Code_for_Good

June 14, 2020

[1]:
```
import tensorflow as tf
```

```
Num GPUs Available:  0
```

[4]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import cv2, time
```

[5]:
```
covid_path = 'dataset/covid_dataset.csv'
covid_image_path = 'dataset/covid_adjusted/'

normal_path = 'dataset/normal_xray_dataset.csv'
normal_image_path = 'dataset/normal_dataset/'

covid_df = pd.read_csv(covid_path, usecols=['filename', 'finding'])
normal_df = pd.read_csv(normal_path, usecols=['filename', 'finding'])
```

[6]:
```
print(normal_df.shape)
print(covid_df.shape)
```

```
(8583, 2)
(92, 2)
```

[7]:
```
normal_df = normal_df.head(99)
```

[8]:
```
print(normal_df.shape)
print(covid_df.shape)
```

```
(99, 2)
(92, 2)
```

[9]:
```
covid_images = []
covid_labels = []
normal_images = []
normal_labels = []
```

[10]:
```
for index, row in covid_df.iterrows():
  filename = row['filename']
  label = row['finding']
  path = covid_image_path + filename

  image = cv2.imread(path)
  image = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)

  covid_images.append(image)
  covid_labels.append(label)
print(len(covid_images), len(covid_labels))
```

```
92 92
```

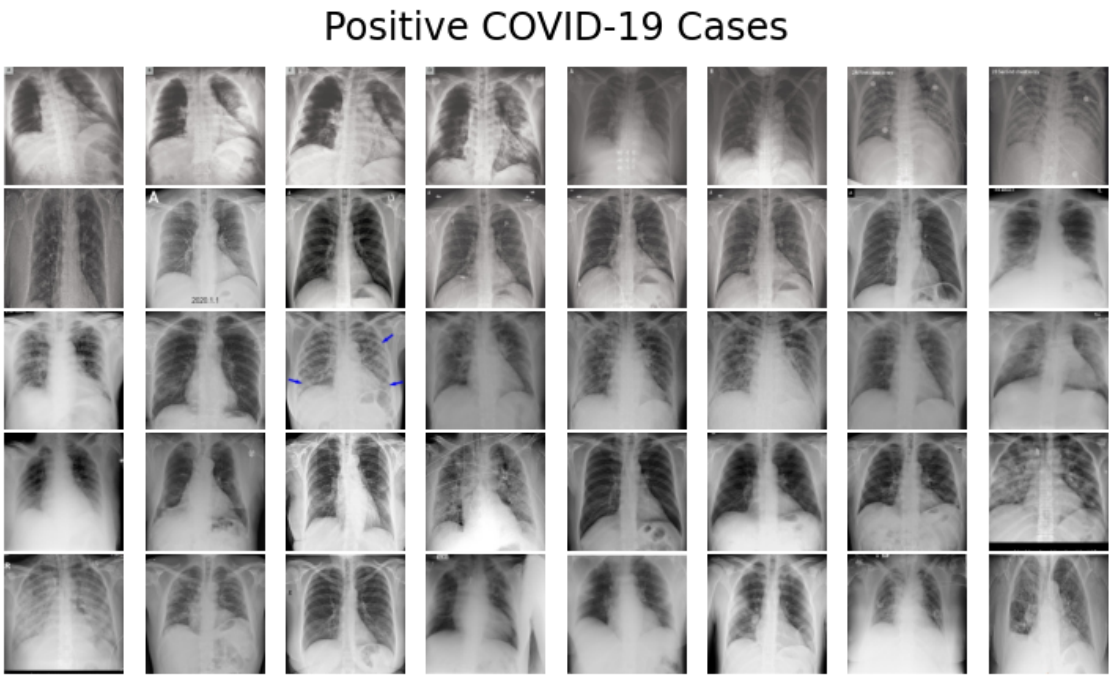
[11]:
```
for index, row in normal_df.iterrows():
  filename = row['filename']
  label = row['finding']
  path = normal_image_path + filename

  image = cv2.imread(path)
  image = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)

  normal_images.append(image)
  normal_labels.append(label)
print(len(normal_images), len(normal_labels))
```

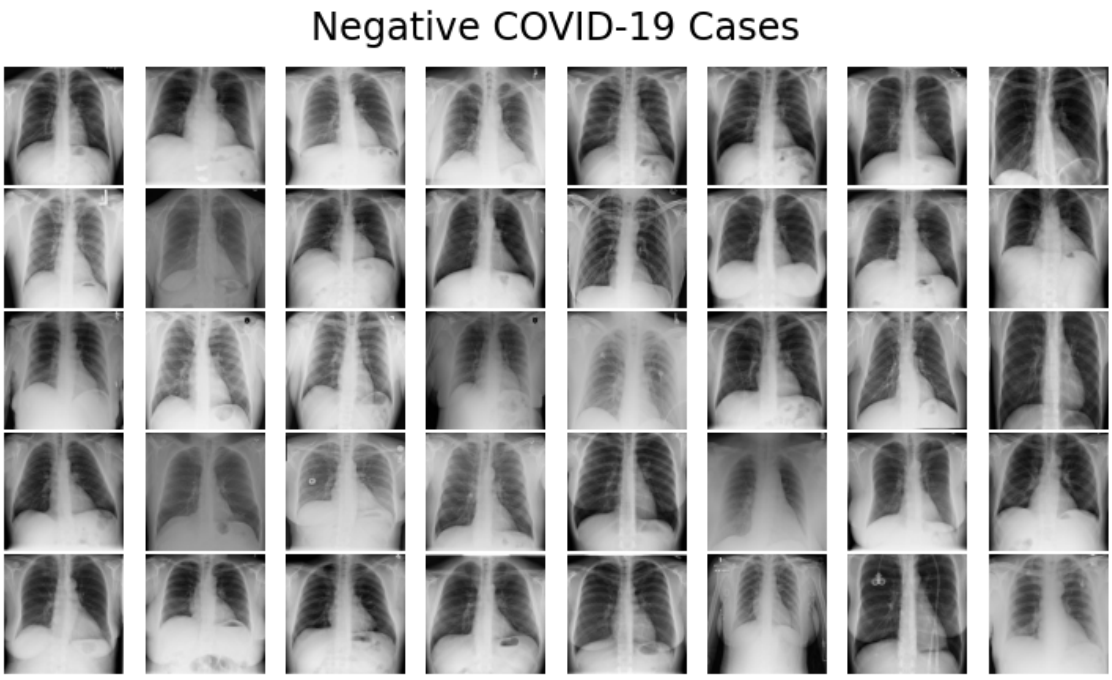
```
99 99
```

[12]:
```
covid_images = np.array(covid_images) / 255
normal_images = np.array(normal_images) / 255
```

[13]:
```
def plot_images(images, title):
    nrows, ncols = 5, 8
    figsize = [10, 6]

    fig, ax = plt.subplots(nrows=nrows, ncols=ncols, figsize=figsize, facecolor␣
 ↪= (1, 1, 1))

    for i, axi in enumerate(ax.flat):
        axi.imshow(images[i])
        axi.set_axis_off()

    plt.suptitle(title, fontsize=24)
    plt.tight_layout(pad=0.2, rect=[0, 0, 1, 0.9])
    plt.show()

plot_images(covid_images, 'Positive COVID-19 Cases')
```

```
plot_images(normal_images, 'Negative COVID-19 Cases')
```





[14]:
```
from sklearn.model_selection import train_test_split

covid_x_train, covid_x_test, covid_y_train, covid_y_test =␣
↪train_test_split(covid_images, covid_labels, test_size=0.2, random_state = 0)

normal_x_train, normal_x_test, normal_y_train, normal_y_test =␣
↪train_test_split(normal_images, normal_labels, test_size=0.2, random_state =␣
↪0)

X_train = np.concatenate((normal_x_train, covid_x_train), axis=0)
X_test = np.concatenate((normal_x_test, covid_x_test), axis=0)
y_train = np.concatenate((normal_y_train, covid_y_train), axis=0)
y_test = np.concatenate((normal_y_test, covid_y_test), axis=0)
```

[15]:
```
from sklearn.preprocessing import LabelBinarizer
from tensorflow.keras.utils import to_categorical

y_train = LabelBinarizer().fit_transform(y_train)
y_train = to_categorical(y_train)

y_test = LabelBinarizer().fit_transform(y_test)
y_test = to_categorical(y_test)
```

[16]:
```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
datagen = ImageDataGenerator(rotation_range=20, width_shift_range=0.2,␣
↪height_shift_range=0.2, horizontal_flip=True)
it = datagen.flow(X_train, y_train, batch_size = 32)
```

[17]:
```
from tensorflow.keras.applications import Xception
from tensorflow.keras.models import Model
from tensorflow.keras.layers import Input
from tensorflow.keras.layers import Flatten
from tensorflow.keras.layers import Dropout
from tensorflow.keras.layers import Dense
from tensorflow.keras.models import load_model
import pickle
```

[23]:
```
deepModel = Xception(weights = 'imagenet',
                     include_top = False,
                     pooling = 'max',
                     input_tensor = Input(shape = (224, 224, 3))
                    )
for layer in deepModel.layers:
    layer.trainable = False
```

[24]:
```
outputs = deepModel.output
outputs = Flatten(name="flatten")(outputs)
outputs = Dropout(0.5)(outputs)
outputs = Dense(2, activation="softmax")(outputs)
```

[25]:
```
model = Model(inputs = deepModel.input, outputs = outputs)
```

[26]:
```
model.compile(loss = 'categorical_crossentropy', optimizer = 'adam', metrics =␣
↪['accuracy'])
```

[27]:
```
history = model.fit(it,
                    validation_data = (X_test, y_test),
                    validation_steps = len(X_test) / 32,
                    steps_per_epoch = len(X_train) / 32,
                    epochs = 800,
                   )
```

```
Epoch 1/800
5/4 [==============================] - 21s 4s/step - loss: 1.2377 - accuracy:
0.5000 - val_loss: 0.7621 - val_accuracy: 0.5641
Epoch 2/800
5/4 [==============================] - 20s 4s/step - loss: 1.1628 - accuracy:
0.5461 - val_loss: 0.5535 - val_accuracy: 0.6667
Epoch 3/800
5/4 [==============================] - 20s 4s/step - loss: 0.8740 - accuracy:
0.6776 - val_loss: 0.5267 - val_accuracy: 0.6923
Epoch 4/800
5/4 [==============================] - 19s 4s/step - loss: 0.7677 - accuracy:
0.6645 - val_loss: 0.4826 - val_accuracy: 0.7692
Epoch 5/800
5/4 [==============================] - 20s 4s/step - loss: 0.9114 - accuracy:
0.6053 - val_loss: 0.4353 - val_accuracy: 0.8205
Epoch 6/800
5/4 [==============================] - 21s 4s/step - loss: 0.7389 - accuracy:
0.6711 - val_loss: 0.4543 - val_accuracy: 0.8205
Epoch 7/800
5/4 [==============================] - 19s 4s/step - loss: 0.8330 - accuracy:
0.6711 - val_loss: 0.3779 - val_accuracy: 0.7949
Epoch 8/800
5/4 [==============================] - 20s 4s/step - loss: 0.8147 - accuracy:
0.6908 - val_loss: 0.3601 - val_accuracy: 0.8205
Epoch 9/800
5/4 [==============================] - 19s 4s/step - loss: 0.7788 - accuracy:
0.7039 - val_loss: 0.3431 - val_accuracy: 0.8462
Epoch 10/800
5/4 [==============================] - 19s 4s/step - loss: 0.6509 - accuracy:
0.6974 - val_loss: 0.4418 - val_accuracy: 0.7949
```

```
Epoch 11/800
5/4 [==============================] - 19s 4s/step - loss: 0.7644 - accuracy:
0.7105 - val_loss: 0.3960 - val_accuracy: 0.7949
Epoch 12/800
5/4 [==============================] - 19s 4s/step - loss: 0.7922 - accuracy:
0.6382 - val_loss: 0.3752 - val_accuracy: 0.8462
Epoch 13/800
5/4 [==============================] - 20s 4s/step - loss: 0.6748 - accuracy:
0.7039 - val_loss: 0.3687 - val_accuracy: 0.8205
Epoch 14/800
5/4 [==============================] - 20s 4s/step - loss: 0.8394 - accuracy:
0.6645 - val_loss: 0.3694 - val_accuracy: 0.8462
Epoch 15/800
5/4 [==============================] - 19s 4s/step - loss: 0.6010 - accuracy:
0.7763 - val_loss: 0.3344 - val_accuracy: 0.8205
Epoch 16/800
5/4 [==============================] - 20s 4s/step - loss: 0.5907 - accuracy:
0.6908 - val_loss: 0.3841 - val_accuracy: 0.8205
Epoch 17/800
5/4 [==============================] - 21s 4s/step - loss: 0.6251 - accuracy:
0.7237 - val_loss: 0.3226 - val_accuracy: 0.7949
Epoch 18/800
5/4 [==============================] - 20s 4s/step - loss: 0.5634 - accuracy:
0.7303 - val_loss: 0.3049 - val_accuracy: 0.8205
Epoch 19/800
5/4 [==============================] - 21s 4s/step - loss: 0.5692 - accuracy:
0.7368 - val_loss: 0.2847 - val_accuracy: 0.8205
Epoch 20/800
5/4 [==============================] - 19s 4s/step - loss: 0.5806 - accuracy:
0.7105 - val_loss: 0.2847 - val_accuracy: 0.8205
Epoch 21/800
5/4 [==============================] - 19s 4s/step - loss: 0.5074 - accuracy:
0.7368 - val_loss: 0.2910 - val_accuracy: 0.8205
Epoch 22/800
5/4 [==============================] - 19s 4s/step - loss: 0.5341 - accuracy:
0.7829 - val_loss: 0.3543 - val_accuracy: 0.8205
Epoch 23/800
5/4 [==============================] - 19s 4s/step - loss: 0.5191 - accuracy:
0.8092 - val_loss: 0.2727 - val_accuracy: 0.8718
Epoch 24/800
5/4 [==============================] - 19s 4s/step - loss: 0.5416 - accuracy:
0.7632 - val_loss: 0.2705 - val_accuracy: 0.8718
Epoch 25/800
5/4 [==============================] - 20s 4s/step - loss: 0.5770 - accuracy:
0.7500 - val_loss: 0.3613 - val_accuracy: 0.8205
Epoch 26/800
5/4 [==============================] - 19s 4s/step - loss: 0.5043 - accuracy:
0.7961 - val_loss: 0.2723 - val_accuracy: 0.8462
```

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Epoch 27/800
5/4 [==============================] - 20s 4s/step - loss: 0.4735 - accuracy:
0.7829 - val_loss: 0.2515 - val_accuracy: 0.8974
Epoch 28/800
5/4 [==============================] - 20s 4s/step - loss: 0.4841 - accuracy:
0.8026 - val_loss: 0.2758 - val_accuracy: 0.8718
Epoch 29/800
5/4 [==============================] - 20s 4s/step - loss: 0.5019 - accuracy:
0.7697 - val_loss: 0.2815 - val_accuracy: 0.8718
Epoch 30/800
5/4 [==============================] - 20s 4s/step - loss: 0.3561 - accuracy:
0.8289 - val_loss: 0.2478 - val_accuracy: 0.8974
Epoch 31/800
5/4 [==============================] - 19s 4s/step - loss: 0.4661 - accuracy:
0.7895 - val_loss: 0.2944 - val_accuracy: 0.8205
Epoch 32/800
5/4 [==============================] - 19s 4s/step - loss: 0.4281 - accuracy:
0.8026 - val_loss: 0.2812 - val_accuracy: 0.8718
Epoch 33/800
5/4 [==============================] - 20s 4s/step - loss: 0.4750 - accuracy:
0.7697 - val_loss: 0.2512 - val_accuracy: 0.8718
Epoch 34/800
5/4 [==============================] - 19s 4s/step - loss: 0.3790 - accuracy:
0.8355 - val_loss: 0.3325 - val_accuracy: 0.8462
Epoch 35/800
5/4 [==============================] - 20s 4s/step - loss: 0.4804 - accuracy:
0.8092 - val_loss: 0.2627 - val_accuracy: 0.8462
Epoch 36/800
5/4 [==============================] - 20s 4s/step - loss: 0.5110 - accuracy:
0.7829 - val_loss: 0.2682 - val_accuracy: 0.8718
Epoch 37/800
5/4 [==============================] - 19s 4s/step - loss: 0.5084 - accuracy:
0.7895 - val_loss: 0.2661 - val_accuracy: 0.8462
Epoch 38/800
5/4 [==============================] - 19s 4s/step - loss: 0.4527 - accuracy:
0.8487 - val_loss: 0.2481 - val_accuracy: 0.8974
Epoch 39/800
5/4 [==============================] - 19s 4s/step - loss: 0.3979 - accuracy:
0.8224 - val_loss: 0.3266 - val_accuracy: 0.8462
Epoch 40/800
5/4 [==============================] - 20s 4s/step - loss: 0.4176 - accuracy:
0.8224 - val_loss: 0.2707 - val_accuracy: 0.8718
Epoch 41/800
5/4 [==============================] - 19s 4s/step - loss: 0.4501 - accuracy:
0.8224 - val_loss: 0.2492 - val_accuracy: 0.8718
Epoch 42/800
5/4 [==============================] - 20s 4s/step - loss: 0.5887 - accuracy:
0.7368 - val_loss: 0.4545 - val_accuracy: 0.7692
```

