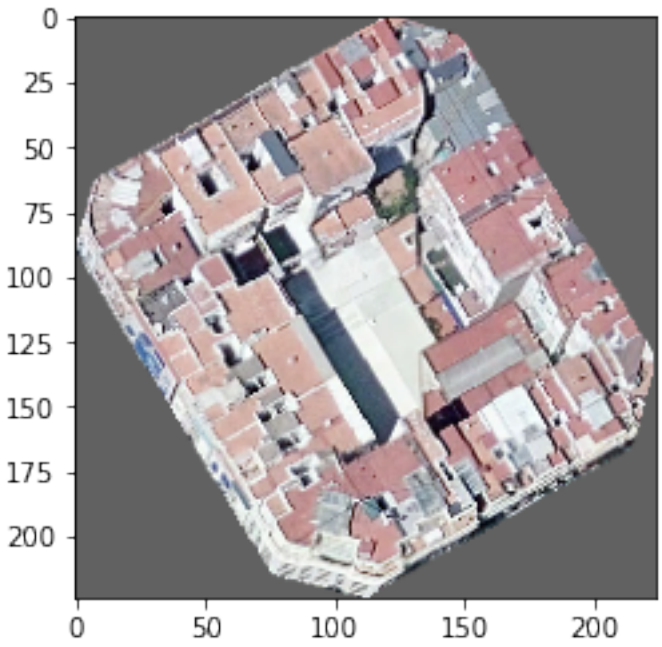


```
<Figure size 432x288 with 0 Axes>
```

[6]:
```
import numpy as np
from keras.preprocessing import image
from IPython.display import Image

builtup_names = ["0_espacioabierto", "1_industrial", "2_atomistic","4_formal"]
base_dir = "E:\TFM_MUESTRAS\Test_003\muestras_maestras"
to_test = [
  base_dir+"\\Valencia-61192cda1504_0.tif",
  base_dir+"\\Valencia-61192eff5fa_0.tif",
  base_dir+"\\Valencia-611928751acc_2.tif",
  base_dir+"\\Valencia-611929607f7_2.tif",
  base_dir+"\\Valencia-61192a125b3_1.tif",
  base_dir+"\\Valencia-61192a13139c_1.tif",
  base_dir+"\\Valencia-61192dd51504_4.tif",
  base_dir+"\\Valencia-61192e3b1cd3_4.tif"
]
#to_test = ["E:\\Atlas_Datos\\test_data\\trainingAll\\tempSample-60a5d3a41b89_4.
 ↪tif"]
#to_test = ["E:\\Atlas_Datos\\test_data\\trainingAll\\tempSample-60a5d3b51189_0.
 ↪tif"]
for fn in to_test:

  # predicting images
  path = fn
  img = image.load_img(path, target_size=(image_size, image_size))
  x = image.img_to_array(img)
  x = np.expand_dims(x, axis=0)

  images = np.vstack([x])
  classes = model.predict(images, batch_size=10)
  print(fn)
  print(classes)
  print(type(classes))
  classes_list = classes.tolist()[0]
  print (classes_list)
  max_index = classes_list.index(max(classes_list))
  print("Clase: ", max_index, " --- ", builtup_names[max_index])
  #print(img)

  from matplotlib.pyplot import imshow
  imshow(np.asarray(img))
```

```
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-61192cda1504_0.tif
[[0. 0. 0. 1.]]
<class 'numpy.ndarray'>
[0.0, 0.0, 0.0, 1.0]
```

```
Clase:  3  ---  4_formal
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-61192eff5fa_0.tif
[[0. 1. 0. 0.]]
<class 'numpy.ndarray'>
[0.0, 1.0, 0.0, 0.0]
Clase:  1  ---  1_industrial
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-611928751acc_2.tif
[[0. 0. 0. 1.]]
<class 'numpy.ndarray'>
[0.0, 0.0, 0.0, 1.0]
Clase:  3  ---  4_formal
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-611929607f7_2.tif
[[0. 0. 0. 1.]]
<class 'numpy.ndarray'>
[0.0, 0.0, 0.0, 1.0]
Clase:  3  ---  4_formal
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-61192a125b3_1.tif
[[0.0000000e+00 1.0000000e+00 0.0000000e+00 2.7878028e-14]]
<class 'numpy.ndarray'>
[0.0, 1.0, 0.0, 2.787802778068168e-14]
Clase:  1  ---  1_industrial
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-61192a13139c_1.tif
[[0. 1. 0. 0.]]
<class 'numpy.ndarray'>
[0.0, 1.0, 0.0, 0.0]
Clase:  1  ---  1_industrial
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-61192dd51504_4.tif
[[0. 0. 0. 1.]]
<class 'numpy.ndarray'>
[0.0, 0.0, 0.0, 1.0]
Clase:  3  ---  4_formal
E:\TFM_MUESTRAS\Test_003\muestras_maestras\Valencia-61192e3b1cd3_4.tif
[[0. 0. 0. 1.]]
<class 'numpy.ndarray'>
[0.0, 0.0, 0.0, 1.0]
Clase:  3  ---  4_formal
```




[7]:
```
#https://subscription.packtpub.com/book/big_data_and_business_intelligence/
 ↪9781838555078/6/ch06lvl1sec34/confusion-matrix
from sklearn.metrics import classification_report, confusion_matrix
import numpy as np
my_validation_datagen = ImageDataGenerator(rescale = 1./255)
my_validation_generator = my_validation_datagen.flow_from_directory(
        NEW_VALIDATION_FOLDER,
        target_size=(image_size, image_size),
        class_mode='categorical',
  batch_size=batch_size,
  shuffle=False
)

Y_pred = model.predict(my_validation_generator)
y_pred = np.argmax(Y_pred, axis=1)

print('Confusion Matrix')
print(confusion_matrix(my_validation_generator.classes, y_pred))
print('Classification Report')
# list(train_generator.class_indices.keys())
target_names = []
for key in builtup_names:
    target_names.append(key)
```

```
print(classification_report(my_validation_generator.classes, y_pred,␣
 ↪target_names=target_names))
```

```
Found 2486 images belonging to 4 classes.
```

```
C:\Users\oskmo\.conda\envs\masterall\lib\site-packages\PIL\Image.py:2855:
DecompressionBombWarning: Image size (171081905 pixels) exceeds limit of
89478485 pixels, could be decompression bomb DOS attack.
  warnings.warn(
```

```
Confusion Matrix
[[618  46   7  14]
 [  6 326  17  12]
 [ 23  32 559  85]
 [ 12  34 130 565]]
Classification Report
                  precision    recall  f1-score   support

0_espacioabierto       0.94      0.90      0.92       685
    1_industrial       0.74      0.90      0.82       361
     2_atomistic       0.78      0.80      0.79       699
        4_formal       0.84      0.76      0.80       741

        accuracy                           0.83      2486
       macro avg       0.83      0.84      0.83      2486
    weighted avg       0.84      0.83      0.83      2486
```