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Epoch 43/800
5/4 [==============================] - 21s 4s/step - loss: 0.4748 - accuracy:
0.7763 - val_loss: 0.2448 - val_accuracy: 0.9487
Epoch 44/800
5/4 [==============================] - 20s 4s/step - loss: 0.5420 - accuracy:
0.7697 - val_loss: 0.3039 - val_accuracy: 0.8462
Epoch 45/800
5/4 [==============================] - 20s 4s/step - loss: 0.4017 - accuracy:
0.7895 - val_loss: 0.3085 - val_accuracy: 0.8462
Epoch 46/800
5/4 [==============================] - 19s 4s/step - loss: 0.3981 - accuracy:
0.8158 - val_loss: 0.3003 - val_accuracy: 0.8462
Epoch 47/800
5/4 [==============================] - 22s 4s/step - loss: 0.4686 - accuracy:
0.8026 - val_loss: 0.2745 - val_accuracy: 0.8462
Epoch 48/800
5/4 [==============================] - 19s 4s/step - loss: 0.4235 - accuracy:
0.8289 - val_loss: 0.3959 - val_accuracy: 0.8205
Epoch 49/800
5/4 [==============================] - 19s 4s/step - loss: 0.3679 - accuracy:
0.8355 - val_loss: 0.2811 - val_accuracy: 0.8462
Epoch 50/800
5/4 [==============================] - 19s 4s/step - loss: 0.3800 - accuracy:
0.8224 - val_loss: 0.3446 - val_accuracy: 0.8462
Epoch 51/800
5/4 [==============================] - 19s 4s/step - loss: 0.3717 - accuracy:
0.8224 - val_loss: 0.2576 - val_accuracy: 0.8718
Epoch 52/800
5/4 [==============================] - 19s 4s/step - loss: 0.3204 - accuracy:
0.8553 - val_loss: 0.2273 - val_accuracy: 0.8718
Epoch 53/800
5/4 [==============================] - 20s 4s/step - loss: 0.4698 - accuracy:
0.7895 - val_loss: 0.2417 - val_accuracy: 0.8974
Epoch 54/800
5/4 [==============================] - 20s 4s/step - loss: 0.5129 - accuracy:
0.7895 - val_loss: 0.3291 - val_accuracy: 0.8462
Epoch 55/800
5/4 [==============================] - 21s 4s/step - loss: 0.3413 - accuracy:
0.8289 - val_loss: 0.2159 - val_accuracy: 0.9487
Epoch 56/800
5/4 [==============================] - 21s 4s/step - loss: 0.4326 - accuracy:
0.7829 - val_loss: 0.2118 - val_accuracy: 0.9231
Epoch 57/800
5/4 [==============================] - 19s 4s/step - loss: 0.4645 - accuracy:
0.7763 - val_loss: 0.2805 - val_accuracy: 0.8462
Epoch 58/800
5/4 [==============================] - 21s 4s/step - loss: 0.3836 - accuracy:
0.8487 - val_loss: 0.2450 - val_accuracy: 0.9231
```

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Epoch 59/800
5/4 [==============================] - 19s 4s/step - loss: 0.4458 - accuracy:
0.8158 - val_loss: 0.2551 - val_accuracy: 0.8718
Epoch 60/800
5/4 [==============================] - 19s 4s/step - loss: 0.3943 - accuracy:
0.8487 - val_loss: 0.2268 - val_accuracy: 0.8974
Epoch 61/800
5/4 [==============================] - 20s 4s/step - loss: 0.4325 - accuracy:
0.7763 - val_loss: 0.2036 - val_accuracy: 0.9231
Epoch 62/800
5/4 [==============================] - 20s 4s/step - loss: 0.4501 - accuracy:
0.8026 - val_loss: 0.3263 - val_accuracy: 0.8718
Epoch 63/800
5/4 [==============================] - 20s 4s/step - loss: 0.4310 - accuracy:
0.8092 - val_loss: 0.2444 - val_accuracy: 0.8718
Epoch 64/800
5/4 [==============================] - 19s 4s/step - loss: 0.3930 - accuracy:
0.8553 - val_loss: 0.2251 - val_accuracy: 0.8718
Epoch 65/800
5/4 [==============================] - 19s 4s/step - loss: 0.4995 - accuracy:
0.7829 - val_loss: 0.3139 - val_accuracy: 0.8205
Epoch 66/800
5/4 [==============================] - 21s 4s/step - loss: 0.4250 - accuracy:
0.7961 - val_loss: 0.2208 - val_accuracy: 0.9231
Epoch 67/800
5/4 [==============================] - 22s 4s/step - loss: 0.2881 - accuracy:
0.8684 - val_loss: 0.2206 - val_accuracy: 0.8974
Epoch 68/800
5/4 [==============================] - 21s 4s/step - loss: 0.4536 - accuracy:
0.7895 - val_loss: 0.2633 - val_accuracy: 0.8718
Epoch 69/800
5/4 [==============================] - 20s 4s/step - loss: 0.3716 - accuracy:
0.8289 - val_loss: 0.2146 - val_accuracy: 0.9231
Epoch 70/800
5/4 [==============================] - 20s 4s/step - loss: 0.3676 - accuracy:
0.8421 - val_loss: 0.2530 - val_accuracy: 0.8718
Epoch 71/800
5/4 [==============================] - 19s 4s/step - loss: 0.4480 - accuracy:
0.7895 - val_loss: 0.2119 - val_accuracy: 0.9487
Epoch 72/800
5/4 [==============================] - 20s 4s/step - loss: 0.4034 - accuracy:
0.8355 - val_loss: 0.2110 - val_accuracy: 0.8718
Epoch 73/800
5/4 [==============================] - 19s 4s/step - loss: 0.3290 - accuracy:
0.8750 - val_loss: 0.2715 - val_accuracy: 0.8718
Epoch 74/800
5/4 [==============================] - 19s 4s/step - loss: 0.4573 - accuracy:
0.8224 - val_loss: 0.1908 - val_accuracy: 0.9487
```

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Epoch 75/800
5/4 [==============================] - 19s 4s/step - loss: 0.4248 - accuracy:
0.8421 - val_loss: 0.2028 - val_accuracy: 0.9231
Epoch 76/800
5/4 [==============================] - 19s 4s/step - loss: 0.2697 - accuracy:
0.9211 - val_loss: 0.2171 - val_accuracy: 0.8718
Epoch 77/800
5/4 [==============================] - 19s 4s/step - loss: 0.4277 - accuracy:
0.8092 - val_loss: 0.2036 - val_accuracy: 0.8974
Epoch 78/800
5/4 [==============================] - 19s 4s/step - loss: 0.4524 - accuracy:
0.8355 - val_loss: 0.1988 - val_accuracy: 0.9744
Epoch 79/800
5/4 [==============================] - 20s 4s/step - loss: 0.3851 - accuracy:
0.8289 - val_loss: 0.2006 - val_accuracy: 0.9487
Epoch 80/800
5/4 [==============================] - 19s 4s/step - loss: 0.3835 - accuracy:
0.8355 - val_loss: 0.2076 - val_accuracy: 0.9231
Epoch 81/800
5/4 [==============================] - 19s 4s/step - loss: 0.3305 - accuracy:
0.8421 - val_loss: 0.1998 - val_accuracy: 0.9487
Epoch 82/800
5/4 [==============================] - 19s 4s/step - loss: 0.3391 - accuracy:
0.8355 - val_loss: 0.2223 - val_accuracy: 0.9231
Epoch 83/800
5/4 [==============================] - 19s 4s/step - loss: 0.3835 - accuracy:
0.8289 - val_loss: 0.2075 - val_accuracy: 0.9487
Epoch 84/800
5/4 [==============================] - 19s 4s/step - loss: 0.4348 - accuracy:
0.7763 - val_loss: 0.2086 - val_accuracy: 0.9487
Epoch 85/800
5/4 [==============================] - 20s 4s/step - loss: 0.4195 - accuracy:
0.7961 - val_loss: 0.2415 - val_accuracy: 0.8718
Epoch 86/800
5/4 [==============================] - 20s 4s/step - loss: 0.4194 - accuracy:
0.8355 - val_loss: 0.2222 - val_accuracy: 0.8974
Epoch 87/800
5/4 [==============================] - 20s 4s/step - loss: 0.4974 - accuracy:
0.7961 - val_loss: 0.2253 - val_accuracy: 0.9487
Epoch 88/800
5/4 [==============================] - 21s 4s/step - loss: 0.3445 - accuracy:
0.8487 - val_loss: 0.2617 - val_accuracy: 0.8718
Epoch 89/800
5/4 [==============================] - 19s 4s/step - loss: 0.4149 - accuracy:
0.8026 - val_loss: 0.2084 - val_accuracy: 0.9487
Epoch 90/800
5/4 [==============================] - 19s 4s/step - loss: 0.4210 - accuracy:
0.8158 - val_loss: 0.2075 - val_accuracy: 0.9231
```

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Epoch 91/800
5/4 [==============================] - 19s 4s/step - loss: 0.3908 - accuracy:
0.8355 - val_loss: 0.2122 - val_accuracy: 0.8974
Epoch 92/800
5/4 [==============================] - 19s 4s/step - loss: 0.4108 - accuracy:
0.8487 - val_loss: 0.2078 - val_accuracy: 0.9231
Epoch 93/800
5/4 [==============================] - 19s 4s/step - loss: 0.3444 - accuracy:
0.8684 - val_loss: 0.2378 - val_accuracy: 0.8974
Epoch 94/800
5/4 [==============================] - 19s 4s/step - loss: 0.4160 - accuracy:
0.8026 - val_loss: 0.2165 - val_accuracy: 0.8974
Epoch 95/800
5/4 [==============================] - 20s 4s/step - loss: 0.3892 - accuracy:
0.8750 - val_loss: 0.2218 - val_accuracy: 0.9231
Epoch 96/800
5/4 [==============================] - 21s 4s/step - loss: 0.3371 - accuracy:
0.8487 - val_loss: 0.2803 - val_accuracy: 0.8718
Epoch 97/800
5/4 [==============================] - 22s 4s/step - loss: 0.3135 - accuracy:
0.8816 - val_loss: 0.2228 - val_accuracy: 0.8974
Epoch 98/800
5/4 [==============================] - 20s 4s/step - loss: 0.4055 - accuracy:
0.8158 - val_loss: 0.2211 - val_accuracy: 0.8974
Epoch 99/800
5/4 [==============================] - 19s 4s/step - loss: 0.3898 - accuracy:
0.8421 - val_loss: 0.2998 - val_accuracy: 0.8718
Epoch 100/800
5/4 [==============================] - 21s 4s/step - loss: 0.3366 - accuracy:
0.8750 - val_loss: 0.2008 - val_accuracy: 0.9231
Epoch 101/800
5/4 [==============================] - 19s 4s/step - loss: 0.3341 - accuracy:
0.8618 - val_loss: 0.2000 - val_accuracy: 0.8974
Epoch 102/800
5/4 [==============================] - 19s 4s/step - loss: 0.3777 - accuracy:
0.8553 - val_loss: 0.2325 - val_accuracy: 0.8718
Epoch 103/800
5/4 [==============================] - 20s 4s/step - loss: 0.3589 - accuracy:
0.8618 - val_loss: 0.2021 - val_accuracy: 0.9231
Epoch 104/800
5/4 [==============================] - 19s 4s/step - loss: 0.3516 - accuracy:
0.8355 - val_loss: 0.1981 - val_accuracy: 0.9231
Epoch 105/800
5/4 [==============================] - 19s 4s/step - loss: 0.3046 - accuracy:
0.8618 - val_loss: 0.1935 - val_accuracy: 0.9487
Epoch 106/800
5/4 [==============================] - 21s 4s/step - loss: 0.3199 - accuracy:
0.8487 - val_loss: 0.2223 - val_accuracy: 0.8974
```

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Epoch 107/800
5/4 [==============================] - 20s 4s/step - loss: 0.2757 - accuracy:
0.8816 - val_loss: 0.1993 - val_accuracy: 0.9487
Epoch 108/800
5/4 [==============================] - 20s 4s/step - loss: 0.4786 - accuracy:
0.8158 - val_loss: 0.2181 - val_accuracy: 0.9231
Epoch 109/800
5/4 [==============================] - 20s 4s/step - loss: 0.3481 - accuracy:
0.8355 - val_loss: 0.2034 - val_accuracy: 0.9231
Epoch 110/800
5/4 [==============================] - 19s 4s/step - loss: 0.4386 - accuracy:
0.8026 - val_loss: 0.2056 - val_accuracy: 0.9231
Epoch 111/800
5/4 [==============================] - 20s 4s/step - loss: 0.2941 - accuracy:
0.8618 - val_loss: 0.2610 - val_accuracy: 0.8718
Epoch 112/800
5/4 [==============================] - 19s 4s/step - loss: 0.4004 - accuracy:
0.8618 - val_loss: 0.1923 - val_accuracy: 0.9487
Epoch 113/800
5/4 [==============================] - 19s 4s/step - loss: 0.2832 - accuracy:
0.8618 - val_loss: 0.1908 - val_accuracy: 0.9487
Epoch 114/800
5/4 [==============================] - 19s 4s/step - loss: 0.3455 - accuracy:
0.8487 - val_loss: 0.2314 - val_accuracy: 0.8718
Epoch 115/800
5/4 [==============================] - 19s 4s/step - loss: 0.3643 - accuracy:
0.8618 - val_loss: 0.2182 - val_accuracy: 0.8974
Epoch 116/800
5/4 [==============================] - 19s 4s/step - loss: 0.4385 - accuracy:
0.8092 - val_loss: 0.2105 - val_accuracy: 0.9231
Epoch 117/800
5/4 [==============================] - 19s 4s/step - loss: 0.3340 - accuracy:
0.8618 - val_loss: 0.2777 - val_accuracy: 0.8462
Epoch 118/800
5/4 [==============================] - 19s 4s/step - loss: 0.4280 - accuracy:
0.8026 - val_loss: 0.2061 - val_accuracy: 0.8974
Epoch 119/800
5/4 [==============================] - 19s 4s/step - loss: 0.4060 - accuracy:
0.8289 - val_loss: 0.2049 - val_accuracy: 0.9487
Epoch 120/800
5/4 [==============================] - 19s 4s/step - loss: 0.3537 - accuracy:
0.8487 - val_loss: 0.2722 - val_accuracy: 0.8462
Epoch 121/800
5/4 [==============================] - 20s 4s/step - loss: 0.2958 - accuracy:
0.8882 - val_loss: 0.2044 - val_accuracy: 0.8974
Epoch 122/800
5/4 [==============================] - 20s 4s/step - loss: 0.3231 - accuracy:
0.8750 - val_loss: 0.2268 - val_accuracy: 0.8974
```

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Epoch 123/800
5/4 [==============================] - 20s 4s/step - loss: 0.4017 - accuracy:
0.8224 - val_loss: 0.1907 - val_accuracy: 0.8974
Epoch 124/800
5/4 [==============================] - 19s 4s/step - loss: 0.2676 - accuracy:
0.9013 - val_loss: 0.2222 - val_accuracy: 0.8974
Epoch 125/800
5/4 [==============================] - 20s 4s/step - loss: 0.3262 - accuracy:
0.8816 - val_loss: 0.1944 - val_accuracy: 0.9744
Epoch 126/800
5/4 [==============================] - 20s 4s/step - loss: 0.3668 - accuracy:
0.8618 - val_loss: 0.1898 - val_accuracy: 0.9487
Epoch 127/800
5/4 [==============================] - 19s 4s/step - loss: 0.3488 - accuracy:
0.8421 - val_loss: 0.4139 - val_accuracy: 0.8462
Epoch 128/800
5/4 [==============================] - 19s 4s/step - loss: 0.4728 - accuracy:
0.8026 - val_loss: 0.1896 - val_accuracy: 0.9231
Epoch 129/800
5/4 [==============================] - 20s 4s/step - loss: 0.3514 - accuracy:
0.8487 - val_loss: 0.1978 - val_accuracy: 0.9487
Epoch 130/800
5/4 [==============================] - 20s 4s/step - loss: 0.4115 - accuracy:
0.8355 - val_loss: 0.2423 - val_accuracy: 0.8718
Epoch 131/800
5/4 [==============================] - 19s 4s/step - loss: 0.3908 - accuracy:
0.8750 - val_loss: 0.2050 - val_accuracy: 0.8974
Epoch 132/800
5/4 [==============================] - 19s 4s/step - loss: 0.3551 - accuracy:
0.8487 - val_loss: 0.1977 - val_accuracy: 0.9487
Epoch 133/800
5/4 [==============================] - 19s 4s/step - loss: 0.2899 - accuracy:
0.8947 - val_loss: 0.2029 - val_accuracy: 0.9231
Epoch 134/800
5/4 [==============================] - 20s 4s/step - loss: 0.4528 - accuracy:
0.8092 - val_loss: 0.1879 - val_accuracy: 0.9487
Epoch 135/800
5/4 [==============================] - 20s 4s/step - loss: 0.2932 - accuracy:
0.8618 - val_loss: 0.1800 - val_accuracy: 0.9487
Epoch 136/800
5/4 [==============================] - 19s 4s/step - loss: 0.2953 - accuracy:
0.8947 - val_loss: 0.1883 - val_accuracy: 0.8974
Epoch 137/800
5/4 [==============================] - 19s 4s/step - loss: 0.3499 - accuracy:
0.8487 - val_loss: 0.1833 - val_accuracy: 0.9487
Epoch 138/800
5/4 [==============================] - 19s 4s/step - loss: 0.3195 - accuracy:
0.9079 - val_loss: 0.1770 - val_accuracy: 0.9487
```

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Epoch 139/800
5/4 [==============================] - 19s 4s/step - loss: 0.3619 - accuracy:
0.8553 - val_loss: 0.1643 - val_accuracy: 0.9487
Epoch 140/800
5/4 [==============================] - 19s 4s/step - loss: 0.4534 - accuracy:
0.8158 - val_loss: 0.2105 - val_accuracy: 0.9744
Epoch 141/800
5/4 [==============================] - 19s 4s/step - loss: 0.3013 - accuracy:
0.8618 - val_loss: 0.2201 - val_accuracy: 0.8974
Epoch 142/800
5/4 [==============================] - 19s 4s/step - loss: 0.3417 - accuracy:
0.8618 - val_loss: 0.1722 - val_accuracy: 0.9487
Epoch 143/800
5/4 [==============================] - 20s 4s/step - loss: 0.3688 - accuracy:
0.8092 - val_loss: 0.1806 - val_accuracy: 0.9487
Epoch 144/800
5/4 [==============================] - 20s 4s/step - loss: 0.2797 - accuracy:
0.8750 - val_loss: 0.1924 - val_accuracy: 0.9487
Epoch 145/800
5/4 [==============================] - 19s 4s/step - loss: 0.2837 - accuracy:
0.8816 - val_loss: 0.1965 - val_accuracy: 0.9487
Epoch 146/800
5/4 [==============================] - 20s 4s/step - loss: 0.4090 - accuracy:
0.8487 - val_loss: 0.1928 - val_accuracy: 0.9487
Epoch 147/800
5/4 [==============================] - 20s 4s/step - loss: 0.3133 - accuracy:
0.8882 - val_loss: 0.2324 - val_accuracy: 0.9231
Epoch 148/800
5/4 [==============================] - 20s 4s/step - loss: 0.3350 - accuracy:
0.8553 - val_loss: 0.2026 - val_accuracy: 0.9487
Epoch 149/800
5/4 [==============================] - 20s 4s/step - loss: 0.3898 - accuracy:
0.8421 - val_loss: 0.2157 - val_accuracy: 0.9231
Epoch 150/800
5/4 [==============================] - 20s 4s/step - loss: 0.2637 - accuracy:
0.9013 - val_loss: 0.1920 - val_accuracy: 0.9487
Epoch 151/800
5/4 [==============================] - 20s 4s/step - loss: 0.4342 - accuracy:
0.8289 - val_loss: 0.1968 - val_accuracy: 0.9487
Epoch 152/800
5/4 [==============================] - 21s 4s/step - loss: 0.3091 - accuracy:
0.8816 - val_loss: 0.1929 - val_accuracy: 0.9487
Epoch 153/800
5/4 [==============================] - 20s 4s/step - loss: 0.2697 - accuracy:
0.8684 - val_loss: 0.1912 - val_accuracy: 0.9487
Epoch 154/800
5/4 [==============================] - 20s 4s/step - loss: 0.2876 - accuracy:
0.9145 - val_loss: 0.1963 - val_accuracy: 0.9487
```

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Epoch 155/800
5/4 [==============================] - 19s 4s/step - loss: 0.2896 - accuracy:
0.8684 - val_loss: 0.1892 - val_accuracy: 0.9487
Epoch 156/800
5/4 [==============================] - 20s 4s/step - loss: 0.3741 - accuracy:
0.8158 - val_loss: 0.1832 - val_accuracy: 0.9487
Epoch 157/800
5/4 [==============================] - 19s 4s/step - loss: 0.3882 - accuracy:
0.8553 - val_loss: 0.1969 - val_accuracy: 0.9487
Epoch 158/800
5/4 [==============================] - 19s 4s/step - loss: 0.3538 - accuracy:
0.8750 - val_loss: 0.2047 - val_accuracy: 0.8974
Epoch 159/800
5/4 [==============================] - 20s 4s/step - loss: 0.3102 - accuracy:
0.8553 - val_loss: 0.1936 - val_accuracy: 0.9487
Epoch 160/800
5/4 [==============================] - 21s 4s/step - loss: 0.3966 - accuracy:
0.8026 - val_loss: 0.2196 - val_accuracy: 0.8718
Epoch 161/800
5/4 [==============================] - 19s 4s/step - loss: 0.3285 - accuracy:
0.8553 - val_loss: 0.2132 - val_accuracy: 0.8718
Epoch 162/800
5/4 [==============================] - 19s 4s/step - loss: 0.3463 - accuracy:
0.8421 - val_loss: 0.1879 - val_accuracy: 0.9487
Epoch 163/800
5/4 [==============================] - 19s 4s/step - loss: 0.3040 - accuracy:
0.8553 - val_loss: 0.2475 - val_accuracy: 0.8462
Epoch 164/800
5/4 [==============================] - 19s 4s/step - loss: 0.2774 - accuracy:
0.8947 - val_loss: 0.2774 - val_accuracy: 0.8462
Epoch 165/800
5/4 [==============================] - 19s 4s/step - loss: 0.4434 - accuracy:
0.7961 - val_loss: 0.1996 - val_accuracy: 0.9487
Epoch 166/800
5/4 [==============================] - 21s 4s/step - loss: 0.3323 - accuracy:
0.8289 - val_loss: 0.2619 - val_accuracy: 0.8462
Epoch 167/800
5/4 [==============================] - 19s 4s/step - loss: 0.3911 - accuracy:
0.8553 - val_loss: 0.2121 - val_accuracy: 0.8974
Epoch 168/800
5/4 [==============================] - 19s 4s/step - loss: 0.4743 - accuracy:
0.8289 - val_loss: 0.2192 - val_accuracy: 0.9231
Epoch 169/800
5/4 [==============================] - 19s 4s/step - loss: 0.3517 - accuracy:
0.8487 - val_loss: 0.2540 - val_accuracy: 0.8462
Epoch 170/800
5/4 [==============================] - 19s 4s/step - loss: 0.5242 - accuracy:
0.8224 - val_loss: 0.1819 - val_accuracy: 0.9487
```

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Epoch 171/800
5/4 [==============================] - 19s 4s/step - loss: 0.4036 - accuracy:
0.8487 - val_loss: 0.1835 - val_accuracy: 0.9487
Epoch 172/800
5/4 [==============================] - 19s 4s/step - loss: 0.2466 - accuracy:
0.8947 - val_loss: 0.1845 - val_accuracy: 0.9487
Epoch 173/800
5/4 [==============================] - 19s 4s/step - loss: 0.3422 - accuracy:
0.8684 - val_loss: 0.2197 - val_accuracy: 0.8718
Epoch 174/800
5/4 [==============================] - 19s 4s/step - loss: 0.3712 - accuracy:
0.8487 - val_loss: 0.1931 - val_accuracy: 0.9487
Epoch 175/800
5/4 [==============================] - 19s 4s/step - loss: 0.2170 - accuracy:
0.9013 - val_loss: 0.1887 - val_accuracy: 0.9487
Epoch 176/800
5/4 [==============================] - 19s 4s/step - loss: 0.2921 - accuracy:
0.8553 - val_loss: 0.2226 - val_accuracy: 0.8718
Epoch 177/800
5/4 [==============================] - 20s 4s/step - loss: 0.2844 - accuracy:
0.8882 - val_loss: 0.1787 - val_accuracy: 0.9487
Epoch 178/800
5/4 [==============================] - 20s 4s/step - loss: 0.3503 - accuracy:
0.8684 - val_loss: 0.1685 - val_accuracy: 0.9487
Epoch 179/800
5/4 [==============================] - 19s 4s/step - loss: 0.2933 - accuracy:
0.8816 - val_loss: 0.1954 - val_accuracy: 0.9231
Epoch 180/800
5/4 [==============================] - 19s 4s/step - loss: 0.2559 - accuracy:
0.8487 - val_loss: 0.1629 - val_accuracy: 0.9487
Epoch 181/800
5/4 [==============================] - 20s 4s/step - loss: 0.2691 - accuracy:
0.8553 - val_loss: 0.1710 - val_accuracy: 0.9487
Epoch 182/800
5/4 [==============================] - 19s 4s/step - loss: 0.4212 - accuracy:
0.8355 - val_loss: 0.1990 - val_accuracy: 0.9231
Epoch 183/800
5/4 [==============================] - 19s 4s/step - loss: 0.2833 - accuracy:
0.8618 - val_loss: 0.1889 - val_accuracy: 0.9231
Epoch 184/800
5/4 [==============================] - 19s 4s/step - loss: 0.3828 - accuracy:
0.7961 - val_loss: 0.2087 - val_accuracy: 0.9231
Epoch 185/800
5/4 [==============================] - 19s 4s/step - loss: 0.3482 - accuracy:
0.8421 - val_loss: 0.1788 - val_accuracy: 0.9487
Epoch 186/800
5/4 [==============================] - 20s 4s/step - loss: 0.3452 - accuracy:
0.8618 - val_loss: 0.1727 - val_accuracy: 0.9487
```

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Epoch 187/800
5/4 [==============================] - 20s 4s/step - loss: 0.3102 - accuracy:
0.8684 - val_loss: 0.2104 - val_accuracy: 0.8974
Epoch 188/800
5/4 [==============================] - 19s 4s/step - loss: 0.2657 - accuracy:
0.8618 - val_loss: 0.1770 - val_accuracy: 0.9487
Epoch 189/800
5/4 [==============================] - 19s 4s/step - loss: 0.3721 - accuracy:
0.8684 - val_loss: 0.2510 - val_accuracy: 0.8462
Epoch 190/800
5/4 [==============================] - 19s 4s/step - loss: 0.3791 - accuracy:
0.8289 - val_loss: 0.1746 - val_accuracy: 0.9487
Epoch 191/800
5/4 [==============================] - 19s 4s/step - loss: 0.2589 - accuracy:
0.8816 - val_loss: 0.1756 - val_accuracy: 0.9487
Epoch 192/800
5/4 [==============================] - 20s 4s/step - loss: 0.3573 - accuracy:
0.8553 - val_loss: 0.1784 - val_accuracy: 0.9487
Epoch 193/800
5/4 [==============================] - 20s 4s/step - loss: 0.4137 - accuracy:
0.8224 - val_loss: 0.1734 - val_accuracy: 0.9487
Epoch 194/800
5/4 [==============================] - 22s 4s/step - loss: 0.2918 - accuracy:
0.8553 - val_loss: 0.1679 - val_accuracy: 0.9487
Epoch 195/800
5/4 [==============================] - 20s 4s/step - loss: 0.2639 - accuracy:
0.8816 - val_loss: 0.1766 - val_accuracy: 0.9487
Epoch 196/800
5/4 [==============================] - 20s 4s/step - loss: 0.2797 - accuracy:
0.8750 - val_loss: 0.1765 - val_accuracy: 0.9487
Epoch 197/800
5/4 [==============================] - 20s 4s/step - loss: 0.4134 - accuracy:
0.8355 - val_loss: 0.2482 - val_accuracy: 0.8462
Epoch 198/800
5/4 [==============================] - 21s 4s/step - loss: 0.2875 - accuracy:
0.8553 - val_loss: 0.1727 - val_accuracy: 0.9487
Epoch 199/800
5/4 [==============================] - 19s 4s/step - loss: 0.2981 - accuracy:
0.8553 - val_loss: 0.1762 - val_accuracy: 0.9487
Epoch 200/800
5/4 [==============================] - 19s 4s/step - loss: 0.3433 - accuracy:
0.8421 - val_loss: 0.2174 - val_accuracy: 0.8974
Epoch 201/800
5/4 [==============================] - 19s 4s/step - loss: 0.2809 - accuracy:
0.8816 - val_loss: 0.1800 - val_accuracy: 0.9487
Epoch 202/800
5/4 [==============================] - 19s 4s/step - loss: 0.3504 - accuracy:
0.8618 - val_loss: 0.2249 - val_accuracy: 0.8974
```

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Epoch 203/800
5/4 [==============================] - 19s 4s/step - loss: 0.2907 - accuracy:
0.8421 - val_loss: 0.2033 - val_accuracy: 0.8974
Epoch 204/800
5/4 [==============================] - 19s 4s/step - loss: 0.3190 - accuracy:
0.8750 - val_loss: 0.1698 - val_accuracy: 0.9487
Epoch 205/800
5/4 [==============================] - 20s 4s/step - loss: 0.3336 - accuracy:
0.8487 - val_loss: 0.2376 - val_accuracy: 0.8462
Epoch 206/800
5/4 [==============================] - 19s 4s/step - loss: 0.4097 - accuracy:
0.8092 - val_loss: 0.1918 - val_accuracy: 0.8974
Epoch 207/800
5/4 [==============================] - 19s 4s/step - loss: 0.2757 - accuracy:
0.8750 - val_loss: 0.1738 - val_accuracy: 0.9487
Epoch 208/800
5/4 [==============================] - 20s 4s/step - loss: 0.3399 - accuracy:
0.8553 - val_loss: 0.1782 - val_accuracy: 0.9487
Epoch 209/800
5/4 [==============================] - 19s 4s/step - loss: 0.3211 - accuracy:
0.8816 - val_loss: 0.1807 - val_accuracy: 0.9487
Epoch 210/800
5/4 [==============================] - 20s 4s/step - loss: 0.3236 - accuracy:
0.8224 - val_loss: 0.1827 - val_accuracy: 0.9487
Epoch 211/800
5/4 [==============================] - 19s 4s/step - loss: 0.3042 - accuracy:
0.9013 - val_loss: 0.1914 - val_accuracy: 0.9231
Epoch 212/800
5/4 [==============================] - 19s 4s/step - loss: 0.3436 - accuracy:
0.8553 - val_loss: 0.1782 - val_accuracy: 0.9487
Epoch 213/800
5/4 [==============================] - 19s 4s/step - loss: 0.3623 - accuracy:
0.8487 - val_loss: 0.2112 - val_accuracy: 0.8974
Epoch 214/800
5/4 [==============================] - 19s 4s/step - loss: 0.3028 - accuracy:
0.8618 - val_loss: 0.1928 - val_accuracy: 0.9231
Epoch 215/800
5/4 [==============================] - 20s 4s/step - loss: 0.2796 - accuracy:
0.8684 - val_loss: 0.1666 - val_accuracy: 0.9487
Epoch 216/800
5/4 [==============================] - 19s 4s/step - loss: 0.3285 - accuracy:
0.8487 - val_loss: 0.2414 - val_accuracy: 0.8974
Epoch 217/800
5/4 [==============================] - 19s 4s/step - loss: 0.2811 - accuracy:
0.8684 - val_loss: 0.1697 - val_accuracy: 0.9487
Epoch 218/800
5/4 [==============================] - 19s 4s/step - loss: 0.3019 - accuracy:
0.8553 - val_loss: 0.1871 - val_accuracy: 0.8974
```

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Epoch 219/800
5/4 [==============================] - 19s 4s/step - loss: 0.3292 - accuracy:
0.8421 - val_loss: 0.3087 - val_accuracy: 0.8718
Epoch 220/800
5/4 [==============================] - 19s 4s/step - loss: 0.3000 - accuracy:
0.8947 - val_loss: 0.1776 - val_accuracy: 0.9231
Epoch 221/800
5/4 [==============================] - 19s 4s/step - loss: 0.4114 - accuracy:
0.8092 - val_loss: 0.2566 - val_accuracy: 0.8718
Epoch 222/800
5/4 [==============================] - 19s 4s/step - loss: 0.2978 - accuracy:
0.8816 - val_loss: 0.3276 - val_accuracy: 0.8718
Epoch 223/800
5/4 [==============================] - 19s 4s/step - loss: 0.3901 - accuracy:
0.8421 - val_loss: 0.1875 - val_accuracy: 0.9231
Epoch 224/800
5/4 [==============================] - 20s 4s/step - loss: 0.3790 - accuracy:
0.8618 - val_loss: 0.2001 - val_accuracy: 0.8974
Epoch 225/800
5/4 [==============================] - 19s 4s/step - loss: 0.3415 - accuracy:
0.8618 - val_loss: 0.3104 - val_accuracy: 0.8718
Epoch 226/800
5/4 [==============================] - 20s 4s/step - loss: 0.5106 - accuracy:
0.8092 - val_loss: 0.1724 - val_accuracy: 0.9231
Epoch 227/800
5/4 [==============================] - 21s 4s/step - loss: 0.3442 - accuracy:
0.8224 - val_loss: 0.2126 - val_accuracy: 0.8718
Epoch 228/800
5/4 [==============================] - 20s 4s/step - loss: 0.3754 - accuracy:
0.8355 - val_loss: 0.2414 - val_accuracy: 0.8718
Epoch 229/800
5/4 [==============================] - 20s 4s/step - loss: 0.3816 - accuracy:
0.8421 - val_loss: 0.1768 - val_accuracy: 0.8974
Epoch 230/800
5/4 [==============================] - 19s 4s/step - loss: 0.2794 - accuracy:
0.8750 - val_loss: 0.2449 - val_accuracy: 0.8718
Epoch 231/800
5/4 [==============================] - 19s 4s/step - loss: 0.2696 - accuracy:
0.8684 - val_loss: 0.2035 - val_accuracy: 0.8974
Epoch 232/800
5/4 [==============================] - 19s 4s/step - loss: 0.3940 - accuracy:
0.8487 - val_loss: 0.1916 - val_accuracy: 0.9487
Epoch 233/800
5/4 [==============================] - 19s 4s/step - loss: 0.2689 - accuracy:
0.8618 - val_loss: 0.2247 - val_accuracy: 0.8718
Epoch 234/800
5/4 [==============================] - 19s 4s/step - loss: 0.2719 - accuracy:
0.8882 - val_loss: 0.2238 - val_accuracy: 0.8974
```

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Epoch 235/800
5/4 [==============================] - 20s 4s/step - loss: 0.3200 - accuracy:
0.8750 - val_loss: 0.1976 - val_accuracy: 0.9487
Epoch 236/800
5/4 [==============================] - 19s 4s/step - loss: 0.3275 - accuracy:
0.8684 - val_loss: 0.2163 - val_accuracy: 0.9231
Epoch 237/800
5/4 [==============================] - 19s 4s/step - loss: 0.3647 - accuracy:
0.8553 - val_loss: 0.1963 - val_accuracy: 0.9487
Epoch 238/800
5/4 [==============================] - 20s 4s/step - loss: 0.4057 - accuracy:
0.8289 - val_loss: 0.2183 - val_accuracy: 0.9231
Epoch 239/800
5/4 [==============================] - 19s 4s/step - loss: 0.3311 - accuracy:
0.8289 - val_loss: 0.2293 - val_accuracy: 0.8974
Epoch 240/800
5/4 [==============================] - 19s 4s/step - loss: 0.3143 - accuracy:
0.8882 - val_loss: 0.1969 - val_accuracy: 0.9231
Epoch 241/800
5/4 [==============================] - 20s 4s/step - loss: 0.3161 - accuracy:
0.8684 - val_loss: 0.2036 - val_accuracy: 0.9487
Epoch 242/800
5/4 [==============================] - 19s 4s/step - loss: 0.3266 - accuracy:
0.8618 - val_loss: 0.1988 - val_accuracy: 0.9487
Epoch 243/800
5/4 [==============================] - 19s 4s/step - loss: 0.2747 - accuracy:
0.8750 - val_loss: 0.1933 - val_accuracy: 0.9487
Epoch 244/800
5/4 [==============================] - 20s 4s/step - loss: 0.3492 - accuracy:
0.8553 - val_loss: 0.2535 - val_accuracy: 0.8718
Epoch 245/800
5/4 [==============================] - 20s 4s/step - loss: 0.2898 - accuracy:
0.8684 - val_loss: 0.2262 - val_accuracy: 0.9231
Epoch 246/800
5/4 [==============================] - 20s 4s/step - loss: 0.3010 - accuracy:
0.8750 - val_loss: 0.3115 - val_accuracy: 0.8205
Epoch 247/800
5/4 [==============================] - 20s 4s/step - loss: 0.2704 - accuracy:
0.8750 - val_loss: 0.2184 - val_accuracy: 0.8974
Epoch 248/800
5/4 [==============================] - 20s 4s/step - loss: 0.3375 - accuracy:
0.9013 - val_loss: 0.2017 - val_accuracy: 0.8974
Epoch 249/800
5/4 [==============================] - 19s 4s/step - loss: 0.3921 - accuracy:
0.8224 - val_loss: 0.2584 - val_accuracy: 0.8718
Epoch 250/800
5/4 [==============================] - 20s 4s/step - loss: 0.3723 - accuracy:
0.8487 - val_loss: 0.2349 - val_accuracy: 0.8974
```

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Epoch 251/800
5/4 [==============================] - 20s 4s/step - loss: 0.2522 - accuracy:
0.8816 - val_loss: 0.1928 - val_accuracy: 0.8974
Epoch 252/800
5/4 [==============================] - 20s 4s/step - loss: 0.2703 - accuracy:
0.8882 - val_loss: 0.2673 - val_accuracy: 0.8718
Epoch 253/800
5/4 [==============================] - 20s 4s/step - loss: 0.3480 - accuracy:
0.8684 - val_loss: 0.1974 - val_accuracy: 0.9231
Epoch 254/800
5/4 [==============================] - 19s 4s/step - loss: 0.3078 - accuracy:
0.8684 - val_loss: 0.2013 - val_accuracy: 0.8974
Epoch 255/800
5/4 [==============================] - 19s 4s/step - loss: 0.2918 - accuracy:
0.8882 - val_loss: 0.2541 - val_accuracy: 0.8718
Epoch 256/800
5/4 [==============================] - 19s 4s/step - loss: 0.3121 - accuracy:
0.8750 - val_loss: 0.2165 - val_accuracy: 0.8974
Epoch 257/800
5/4 [==============================] - 19s 4s/step - loss: 0.2938 - accuracy:
0.8816 - val_loss: 0.2228 - val_accuracy: 0.8974
Epoch 258/800
5/4 [==============================] - 19s 4s/step - loss: 0.4173 - accuracy:
0.8553 - val_loss: 0.2389 - val_accuracy: 0.8974
Epoch 259/800
5/4 [==============================] - 19s 4s/step - loss: 0.3425 - accuracy:
0.8618 - val_loss: 0.2154 - val_accuracy: 0.8974
Epoch 260/800
5/4 [==============================] - 20s 4s/step - loss: 0.3853 - accuracy:
0.8553 - val_loss: 0.2501 - val_accuracy: 0.8974
Epoch 261/800
5/4 [==============================] - 19s 4s/step - loss: 0.3248 - accuracy:
0.8750 - val_loss: 0.2058 - val_accuracy: 0.8974
Epoch 262/800
5/4 [==============================] - 19s 4s/step - loss: 0.3469 - accuracy:
0.8289 - val_loss: 0.1867 - val_accuracy: 0.9487
Epoch 263/800
5/4 [==============================] - 19s 4s/step - loss: 0.3854 - accuracy:
0.8289 - val_loss: 0.1953 - val_accuracy: 0.9231
Epoch 264/800
5/4 [==============================] - 19s 4s/step - loss: 0.2707 - accuracy:
0.8816 - val_loss: 0.1982 - val_accuracy: 0.9231
Epoch 265/800
5/4 [==============================] - 19s 4s/step - loss: 0.3423 - accuracy:
0.8553 - val_loss: 0.1964 - val_accuracy: 0.9231
Epoch 266/800
5/4 [==============================] - 19s 4s/step - loss: 0.3107 - accuracy:
0.8355 - val_loss: 0.2217 - val_accuracy: 0.8974
```

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Epoch 267/800
5/4 [==============================] - 19s 4s/step - loss: 0.4600 - accuracy:
0.8158 - val_loss: 0.1962 - val_accuracy: 0.8974
Epoch 268/800
5/4 [==============================] - 20s 4s/step - loss: 0.2595 - accuracy:
0.9079 - val_loss: 0.1770 - val_accuracy: 0.9487
Epoch 269/800
5/4 [==============================] - 20s 4s/step - loss: 0.3966 - accuracy:
0.8355 - val_loss: 0.1936 - val_accuracy: 0.9231
Epoch 270/800
5/4 [==============================] - 20s 4s/step - loss: 0.3890 - accuracy:
0.8355 - val_loss: 0.1898 - val_accuracy: 0.8974
Epoch 271/800
5/4 [==============================] - 19s 4s/step - loss: 0.2731 - accuracy:
0.8750 - val_loss: 0.1765 - val_accuracy: 0.8974
Epoch 272/800
5/4 [==============================] - 19s 4s/step - loss: 0.3405 - accuracy:
0.8421 - val_loss: 0.1921 - val_accuracy: 0.8974
Epoch 273/800
5/4 [==============================] - 19s 4s/step - loss: 0.2883 - accuracy:
0.8618 - val_loss: 0.1910 - val_accuracy: 0.9231
Epoch 274/800
5/4 [==============================] - 20s 4s/step - loss: 0.3614 - accuracy:
0.8421 - val_loss: 0.2636 - val_accuracy: 0.8974
Epoch 275/800
5/4 [==============================] - 19s 4s/step - loss: 0.3410 - accuracy:
0.8816 - val_loss: 0.1964 - val_accuracy: 0.8974
Epoch 276/800
5/4 [==============================] - 20s 4s/step - loss: 0.1954 - accuracy:
0.9276 - val_loss: 0.1859 - val_accuracy: 0.9231
Epoch 277/800
5/4 [==============================] - 19s 4s/step - loss: 0.2113 - accuracy:
0.8947 - val_loss: 0.2237 - val_accuracy: 0.8974
Epoch 278/800
5/4 [==============================] - 19s 4s/step - loss: 0.2409 - accuracy:
0.8947 - val_loss: 0.1980 - val_accuracy: 0.8974
Epoch 279/800
5/4 [==============================] - 20s 4s/step - loss: 0.2783 - accuracy:
0.9079 - val_loss: 0.1923 - val_accuracy: 0.9231
Epoch 280/800
5/4 [==============================] - 20s 4s/step - loss: 0.3271 - accuracy:
0.8553 - val_loss: 0.2058 - val_accuracy: 0.9231
Epoch 281/800
5/4 [==============================] - 19s 4s/step - loss: 0.2844 - accuracy:
0.8618 - val_loss: 0.1933 - val_accuracy: 0.9231
Epoch 282/800
5/4 [==============================] - 20s 4s/step - loss: 0.3423 - accuracy:
0.8487 - val_loss: 0.1696 - val_accuracy: 0.9231
```

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Epoch 283/800
5/4 [==============================] - 21s 4s/step - loss: 0.4144 - accuracy:
0.8289 - val_loss: 0.2303 - val_accuracy: 0.8718
Epoch 284/800
5/4 [==============================] - 19s 4s/step - loss: 0.2825 - accuracy:
0.9013 - val_loss: 0.1570 - val_accuracy: 0.9231
Epoch 285/800
5/4 [==============================] - 20s 4s/step - loss: 0.2898 - accuracy:
0.8816 - val_loss: 0.1599 - val_accuracy: 0.9231
Epoch 286/800
5/4 [==============================] - 20s 4s/step - loss: 0.2390 - accuracy:
0.9013 - val_loss: 0.1998 - val_accuracy: 0.9231
Epoch 287/800
5/4 [==============================] - 19s 4s/step - loss: 0.2552 - accuracy:
0.8684 - val_loss: 0.1695 - val_accuracy: 0.9487
Epoch 288/800
5/4 [==============================] - 19s 4s/step - loss: 0.4041 - accuracy:
0.8355 - val_loss: 0.1880 - val_accuracy: 0.9231
Epoch 289/800
5/4 [==============================] - 20s 4s/step - loss: 0.2518 - accuracy:
0.8947 - val_loss: 0.2723 - val_accuracy: 0.8718
Epoch 290/800
5/4 [==============================] - 19s 4s/step - loss: 0.3079 - accuracy:
0.8553 - val_loss: 0.1772 - val_accuracy: 0.9231
Epoch 291/800
5/4 [==============================] - 19s 4s/step - loss: 0.3325 - accuracy:
0.8487 - val_loss: 0.1765 - val_accuracy: 0.8974
Epoch 292/800
5/4 [==============================] - 19s 4s/step - loss: 0.2303 - accuracy:
0.9211 - val_loss: 0.2238 - val_accuracy: 0.8974
Epoch 293/800
5/4 [==============================] - 20s 4s/step - loss: 0.2836 - accuracy:
0.8816 - val_loss: 0.1784 - val_accuracy: 0.8974
Epoch 294/800
5/4 [==============================] - 19s 4s/step - loss: 0.3941 - accuracy:
0.8355 - val_loss: 0.1762 - val_accuracy: 0.9231
Epoch 295/800
5/4 [==============================] - 19s 4s/step - loss: 0.3171 - accuracy:
0.8750 - val_loss: 0.1714 - val_accuracy: 0.9231
Epoch 296/800
5/4 [==============================] - 19s 4s/step - loss: 0.3144 - accuracy:
0.8618 - val_loss: 0.1902 - val_accuracy: 0.9231
Epoch 297/800
5/4 [==============================] - 19s 4s/step - loss: 0.3312 - accuracy:
0.8355 - val_loss: 0.1889 - val_accuracy: 0.9231
Epoch 298/800
5/4 [==============================] - 21s 4s/step - loss: 0.2515 - accuracy:
0.8816 - val_loss: 0.1695 - val_accuracy: 0.9231
```

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Epoch 299/800
5/4 [==============================] - 19s 4s/step - loss: 0.3248 - accuracy:
0.8618 - val_loss: 0.1957 - val_accuracy: 0.9231
Epoch 300/800
5/4 [==============================] - 19s 4s/step - loss: 0.3801 - accuracy:
0.8421 - val_loss: 0.2532 - val_accuracy: 0.8974
Epoch 301/800
5/4 [==============================] - 20s 4s/step - loss: 0.3254 - accuracy:
0.8750 - val_loss: 0.1976 - val_accuracy: 0.9231
Epoch 302/800
5/4 [==============================] - 19s 4s/step - loss: 0.3103 - accuracy:
0.8487 - val_loss: 0.2579 - val_accuracy: 0.8718
Epoch 303/800
5/4 [==============================] - 19s 4s/step - loss: 0.3851 - accuracy:
0.8487 - val_loss: 0.2593 - val_accuracy: 0.8718
Epoch 304/800
5/4 [==============================] - 20s 4s/step - loss: 0.3677 - accuracy:
0.8684 - val_loss: 0.2522 - val_accuracy: 0.9231
Epoch 305/800
5/4 [==============================] - 19s 4s/step - loss: 0.3690 - accuracy:
0.8224 - val_loss: 0.3371 - val_accuracy: 0.8205
Epoch 306/800
5/4 [==============================] - 20s 4s/step - loss: 0.2987 - accuracy:
0.8947 - val_loss: 0.2997 - val_accuracy: 0.8205
Epoch 307/800
5/4 [==============================] - 19s 4s/step - loss: 0.4141 - accuracy:
0.8289 - val_loss: 0.1953 - val_accuracy: 0.9231
Epoch 308/800
5/4 [==============================] - 20s 4s/step - loss: 0.3067 - accuracy:
0.8882 - val_loss: 0.2641 - val_accuracy: 0.8462
Epoch 309/800
5/4 [==============================] - 20s 4s/step - loss: 0.2917 - accuracy:
0.8882 - val_loss: 0.2090 - val_accuracy: 0.9231
Epoch 310/800
5/4 [==============================] - 20s 4s/step - loss: 0.3165 - accuracy:
0.8355 - val_loss: 0.1859 - val_accuracy: 0.8974
Epoch 311/800
5/4 [==============================] - 19s 4s/step - loss: 0.3273 - accuracy:
0.8816 - val_loss: 0.2026 - val_accuracy: 0.9231
Epoch 312/800
5/4 [==============================] - 19s 4s/step - loss: 0.2694 - accuracy:
0.9079 - val_loss: 0.2115 - val_accuracy: 0.9231
Epoch 313/800
5/4 [==============================] - 19s 4s/step - loss: 0.2771 - accuracy:
0.8618 - val_loss: 0.2043 - val_accuracy: 0.8974
Epoch 314/800
5/4 [==============================] - 19s 4s/step - loss: 0.4161 - accuracy:
0.8158 - val_loss: 0.2217 - val_accuracy: 0.8974
```

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Epoch 315/800
5/4 [==============================] - 20s 4s/step - loss: 0.3474 - accuracy:
0.8553 - val_loss: 0.1761 - val_accuracy: 0.9487
Epoch 316/800
5/4 [==============================] - 19s 4s/step - loss: 0.2370 - accuracy:
0.9079 - val_loss: 0.1775 - val_accuracy: 0.9231
Epoch 317/800
5/4 [==============================] - 20s 4s/step - loss: 0.2691 - accuracy:
0.8816 - val_loss: 0.2717 - val_accuracy: 0.8205
Epoch 318/800
5/4 [==============================] - 19s 4s/step - loss: 0.2758 - accuracy:
0.8618 - val_loss: 0.1641 - val_accuracy: 0.9231
Epoch 319/800
5/4 [==============================] - 19s 4s/step - loss: 0.4416 - accuracy:
0.8289 - val_loss: 0.1845 - val_accuracy: 0.9231
Epoch 320/800
5/4 [==============================] - 19s 4s/step - loss: 0.4196 - accuracy:
0.8618 - val_loss: 0.2156 - val_accuracy: 0.8974
Epoch 321/800
5/4 [==============================] - 19s 4s/step - loss: 0.2936 - accuracy:
0.8882 - val_loss: 0.1862 - val_accuracy: 0.9487
Epoch 322/800
5/4 [==============================] - 19s 4s/step - loss: 0.3590 - accuracy:
0.8289 - val_loss: 0.2420 - val_accuracy: 0.8974
Epoch 323/800
5/4 [==============================] - 19s 4s/step - loss: 0.3074 - accuracy:
0.8684 - val_loss: 0.1779 - val_accuracy: 0.9231
Epoch 324/800
5/4 [==============================] - 19s 4s/step - loss: 0.2458 - accuracy:
0.9276 - val_loss: 0.1619 - val_accuracy: 0.9744
Epoch 325/800
5/4 [==============================] - 19s 4s/step - loss: 0.2553 - accuracy:
0.8750 - val_loss: 0.2253 - val_accuracy: 0.8974
Epoch 326/800
5/4 [==============================] - 20s 4s/step - loss: 0.3979 - accuracy:
0.8421 - val_loss: 0.1975 - val_accuracy: 0.9231
Epoch 327/800
5/4 [==============================] - 20s 4s/step - loss: 0.3021 - accuracy:
0.8750 - val_loss: 0.1666 - val_accuracy: 0.9231
Epoch 328/800
5/4 [==============================] - 19s 4s/step - loss: 0.3611 - accuracy:
0.8487 - val_loss: 0.2089 - val_accuracy: 0.8718
Epoch 329/800
5/4 [==============================] - 19s 4s/step - loss: 0.2278 - accuracy:
0.9013 - val_loss: 0.2130 - val_accuracy: 0.8718
Epoch 330/800
5/4 [==============================] - 19s 4s/step - loss: 0.3107 - accuracy:
0.8816 - val_loss: 0.1831 - val_accuracy: 0.8974
```

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Epoch 331/800
5/4 [==============================] - 20s 4s/step - loss: 0.3113 - accuracy:
0.8816 - val_loss: 0.2631 - val_accuracy: 0.8718
Epoch 332/800
5/4 [==============================] - 19s 4s/step - loss: 0.3072 - accuracy:
0.8947 - val_loss: 0.1806 - val_accuracy: 0.9231
Epoch 333/800
5/4 [==============================] - 19s 4s/step - loss: 0.4011 - accuracy:
0.8158 - val_loss: 0.1988 - val_accuracy: 0.8974
Epoch 334/800
5/4 [==============================] - 19s 4s/step - loss: 0.2903 - accuracy:
0.8947 - val_loss: 0.1825 - val_accuracy: 0.9231
Epoch 335/800
5/4 [==============================] - 19s 4s/step - loss: 0.2656 - accuracy:
0.9013 - val_loss: 0.1813 - val_accuracy: 0.9231
Epoch 336/800
5/4 [==============================] - 19s 4s/step - loss: 0.2388 - accuracy:
0.8882 - val_loss: 0.1885 - val_accuracy: 0.9231
Epoch 337/800
5/4 [==============================] - 20s 4s/step - loss: 0.2112 - accuracy:
0.9211 - val_loss: 0.2575 - val_accuracy: 0.8718
Epoch 338/800
5/4 [==============================] - 19s 4s/step - loss: 0.3241 - accuracy:
0.8816 - val_loss: 0.3579 - val_accuracy: 0.8205
Epoch 339/800
5/4 [==============================] - 20s 4s/step - loss: 0.3973 - accuracy:
0.8421 - val_loss: 0.2309 - val_accuracy: 0.9231
Epoch 340/800
5/4 [==============================] - 20s 4s/step - loss: 0.2580 - accuracy:
0.9211 - val_loss: 0.2278 - val_accuracy: 0.9231
Epoch 341/800
5/4 [==============================] - 19s 4s/step - loss: 0.3416 - accuracy:
0.8618 - val_loss: 0.4600 - val_accuracy: 0.8462
Epoch 342/800
5/4 [==============================] - 19s 4s/step - loss: 0.3247 - accuracy:
0.8224 - val_loss: 0.2138 - val_accuracy: 0.9231
Epoch 343/800
5/4 [==============================] - 19s 4s/step - loss: 0.3063 - accuracy:
0.8553 - val_loss: 0.2076 - val_accuracy: 0.9231
Epoch 344/800
5/4 [==============================] - 20s 4s/step - loss: 0.2929 - accuracy:
0.8750 - val_loss: 0.2619 - val_accuracy: 0.8718
Epoch 345/800
5/4 [==============================] - 19s 4s/step - loss: 0.3012 - accuracy:
0.8882 - val_loss: 0.2063 - val_accuracy: 0.9231
Epoch 346/800
5/4 [==============================] - 19s 4s/step - loss: 0.2596 - accuracy:
0.8816 - val_loss: 0.1755 - val_accuracy: 0.9231
```

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Epoch 347/800
5/4 [==============================] - 20s 4s/step - loss: 0.3626 - accuracy:
0.8487 - val_loss: 0.1720 - val_accuracy: 0.9231
Epoch 348/800
5/4 [==============================] - 19s 4s/step - loss: 0.2666 - accuracy:
0.8750 - val_loss: 0.1897 - val_accuracy: 0.9231
Epoch 349/800
5/4 [==============================] - 19s 4s/step - loss: 0.4039 - accuracy:
0.8158 - val_loss: 0.1751 - val_accuracy: 0.9487
Epoch 350/800
5/4 [==============================] - 20s 4s/step - loss: 0.3231 - accuracy:
0.8750 - val_loss: 0.1729 - val_accuracy: 0.9744
Epoch 351/800
5/4 [==============================] - 19s 4s/step - loss: 0.3276 - accuracy:
0.8750 - val_loss: 0.2248 - val_accuracy: 0.8718
Epoch 352/800
5/4 [==============================] - 19s 4s/step - loss: 0.2998 - accuracy:
0.8421 - val_loss: 0.1675 - val_accuracy: 0.9231
Epoch 353/800
5/4 [==============================] - 19s 4s/step - loss: 0.2608 - accuracy:
0.9013 - val_loss: 0.1711 - val_accuracy: 0.9231
Epoch 354/800
5/4 [==============================] - 19s 4s/step - loss: 0.1913 - accuracy:
0.9145 - val_loss: 0.1778 - val_accuracy: 0.8974
Epoch 355/800
5/4 [==============================] - 19s 4s/step - loss: 0.3918 - accuracy:
0.8553 - val_loss: 0.1863 - val_accuracy: 0.8974
Epoch 356/800
5/4 [==============================] - 20s 4s/step - loss: 0.2925 - accuracy:
0.8684 - val_loss: 0.1598 - val_accuracy: 0.9744
Epoch 357/800
5/4 [==============================] - 20s 4s/step - loss: 0.3111 - accuracy:
0.8487 - val_loss: 0.1564 - val_accuracy: 0.9231
Epoch 358/800
5/4 [==============================] - 20s 4s/step - loss: 0.3466 - accuracy:
0.8553 - val_loss: 0.1558 - val_accuracy: 0.9231
Epoch 359/800
5/4 [==============================] - 19s 4s/step - loss: 0.2420 - accuracy:
0.9013 - val_loss: 0.1542 - val_accuracy: 0.9744
Epoch 360/800
5/4 [==============================] - 19s 4s/step - loss: 0.3988 - accuracy:
0.8618 - val_loss: 0.1644 - val_accuracy: 0.9487
Epoch 361/800
5/4 [==============================] - 19s 4s/step - loss: 0.3525 - accuracy:
0.8289 - val_loss: 0.1889 - val_accuracy: 0.9231
Epoch 362/800
5/4 [==============================] - 19s 4s/step - loss: 0.3456 - accuracy:
0.8816 - val_loss: 0.1797 - val_accuracy: 0.9231
```

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Epoch 363/800
5/4 [==============================] - 20s 4s/step - loss: 0.2500 - accuracy:
0.8684 - val_loss: 0.1649 - val_accuracy: 0.9487
Epoch 364/800
5/4 [==============================] - 19s 4s/step - loss: 0.2985 - accuracy:
0.8684 - val_loss: 0.1693 - val_accuracy: 0.9231
Epoch 365/800
5/4 [==============================] - 19s 4s/step - loss: 0.2323 - accuracy:
0.9276 - val_loss: 0.1835 - val_accuracy: 0.9231
Epoch 366/800
5/4 [==============================] - 19s 4s/step - loss: 0.2124 - accuracy:
0.9013 - val_loss: 0.1946 - val_accuracy: 0.9231
Epoch 367/800
5/4 [==============================] - 19s 4s/step - loss: 0.4165 - accuracy:
0.8487 - val_loss: 0.1608 - val_accuracy: 0.9487
Epoch 368/800
5/4 [==============================] - 19s 4s/step - loss: 0.2713 - accuracy:
0.8618 - val_loss: 0.1768 - val_accuracy: 0.9231
Epoch 369/800
5/4 [==============================] - 19s 4s/step - loss: 0.3446 - accuracy:
0.8618 - val_loss: 0.1859 - val_accuracy: 0.9231
Epoch 370/800
5/4 [==============================] - 19s 4s/step - loss: 0.2779 - accuracy:
0.8684 - val_loss: 0.1685 - val_accuracy: 0.9231
Epoch 371/800
5/4 [==============================] - 19s 4s/step - loss: 0.1673 - accuracy:
0.9211 - val_loss: 0.1796 - val_accuracy: 0.9231
Epoch 372/800
5/4 [==============================] - 19s 4s/step - loss: 0.2527 - accuracy:
0.9013 - val_loss: 0.2212 - val_accuracy: 0.8974
Epoch 373/800
5/4 [==============================] - 19s 4s/step - loss: 0.3163 - accuracy:
0.8618 - val_loss: 0.2378 - val_accuracy: 0.9487
Epoch 374/800
5/4 [==============================] - 20s 4s/step - loss: 0.2789 - accuracy:
0.8487 - val_loss: 0.2668 - val_accuracy: 0.8974
Epoch 375/800
5/4 [==============================] - 21s 4s/step - loss: 0.4096 - accuracy:
0.8421 - val_loss: 0.2419 - val_accuracy: 0.8974
Epoch 376/800
5/4 [==============================] - 19s 4s/step - loss: 0.3599 - accuracy:
0.8553 - val_loss: 0.2559 - val_accuracy: 0.9231
Epoch 377/800
5/4 [==============================] - 19s 4s/step - loss: 0.3017 - accuracy:
0.8553 - val_loss: 0.2519 - val_accuracy: 0.8974
Epoch 378/800
5/4 [==============================] - 19s 4s/step - loss: 0.3893 - accuracy:
0.8421 - val_loss: 0.2832 - val_accuracy: 0.8462
```

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Epoch 379/800
5/4 [==============================] - 19s 4s/step - loss: 0.3120 - accuracy:
0.8289 - val_loss: 0.2118 - val_accuracy: 0.9744
Epoch 380/800
5/4 [==============================] - 19s 4s/step - loss: 0.3387 - accuracy:
0.8618 - val_loss: 0.2042 - val_accuracy: 0.9231
Epoch 381/800
5/4 [==============================] - 19s 4s/step - loss: 0.3773 - accuracy:
0.8816 - val_loss: 0.2247 - val_accuracy: 0.9231
Epoch 382/800
5/4 [==============================] - 19s 4s/step - loss: 0.4547 - accuracy:
0.8487 - val_loss: 0.2010 - val_accuracy: 0.9231
Epoch 383/800
5/4 [==============================] - 19s 4s/step - loss: 0.2643 - accuracy:
0.9013 - val_loss: 0.2130 - val_accuracy: 0.9231
Epoch 384/800
5/4 [==============================] - 19s 4s/step - loss: 0.2450 - accuracy:
0.8816 - val_loss: 0.2168 - val_accuracy: 0.9231
Epoch 385/800
5/4 [==============================] - 20s 4s/step - loss: 0.4962 - accuracy:
0.7961 - val_loss: 0.2186 - val_accuracy: 0.9231
Epoch 386/800
5/4 [==============================] - 21s 4s/step - loss: 0.3028 - accuracy:
0.8947 - val_loss: 0.2036 - val_accuracy: 0.9231
Epoch 387/800
5/4 [==============================] - 20s 4s/step - loss: 0.2907 - accuracy:
0.9211 - val_loss: 0.2000 - val_accuracy: 0.9231
Epoch 388/800
5/4 [==============================] - 20s 4s/step - loss: 0.3669 - accuracy:
0.8750 - val_loss: 0.2157 - val_accuracy: 0.9231
Epoch 389/800
5/4 [==============================] - 19s 4s/step - loss: 0.3288 - accuracy:
0.8553 - val_loss: 0.2363 - val_accuracy: 0.8974
Epoch 390/800
5/4 [==============================] - 19s 4s/step - loss: 0.3194 - accuracy:
0.8355 - val_loss: 0.1982 - val_accuracy: 0.9231
Epoch 391/800
5/4 [==============================] - 19s 4s/step - loss: 0.3406 - accuracy:
0.8618 - val_loss: 0.1980 - val_accuracy: 0.9231
Epoch 392/800
5/4 [==============================] - 19s 4s/step - loss: 0.2970 - accuracy:
0.8750 - val_loss: 0.2304 - val_accuracy: 0.8974
Epoch 393/800
5/4 [==============================] - 19s 4s/step - loss: 0.3893 - accuracy:
0.8553 - val_loss: 0.1912 - val_accuracy: 0.9231
Epoch 394/800
5/4 [==============================] - 19s 4s/step - loss: 0.2691 - accuracy:
0.8882 - val_loss: 0.2105 - val_accuracy: 0.9231
```

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Epoch 395/800
5/4 [==============================] - 19s 4s/step - loss: 0.3197 - accuracy:
0.8816 - val_loss: 0.1949 - val_accuracy: 0.9231
Epoch 396/800
5/4 [==============================] - 19s 4s/step - loss: 0.3020 - accuracy:
0.8684 - val_loss: 0.2039 - val_accuracy: 0.9231
Epoch 397/800
5/4 [==============================] - 19s 4s/step - loss: 0.3312 - accuracy:
0.8750 - val_loss: 0.2724 - val_accuracy: 0.8462
Epoch 398/800
5/4 [==============================] - 19s 4s/step - loss: 0.1697 - accuracy:
0.9211 - val_loss: 0.2061 - val_accuracy: 0.9231
Epoch 399/800
5/4 [==============================] - 19s 4s/step - loss: 0.3494 - accuracy:
0.8487 - val_loss: 0.2390 - val_accuracy: 0.8718
Epoch 400/800
5/4 [==============================] - 19s 4s/step - loss: 0.3817 - accuracy:
0.8289 - val_loss: 0.2194 - val_accuracy: 0.8974
Epoch 401/800
5/4 [==============================] - 22s 4s/step - loss: 0.4251 - accuracy:
0.8092 - val_loss: 0.2272 - val_accuracy: 0.8718
Epoch 402/800
5/4 [==============================] - 20s 4s/step - loss: 0.2691 - accuracy:
0.9013 - val_loss: 0.2086 - val_accuracy: 0.8974
Epoch 403/800
5/4 [==============================] - 21s 4s/step - loss: 0.4167 - accuracy:
0.8224 - val_loss: 0.2579 - val_accuracy: 0.8718
Epoch 404/800
5/4 [==============================] - 19s 4s/step - loss: 0.3255 - accuracy:
0.8618 - val_loss: 0.2264 - val_accuracy: 0.8718
Epoch 405/800
5/4 [==============================] - 21s 4s/step - loss: 0.1958 - accuracy:
0.9211 - val_loss: 0.2595 - val_accuracy: 0.8718
Epoch 406/800
5/4 [==============================] - 20s 4s/step - loss: 0.3578 - accuracy:
0.8553 - val_loss: 0.2345 - val_accuracy: 0.8718
Epoch 407/800
5/4 [==============================] - 19s 4s/step - loss: 0.3384 - accuracy:
0.8816 - val_loss: 0.2170 - val_accuracy: 0.8974
Epoch 408/800
5/4 [==============================] - 19s 4s/step - loss: 0.3099 - accuracy:
0.8618 - val_loss: 0.2701 - val_accuracy: 0.8718
Epoch 409/800
5/4 [==============================] - 19s 4s/step - loss: 0.2246 - accuracy:
0.9211 - val_loss: 0.2035 - val_accuracy: 0.9231
Epoch 410/800
5/4 [==============================] - 19s 4s/step - loss: 0.4214 - accuracy:
0.8224 - val_loss: 0.2445 - val_accuracy: 0.8718
```

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Epoch 411/800
5/4 [==============================] - 19s 4s/step - loss: 0.2860 - accuracy:
0.8947 - val_loss: 0.2463 - val_accuracy: 0.8718
Epoch 412/800
5/4 [==============================] - 20s 4s/step - loss: 0.2698 - accuracy:
0.8816 - val_loss: 0.2007 - val_accuracy: 0.8974
Epoch 413/800
5/4 [==============================] - 20s 4s/step - loss: 0.3335 - accuracy:
0.8618 - val_loss: 0.2482 - val_accuracy: 0.8718
Epoch 414/800
5/4 [==============================] - 19s 4s/step - loss: 0.4345 - accuracy:
0.8487 - val_loss: 0.2026 - val_accuracy: 0.8974
Epoch 415/800
5/4 [==============================] - 20s 4s/step - loss: 0.3269 - accuracy:
0.8553 - val_loss: 0.1875 - val_accuracy: 0.8974
Epoch 416/800
5/4 [==============================] - 19s 4s/step - loss: 0.2847 - accuracy:
0.8882 - val_loss: 0.2063 - val_accuracy: 0.8718
Epoch 417/800
5/4 [==============================] - 19s 4s/step - loss: 0.3596 - accuracy:
0.8289 - val_loss: 0.3001 - val_accuracy: 0.8462
Epoch 418/800
5/4 [==============================] - 19s 4s/step - loss: 0.3588 - accuracy:
0.8684 - val_loss: 0.1972 - val_accuracy: 0.9231
Epoch 419/800
5/4 [==============================] - 19s 4s/step - loss: 0.3181 - accuracy:
0.8553 - val_loss: 0.2643 - val_accuracy: 0.8462
Epoch 420/800
5/4 [==============================] - 20s 4s/step - loss: 0.3253 - accuracy:
0.8684 - val_loss: 0.2487 - val_accuracy: 0.8462
Epoch 421/800
5/4 [==============================] - 19s 4s/step - loss: 0.3945 - accuracy:
0.8487 - val_loss: 0.1949 - val_accuracy: 0.9231
Epoch 422/800
5/4 [==============================] - 19s 4s/step - loss: 0.2687 - accuracy:
0.8947 - val_loss: 0.2651 - val_accuracy: 0.8462
Epoch 423/800
5/4 [==============================] - 20s 4s/step - loss: 0.4121 - accuracy:
0.8553 - val_loss: 0.2240 - val_accuracy: 0.8974
Epoch 424/800
5/4 [==============================] - 19s 4s/step - loss: 0.2882 - accuracy:
0.8750 - val_loss: 0.2056 - val_accuracy: 0.9231
Epoch 425/800
5/4 [==============================] - 20s 4s/step - loss: 0.3016 - accuracy:
0.8816 - val_loss: 0.2237 - val_accuracy: 0.8974
Epoch 426/800
5/4 [==============================] - 19s 4s/step - loss: 0.4350 - accuracy:
0.8092 - val_loss: 0.2768 - val_accuracy: 0.8462
```

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Epoch 427/800
5/4 [==============================] - 20s 4s/step - loss: 0.2700 - accuracy:
0.8816 - val_loss: 0.2149 - val_accuracy: 0.9231
Epoch 428/800
5/4 [==============================] - 19s 4s/step - loss: 0.2854 - accuracy:
0.8816 - val_loss: 0.2154 - val_accuracy: 0.8974
Epoch 429/800
5/4 [==============================] - 19s 4s/step - loss: 0.3214 - accuracy:
0.8421 - val_loss: 0.2545 - val_accuracy: 0.8974
Epoch 430/800
5/4 [==============================] - 20s 4s/step - loss: 0.2874 - accuracy:
0.8816 - val_loss: 0.2063 - val_accuracy: 0.9231
Epoch 431/800
5/4 [==============================] - 19s 4s/step - loss: 0.3285 - accuracy:
0.8816 - val_loss: 0.2416 - val_accuracy: 0.8718
Epoch 432/800
5/4 [==============================] - 20s 4s/step - loss: 0.2989 - accuracy:
0.8553 - val_loss: 0.1686 - val_accuracy: 0.9231
Epoch 433/800
5/4 [==============================] - 19s 4s/step - loss: 0.3141 - accuracy:
0.8750 - val_loss: 0.1648 - val_accuracy: 0.9231
Epoch 434/800
5/4 [==============================] - 19s 4s/step - loss: 0.3224 - accuracy:
0.8750 - val_loss: 0.3482 - val_accuracy: 0.8718
Epoch 435/800
5/4 [==============================] - 20s 4s/step - loss: 0.4281 - accuracy:
0.8355 - val_loss: 0.1701 - val_accuracy: 0.9231
Epoch 436/800
5/4 [==============================] - 19s 4s/step - loss: 0.3983 - accuracy:
0.8421 - val_loss: 0.1758 - val_accuracy: 0.9231
Epoch 437/800
5/4 [==============================] - 19s 4s/step - loss: 0.2534 - accuracy:
0.8750 - val_loss: 0.2249 - val_accuracy: 0.8974
Epoch 438/800
5/4 [==============================] - 19s 4s/step - loss: 0.2622 - accuracy:
0.8618 - val_loss: 0.2107 - val_accuracy: 0.8974
Epoch 439/800
5/4 [==============================] - 19s 4s/step - loss: 0.3460 - accuracy:
0.8816 - val_loss: 0.2266 - val_accuracy: 0.8718
Epoch 440/800
5/4 [==============================] - 19s 4s/step - loss: 0.3229 - accuracy:
0.8684 - val_loss: 0.3499 - val_accuracy: 0.8462
Epoch 441/800
5/4 [==============================] - 20s 4s/step - loss: 0.2891 - accuracy:
0.8947 - val_loss: 0.2482 - val_accuracy: 0.8974
Epoch 442/800
5/4 [==============================] - 20s 4s/step - loss: 0.4804 - accuracy:
0.8355 - val_loss: 0.2695 - val_accuracy: 0.8718
```

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Epoch 443/800
5/4 [==============================] - 20s 4s/step - loss: 0.2929 - accuracy:
0.8882 - val_loss: 0.3879 - val_accuracy: 0.8462
Epoch 444/800
5/4 [==============================] - 20s 4s/step - loss: 0.3595 - accuracy:
0.8224 - val_loss: 0.2786 - val_accuracy: 0.8718
Epoch 445/800
5/4 [==============================] - 20s 4s/step - loss: 0.3800 - accuracy:
0.8487 - val_loss: 0.3765 - val_accuracy: 0.8462
Epoch 446/800
5/4 [==============================] - 19s 4s/step - loss: 0.3720 - accuracy:
0.8553 - val_loss: 0.2628 - val_accuracy: 0.8718
Epoch 447/800
5/4 [==============================] - 20s 4s/step - loss: 0.2935 - accuracy:
0.8618 - val_loss: 0.2628 - val_accuracy: 0.8718
Epoch 448/800
5/4 [==============================] - 19s 4s/step - loss: 0.3725 - accuracy:
0.8487 - val_loss: 0.2267 - val_accuracy: 0.8974
Epoch 449/800
5/4 [==============================] - 19s 4s/step - loss: 0.3424 - accuracy:
0.8487 - val_loss: 0.2348 - val_accuracy: 0.8974
Epoch 450/800
5/4 [==============================] - 19s 4s/step - loss: 0.2403 - accuracy:
0.8947 - val_loss: 0.2170 - val_accuracy: 0.8974
Epoch 451/800
5/4 [==============================] - 19s 4s/step - loss: 0.2604 - accuracy:
0.8816 - val_loss: 0.2077 - val_accuracy: 0.8974
Epoch 452/800
5/4 [==============================] - 19s 4s/step - loss: 0.2560 - accuracy:
0.8618 - val_loss: 0.1892 - val_accuracy: 0.9231
Epoch 453/800
5/4 [==============================] - 20s 4s/step - loss: 0.3514 - accuracy:
0.8882 - val_loss: 0.2080 - val_accuracy: 0.8974
Epoch 454/800
5/4 [==============================] - 20s 4s/step - loss: 0.3114 - accuracy:
0.8224 - val_loss: 0.1889 - val_accuracy: 0.9231
Epoch 455/800
5/4 [==============================] - 20s 4s/step - loss: 0.2233 - accuracy:
0.9342 - val_loss: 0.1806 - val_accuracy: 0.9231
Epoch 456/800
5/4 [==============================] - 20s 4s/step - loss: 0.3523 - accuracy:
0.8421 - val_loss: 0.1953 - val_accuracy: 0.8974
Epoch 457/800
5/4 [==============================] - 19s 4s/step - loss: 0.3506 - accuracy:
0.8224 - val_loss: 0.1948 - val_accuracy: 0.8974
Epoch 458/800
5/4 [==============================] - 19s 4s/step - loss: 0.1942 - accuracy:
0.9211 - val_loss: 0.2054 - val_accuracy: 0.8974
```

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Epoch 459/800
5/4 [==============================] - 20s 4s/step - loss: 0.4083 - accuracy:
0.8224 - val_loss: 0.1863 - val_accuracy: 0.9487
Epoch 460/800
5/4 [==============================] - 20s 4s/step - loss: 0.2974 - accuracy:
0.8618 - val_loss: 0.1905 - val_accuracy: 0.8974
Epoch 461/800
5/4 [==============================] - 19s 4s/step - loss: 0.1546 - accuracy:
0.9342 - val_loss: 0.2088 - val_accuracy: 0.8974
Epoch 462/800
5/4 [==============================] - 19s 4s/step - loss: 0.3334 - accuracy:
0.8882 - val_loss: 0.1860 - val_accuracy: 0.8974
Epoch 463/800
5/4 [==============================] - 19s 4s/step - loss: 0.3341 - accuracy:
0.8750 - val_loss: 0.1823 - val_accuracy: 0.9231
Epoch 464/800
5/4 [==============================] - 19s 4s/step - loss: 0.2765 - accuracy:
0.8487 - val_loss: 0.2229 - val_accuracy: 0.8974
Epoch 465/800
5/4 [==============================] - 19s 4s/step - loss: 0.3044 - accuracy:
0.8487 - val_loss: 0.1886 - val_accuracy: 0.8974
Epoch 466/800
5/4 [==============================] - 19s 4s/step - loss: 0.2787 - accuracy:
0.9079 - val_loss: 0.2861 - val_accuracy: 0.8462
Epoch 467/800
5/4 [==============================] - 19s 4s/step - loss: 0.2499 - accuracy:
0.9079 - val_loss: 0.2081 - val_accuracy: 0.9231
Epoch 468/800
5/4 [==============================] - 19s 4s/step - loss: 0.2898 - accuracy:
0.8816 - val_loss: 0.2106 - val_accuracy: 0.8974
Epoch 469/800
5/4 [==============================] - 19s 4s/step - loss: 0.3822 - accuracy:
0.8684 - val_loss: 0.3302 - val_accuracy: 0.8205
Epoch 470/800
5/4 [==============================] - 19s 4s/step - loss: 0.4994 - accuracy:
0.8224 - val_loss: 0.1976 - val_accuracy: 0.9231
Epoch 471/800
5/4 [==============================] - 20s 4s/step - loss: 0.5032 - accuracy:
0.8158 - val_loss: 0.2073 - val_accuracy: 0.9231
Epoch 472/800
5/4 [==============================] - 19s 4s/step - loss: 0.5587 - accuracy:
0.8158 - val_loss: 0.3722 - val_accuracy: 0.8462
Epoch 473/800
5/4 [==============================] - 19s 4s/step - loss: 0.3669 - accuracy:
0.8618 - val_loss: 0.2218 - val_accuracy: 0.9487
Epoch 474/800
5/4 [==============================] - 19s 4s/step - loss: 0.3215 - accuracy:
0.8684 - val_loss: 0.2009 - val_accuracy: 0.8974
```

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Epoch 475/800
5/4 [==============================] - 20s 4s/step - loss: 0.2535 - accuracy:
0.8882 - val_loss: 0.2066 - val_accuracy: 0.8974
Epoch 476/800
5/4 [==============================] - 20s 4s/step - loss: 0.3262 - accuracy:
0.8882 - val_loss: 0.2107 - val_accuracy: 0.8718
Epoch 477/800
5/4 [==============================] - 19s 4s/step - loss: 0.2586 - accuracy:
0.9079 - val_loss: 0.1972 - val_accuracy: 0.8974
Epoch 478/800
5/4 [==============================] - 20s 4s/step - loss: 0.2799 - accuracy:
0.8684 - val_loss: 0.1887 - val_accuracy: 0.8974
Epoch 479/800
5/4 [==============================] - 19s 4s/step - loss: 0.3283 - accuracy:
0.8553 - val_loss: 0.2308 - val_accuracy: 0.8974
Epoch 480/800
5/4 [==============================] - 19s 4s/step - loss: 0.2988 - accuracy:
0.8750 - val_loss: 0.2070 - val_accuracy: 0.8974
Epoch 481/800
5/4 [==============================] - 20s 4s/step - loss: 0.3424 - accuracy:
0.8684 - val_loss: 0.2149 - val_accuracy: 0.8974
Epoch 482/800
5/4 [==============================] - 20s 4s/step - loss: 0.1847 - accuracy:
0.9342 - val_loss: 0.2080 - val_accuracy: 0.8974
Epoch 483/800
5/4 [==============================] - 19s 4s/step - loss: 0.3502 - accuracy:
0.8158 - val_loss: 0.3032 - val_accuracy: 0.8205
Epoch 484/800
5/4 [==============================] - 20s 4s/step - loss: 0.3899 - accuracy:
0.8684 - val_loss: 0.2129 - val_accuracy: 0.9231
Epoch 485/800
5/4 [==============================] - 19s 4s/step - loss: 0.3202 - accuracy:
0.8553 - val_loss: 0.2282 - val_accuracy: 0.8718
Epoch 486/800
5/4 [==============================] - 19s 4s/step - loss: 0.3476 - accuracy:
0.8816 - val_loss: 0.2202 - val_accuracy: 0.8718
Epoch 487/800
5/4 [==============================] - 19s 4s/step - loss: 0.3456 - accuracy:
0.8684 - val_loss: 0.2029 - val_accuracy: 0.8974
Epoch 488/800
5/4 [==============================] - 20s 4s/step - loss: 0.3422 - accuracy:
0.8684 - val_loss: 0.1968 - val_accuracy: 0.8718
Epoch 489/800
5/4 [==============================] - 19s 4s/step - loss: 0.2912 - accuracy:
0.8553 - val_loss: 0.1886 - val_accuracy: 0.8974
Epoch 490/800
5/4 [==============================] - 19s 4s/step - loss: 0.3592 - accuracy:
0.8487 - val_loss: 0.1833 - val_accuracy: 0.8974
```

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Epoch 491/800
5/4 [==============================] - 19s 4s/step - loss: 0.2454 - accuracy:
0.8882 - val_loss: 0.1852 - val_accuracy: 0.8974
Epoch 492/800
5/4 [==============================] - 19s 4s/step - loss: 0.3905 - accuracy:
0.8224 - val_loss: 0.2053 - val_accuracy: 0.8974
Epoch 493/800
5/4 [==============================] - 19s 4s/step - loss: 0.4379 - accuracy:
0.8224 - val_loss: 0.1865 - val_accuracy: 0.9487
Epoch 494/800
5/4 [==============================] - 19s 4s/step - loss: 0.2728 - accuracy:
0.8816 - val_loss: 0.2060 - val_accuracy: 0.8974
Epoch 495/800
5/4 [==============================] - 20s 4s/step - loss: 0.3184 - accuracy:
0.8750 - val_loss: 0.1939 - val_accuracy: 0.8974
Epoch 496/800
5/4 [==============================] - 19s 4s/step - loss: 0.3498 - accuracy:
0.8750 - val_loss: 0.1792 - val_accuracy: 0.8974
Epoch 497/800
5/4 [==============================] - 19s 4s/step - loss: 0.2900 - accuracy:
0.8684 - val_loss: 0.1988 - val_accuracy: 0.8718
Epoch 498/800
5/4 [==============================] - 19s 4s/step - loss: 0.2943 - accuracy:
0.8816 - val_loss: 0.2088 - val_accuracy: 0.8718
Epoch 499/800
5/4 [==============================] - 19s 4s/step - loss: 0.2585 - accuracy:
0.9079 - val_loss: 0.2133 - val_accuracy: 0.8718
Epoch 500/800
5/4 [==============================] - 20s 4s/step - loss: 0.3569 - accuracy:
0.8553 - val_loss: 0.2278 - val_accuracy: 0.8718
Epoch 501/800
5/4 [==============================] - 19s 4s/step - loss: 0.2650 - accuracy:
0.8816 - val_loss: 0.2591 - val_accuracy: 0.8718
Epoch 502/800
5/4 [==============================] - 19s 4s/step - loss: 0.4231 - accuracy:
0.8618 - val_loss: 0.3524 - val_accuracy: 0.8974
Epoch 503/800
5/4 [==============================] - 21s 4s/step - loss: 0.3716 - accuracy:
0.8750 - val_loss: 0.2519 - val_accuracy: 0.8718
Epoch 504/800
5/4 [==============================] - 19s 4s/step - loss: 0.3067 - accuracy:
0.8816 - val_loss: 0.2565 - val_accuracy: 0.8718
Epoch 505/800
5/4 [==============================] - 19s 4s/step - loss: 0.2695 - accuracy:
0.8750 - val_loss: 0.3098 - val_accuracy: 0.8462
Epoch 506/800
5/4 [==============================] - 19s 4s/step - loss: 0.2426 - accuracy:
0.8750 - val_loss: 0.2451 - val_accuracy: 0.8974
```

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Epoch 507/800
5/4 [==============================] - 20s 4s/step - loss: 0.5156 - accuracy:
0.7829 - val_loss: 0.2704 - val_accuracy: 0.8974
Epoch 508/800
5/4 [==============================] - 19s 4s/step - loss: 0.3127 - accuracy:
0.8421 - val_loss: 0.2599 - val_accuracy: 0.8974
Epoch 509/800
5/4 [==============================] - 19s 4s/step - loss: 0.2688 - accuracy:
0.8750 - val_loss: 0.2028 - val_accuracy: 0.8974
Epoch 510/800
5/4 [==============================] - 20s 4s/step - loss: 0.2462 - accuracy:
0.9079 - val_loss: 0.2803 - val_accuracy: 0.8974
Epoch 511/800
5/4 [==============================] - 19s 4s/step - loss: 0.3747 - accuracy:
0.8553 - val_loss: 0.2308 - val_accuracy: 0.8974
Epoch 512/800
5/4 [==============================] - 20s 4s/step - loss: 0.3698 - accuracy:
0.8618 - val_loss: 0.1940 - val_accuracy: 0.8718
Epoch 513/800
5/4 [==============================] - 19s 4s/step - loss: 0.2566 - accuracy:
0.8750 - val_loss: 0.2624 - val_accuracy: 0.8974
Epoch 514/800
5/4 [==============================] - 19s 4s/step - loss: 0.3218 - accuracy:
0.8618 - val_loss: 0.1920 - val_accuracy: 0.8718
Epoch 515/800
5/4 [==============================] - 19s 4s/step - loss: 0.3039 - accuracy:
0.8684 - val_loss: 0.2068 - val_accuracy: 0.8718
Epoch 516/800
5/4 [==============================] - 19s 4s/step - loss: 0.3700 - accuracy:
0.8553 - val_loss: 0.1881 - val_accuracy: 0.8974
Epoch 517/800
5/4 [==============================] - 19s 4s/step - loss: 0.2596 - accuracy:
0.8684 - val_loss: 0.1786 - val_accuracy: 0.8974
Epoch 518/800
5/4 [==============================] - 19s 4s/step - loss: 0.3988 - accuracy:
0.8355 - val_loss: 0.1747 - val_accuracy: 0.8974
Epoch 519/800
5/4 [==============================] - 20s 4s/step - loss: 0.4169 - accuracy:
0.8092 - val_loss: 0.1776 - val_accuracy: 0.9231
Epoch 520/800
5/4 [==============================] - 20s 4s/step - loss: 0.2578 - accuracy:
0.8882 - val_loss: 0.2184 - val_accuracy: 0.8974
Epoch 521/800
5/4 [==============================] - 19s 4s/step - loss: 0.3194 - accuracy:
0.8684 - val_loss: 0.1848 - val_accuracy: 0.9231
Epoch 522/800
5/4 [==============================] - 20s 4s/step - loss: 0.3574 - accuracy:
0.8487 - val_loss: 0.1785 - val_accuracy: 0.8974
```

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Epoch 523/800
5/4 [==============================] - 19s 4s/step - loss: 0.2278 - accuracy:
0.9276 - val_loss: 0.2763 - val_accuracy: 0.8462
Epoch 524/800
5/4 [==============================] - 19s 4s/step - loss: 0.2882 - accuracy:
0.8816 - val_loss: 0.2018 - val_accuracy: 0.8974
Epoch 525/800
5/4 [==============================] - 20s 4s/step - loss: 0.3173 - accuracy:
0.8816 - val_loss: 0.2156 - val_accuracy: 0.9231
Epoch 526/800
5/4 [==============================] - 19s 4s/step - loss: 0.3894 - accuracy:
0.8224 - val_loss: 0.2369 - val_accuracy: 0.8718
Epoch 527/800
5/4 [==============================] - 19s 4s/step - loss: 0.2987 - accuracy:
0.8750 - val_loss: 0.1951 - val_accuracy: 0.8974
Epoch 528/800
5/4 [==============================] - 19s 4s/step - loss: 0.2851 - accuracy:
0.8947 - val_loss: 0.2221 - val_accuracy: 0.8974
Epoch 529/800
5/4 [==============================] - 19s 4s/step - loss: 0.3435 - accuracy:
0.8684 - val_loss: 0.2517 - val_accuracy: 0.8718
Epoch 530/800
5/4 [==============================] - 19s 4s/step - loss: 0.2969 - accuracy:
0.8882 - val_loss: 0.1750 - val_accuracy: 0.9231
Epoch 531/800
5/4 [==============================] - 19s 4s/step - loss: 0.3699 - accuracy:
0.8289 - val_loss: 0.1856 - val_accuracy: 0.9231
Epoch 532/800
5/4 [==============================] - 20s 4s/step - loss: 0.3129 - accuracy:
0.8947 - val_loss: 0.1646 - val_accuracy: 0.9231
Epoch 533/800
5/4 [==============================] - 19s 4s/step - loss: 0.3460 - accuracy:
0.8947 - val_loss: 0.1601 - val_accuracy: 0.9231
Epoch 534/800
5/4 [==============================] - 20s 4s/step - loss: 0.2926 - accuracy:
0.8684 - val_loss: 0.1878 - val_accuracy: 0.8974
Epoch 535/800
5/4 [==============================] - 19s 4s/step - loss: 0.3521 - accuracy:
0.8684 - val_loss: 0.1714 - val_accuracy: 0.9487
Epoch 536/800
5/4 [==============================] - 19s 4s/step - loss: 0.3004 - accuracy:
0.8947 - val_loss: 0.2020 - val_accuracy: 0.8974
Epoch 537/800
5/4 [==============================] - 20s 4s/step - loss: 0.3211 - accuracy:
0.8618 - val_loss: 0.1992 - val_accuracy: 0.8974
Epoch 538/800
5/4 [==============================] - 19s 4s/step - loss: 0.3085 - accuracy:
0.8684 - val_loss: 0.1900 - val_accuracy: 0.9231
```

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Epoch 539/800
5/4 [==============================] - 19s 4s/step - loss: 0.2953 - accuracy:
0.8618 - val_loss: 0.2264 - val_accuracy: 0.8718
Epoch 540/800
5/4 [==============================] - 19s 4s/step - loss: 0.2826 - accuracy:
0.8882 - val_loss: 0.2081 - val_accuracy: 0.8718
Epoch 541/800
5/4 [==============================] - 19s 4s/step - loss: 0.3056 - accuracy:
0.8618 - val_loss: 0.1774 - val_accuracy: 0.9231
Epoch 542/800
5/4 [==============================] - 19s 4s/step - loss: 0.2479 - accuracy:
0.9013 - val_loss: 0.2807 - val_accuracy: 0.8462
Epoch 543/800
5/4 [==============================] - 19s 4s/step - loss: 0.3684 - accuracy:
0.8750 - val_loss: 0.1802 - val_accuracy: 0.9231
Epoch 544/800
5/4 [==============================] - 19s 4s/step - loss: 0.3686 - accuracy:
0.8553 - val_loss: 0.1725 - val_accuracy: 0.9487
Epoch 545/800
5/4 [==============================] - 19s 4s/step - loss: 0.2997 - accuracy:
0.8618 - val_loss: 0.2814 - val_accuracy: 0.8718
Epoch 546/800
5/4 [==============================] - 19s 4s/step - loss: 0.2745 - accuracy:
0.8750 - val_loss: 0.1680 - val_accuracy: 0.9487
Epoch 547/800
5/4 [==============================] - 20s 4s/step - loss: 0.3793 - accuracy:
0.8421 - val_loss: 0.2129 - val_accuracy: 0.9487
Epoch 548/800
5/4 [==============================] - 19s 4s/step - loss: 0.3641 - accuracy:
0.8684 - val_loss: 0.3022 - val_accuracy: 0.8462
Epoch 549/800
5/4 [==============================] - 19s 4s/step - loss: 0.3458 - accuracy:
0.8553 - val_loss: 0.1814 - val_accuracy: 0.9231
Epoch 550/800
5/4 [==============================] - 22s 4s/step - loss: 0.3341 - accuracy:
0.8750 - val_loss: 0.1873 - val_accuracy: 0.9231
Epoch 551/800
5/4 [==============================] - 19s 4s/step - loss: 0.3603 - accuracy:
0.8684 - val_loss: 0.2571 - val_accuracy: 0.8718
Epoch 552/800
5/4 [==============================] - 19s 4s/step - loss: 0.2761 - accuracy:
0.8882 - val_loss: 0.1921 - val_accuracy: 0.9231
Epoch 553/800
5/4 [==============================] - 20s 4s/step - loss: 0.4048 - accuracy:
0.8553 - val_loss: 0.2404 - val_accuracy: 0.8718
Epoch 554/800
5/4 [==============================] - 19s 4s/step - loss: 0.2830 - accuracy:
0.8816 - val_loss: 0.2038 - val_accuracy: 0.8974
```

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Epoch 555/800
5/4 [==============================] - 19s 4s/step - loss: 0.3575 - accuracy:
0.8487 - val_loss: 0.2074 - val_accuracy: 0.8974
Epoch 556/800
5/4 [==============================] - 19s 4s/step - loss: 0.2820 - accuracy:
0.8684 - val_loss: 0.2614 - val_accuracy: 0.8462
Epoch 557/800
5/4 [==============================] - 19s 4s/step - loss: 0.2477 - accuracy:
0.8816 - val_loss: 0.2096 - val_accuracy: 0.8718
Epoch 558/800
5/4 [==============================] - 19s 4s/step - loss: 0.2951 - accuracy:
0.8684 - val_loss: 0.2030 - val_accuracy: 0.9231
Epoch 559/800
5/4 [==============================] - 20s 4s/step - loss: 0.3154 - accuracy:
0.8882 - val_loss: 0.2359 - val_accuracy: 0.8974
Epoch 560/800
5/4 [==============================] - 20s 4s/step - loss: 0.3718 - accuracy:
0.8882 - val_loss: 0.2108 - val_accuracy: 0.8718
Epoch 561/800
5/4 [==============================] - 19s 4s/step - loss: 0.2745 - accuracy:
0.8882 - val_loss: 0.2218 - val_accuracy: 0.8974
Epoch 562/800
5/4 [==============================] - 19s 4s/step - loss: 0.2796 - accuracy:
0.9079 - val_loss: 0.2289 - val_accuracy: 0.8718
Epoch 563/800
5/4 [==============================] - 20s 4s/step - loss: 0.2957 - accuracy:
0.8421 - val_loss: 0.1836 - val_accuracy: 0.8974
Epoch 564/800
5/4 [==============================] - 19s 4s/step - loss: 0.2188 - accuracy:
0.9211 - val_loss: 0.1887 - val_accuracy: 0.9231
Epoch 565/800
5/4 [==============================] - 20s 4s/step - loss: 0.3504 - accuracy:
0.8684 - val_loss: 0.1778 - val_accuracy: 0.9231
Epoch 566/800
5/4 [==============================] - 20s 4s/step - loss: 0.2200 - accuracy:
0.8882 - val_loss: 0.1791 - val_accuracy: 0.9231
Epoch 567/800
5/4 [==============================] - 20s 4s/step - loss: 0.2861 - accuracy:
0.8750 - val_loss: 0.1718 - val_accuracy: 0.9231
Epoch 568/800
5/4 [==============================] - 19s 4s/step - loss: 0.4061 - accuracy:
0.8355 - val_loss: 0.1630 - val_accuracy: 0.8974
Epoch 569/800
5/4 [==============================] - 19s 4s/step - loss: 0.2404 - accuracy:
0.9145 - val_loss: 0.1781 - val_accuracy: 0.9231
Epoch 570/800
5/4 [==============================] - 19s 4s/step - loss: 0.3101 - accuracy:
0.8553 - val_loss: 0.1663 - val_accuracy: 0.9487
```

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Epoch 571/800
5/4 [==============================] - 19s 4s/step - loss: 0.3161 - accuracy:
0.8684 - val_loss: 0.1722 - val_accuracy: 0.9231
Epoch 572/800
5/4 [==============================] - 19s 4s/step - loss: 0.2623 - accuracy:
0.8947 - val_loss: 0.1944 - val_accuracy: 0.8974
Epoch 573/800
5/4 [==============================] - 19s 4s/step - loss: 0.3318 - accuracy:
0.8947 - val_loss: 0.1628 - val_accuracy: 0.9487
Epoch 574/800
5/4 [==============================] - 19s 4s/step - loss: 0.2754 - accuracy:
0.9013 - val_loss: 0.1793 - val_accuracy: 0.9231
Epoch 575/800
5/4 [==============================] - 19s 4s/step - loss: 0.2710 - accuracy:
0.8816 - val_loss: 0.1949 - val_accuracy: 0.8718
Epoch 576/800
5/4 [==============================] - 19s 4s/step - loss: 0.2185 - accuracy:
0.9013 - val_loss: 0.1567 - val_accuracy: 0.9744
Epoch 577/800
5/4 [==============================] - 20s 4s/step - loss: 0.3300 - accuracy:
0.8553 - val_loss: 0.1574 - val_accuracy: 0.9487
Epoch 578/800
5/4 [==============================] - 20s 4s/step - loss: 0.3315 - accuracy:
0.8487 - val_loss: 0.1710 - val_accuracy: 0.9231
Epoch 579/800
5/4 [==============================] - 21s 4s/step - loss: 0.3193 - accuracy:
0.8553 - val_loss: 0.1874 - val_accuracy: 0.8974
Epoch 580/800
5/4 [==============================] - 20s 4s/step - loss: 0.1997 - accuracy:
0.9079 - val_loss: 0.1779 - val_accuracy: 0.9487
Epoch 581/800
5/4 [==============================] - 20s 4s/step - loss: 0.3703 - accuracy:
0.8684 - val_loss: 0.2058 - val_accuracy: 0.8974
Epoch 582/800
5/4 [==============================] - 19s 4s/step - loss: 0.3209 - accuracy:
0.8816 - val_loss: 0.1622 - val_accuracy: 0.9487
Epoch 583/800
5/4 [==============================] - 20s 4s/step - loss: 0.4218 - accuracy:
0.8487 - val_loss: 0.1784 - val_accuracy: 0.9231
Epoch 584/800
5/4 [==============================] - 19s 4s/step - loss: 0.3028 - accuracy:
0.8750 - val_loss: 0.1818 - val_accuracy: 0.9231
Epoch 585/800
5/4 [==============================] - 20s 4s/step - loss: 0.2184 - accuracy:
0.8947 - val_loss: 0.1873 - val_accuracy: 0.9231
Epoch 586/800
5/4 [==============================] - 19s 4s/step - loss: 0.2441 - accuracy:
0.8684 - val_loss: 0.1679 - val_accuracy: 0.9487
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Epoch 587/800
5/4 [==============================] - 19s 4s/step - loss: 0.4568 - accuracy:
0.7961 - val_loss: 0.1629 - val_accuracy: 0.9231
Epoch 588/800
5/4 [==============================] - 19s 4s/step - loss: 0.2561 - accuracy:
0.8750 - val_loss: 0.1643 - val_accuracy: 0.9231
Epoch 589/800
5/4 [==============================] - 19s 4s/step - loss: 0.3133 - accuracy:
0.8750 - val_loss: 0.1583 - val_accuracy: 0.9487
Epoch 590/800
5/4 [==============================] - 19s 4s/step - loss: 0.2637 - accuracy:
0.8816 - val_loss: 0.1930 - val_accuracy: 0.9231
Epoch 591/800
5/4 [==============================] - 19s 4s/step - loss: 0.3259 - accuracy:
0.8816 - val_loss: 0.1616 - val_accuracy: 0.9231
Epoch 592/800
5/4 [==============================] - 19s 4s/step - loss: 0.2459 - accuracy:
0.8750 - val_loss: 0.1513 - val_accuracy: 0.9487
Epoch 593/800
5/4 [==============================] - 19s 4s/step - loss: 0.3843 - accuracy:
0.8421 - val_loss: 0.1624 - val_accuracy: 0.9487
Epoch 594/800
5/4 [==============================] - 19s 4s/step - loss: 0.3885 - accuracy:
0.8355 - val_loss: 0.1880 - val_accuracy: 0.8974
Epoch 595/800
5/4 [==============================] - 19s 4s/step - loss: 0.3070 - accuracy:
0.8684 - val_loss: 0.1684 - val_accuracy: 0.9231
Epoch 596/800
5/4 [==============================] - 20s 4s/step - loss: 0.2959 - accuracy:
0.8750 - val_loss: 0.1691 - val_accuracy: 0.9487
Epoch 597/800
5/4 [==============================] - 19s 4s/step - loss: 0.3870 - accuracy:
0.8224 - val_loss: 0.1749 - val_accuracy: 0.8974
Epoch 598/800
5/4 [==============================] - 19s 4s/step - loss: 0.3290 - accuracy:
0.8355 - val_loss: 0.1731 - val_accuracy: 0.9487
Epoch 599/800
5/4 [==============================] - 19s 4s/step - loss: 0.2570 - accuracy:
0.8947 - val_loss: 0.1842 - val_accuracy: 0.9487
Epoch 600/800
5/4 [==============================] - 19s 4s/step - loss: 0.4579 - accuracy:
0.8553 - val_loss: 0.2010 - val_accuracy: 0.8718
Epoch 601/800
5/4 [==============================] - 20s 4s/step - loss: 0.4311 - accuracy:
0.8355 - val_loss: 0.1911 - val_accuracy: 0.8718
Epoch 602/800
5/4 [==============================] - 19s 4s/step - loss: 0.2200 - accuracy:
0.9145 - val_loss: 0.2194 - val_accuracy: 0.9231
```

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Epoch 603/800
5/4 [==============================] - 20s 4s/step - loss: 0.4431 - accuracy:
0.8355 - val_loss: 0.1915 - val_accuracy: 0.9231
Epoch 604/800
5/4 [==============================] - 19s 4s/step - loss: 0.3658 - accuracy:
0.8882 - val_loss: 0.1670 - val_accuracy: 0.9487
Epoch 605/800
5/4 [==============================] - 19s 4s/step - loss: 0.2948 - accuracy:
0.8750 - val_loss: 0.1616 - val_accuracy: 0.9487
Epoch 606/800
5/4 [==============================] - 19s 4s/step - loss: 0.2703 - accuracy:
0.9079 - val_loss: 0.1941 - val_accuracy: 0.8974
Epoch 607/800
5/4 [==============================] - 20s 4s/step - loss: 0.2761 - accuracy:
0.8684 - val_loss: 0.1669 - val_accuracy: 0.9487
Epoch 608/800
5/4 [==============================] - 19s 4s/step - loss: 0.2626 - accuracy:
0.9013 - val_loss: 0.2081 - val_accuracy: 0.8974
Epoch 609/800
5/4 [==============================] - 19s 4s/step - loss: 0.3659 - accuracy:
0.9079 - val_loss: 0.1863 - val_accuracy: 0.9231
Epoch 610/800
5/4 [==============================] - 19s 4s/step - loss: 0.3140 - accuracy:
0.8421 - val_loss: 0.1830 - val_accuracy: 0.9487
Epoch 611/800
5/4 [==============================] - 19s 4s/step - loss: 0.2313 - accuracy:
0.8816 - val_loss: 0.2325 - val_accuracy: 0.8462
Epoch 612/800
5/4 [==============================] - 19s 4s/step - loss: 0.2288 - accuracy:
0.8816 - val_loss: 0.1689 - val_accuracy: 0.9487
Epoch 613/800
5/4 [==============================] - 20s 4s/step - loss: 0.3594 - accuracy:
0.8947 - val_loss: 0.1740 - val_accuracy: 0.9487
Epoch 614/800
5/4 [==============================] - 19s 4s/step - loss: 0.3236 - accuracy:
0.8750 - val_loss: 0.1705 - val_accuracy: 0.9487
Epoch 615/800
5/4 [==============================] - 20s 4s/step - loss: 0.2625 - accuracy:
0.8947 - val_loss: 0.1772 - val_accuracy: 0.9487
Epoch 616/800
5/4 [==============================] - 19s 4s/step - loss: 0.3858 - accuracy:
0.8355 - val_loss: 0.1957 - val_accuracy: 0.8974
Epoch 617/800
5/4 [==============================] - 19s 4s/step - loss: 0.3394 - accuracy:
0.8882 - val_loss: 0.1594 - val_accuracy: 0.9487
Epoch 618/800
5/4 [==============================] - 19s 4s/step - loss: 0.2708 - accuracy:
0.9013 - val_loss: 0.1661 - val_accuracy: 0.9744
```

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Epoch 619/800
5/4 [==============================] - 19s 4s/step - loss: 0.3092 - accuracy:
0.8553 - val_loss: 0.1619 - val_accuracy: 0.9487
Epoch 620/800
5/4 [==============================] - 19s 4s/step - loss: 0.2753 - accuracy:
0.8882 - val_loss: 0.1693 - val_accuracy: 0.9231
Epoch 621/800
5/4 [==============================] - 20s 4s/step - loss: 0.4429 - accuracy:
0.8487 - val_loss: 0.1733 - val_accuracy: 0.9231
Epoch 622/800
5/4 [==============================] - 19s 4s/step - loss: 0.3903 - accuracy:
0.8553 - val_loss: 0.1692 - val_accuracy: 0.9487
Epoch 623/800
5/4 [==============================] - 20s 4s/step - loss: 0.2858 - accuracy:
0.8882 - val_loss: 0.1722 - val_accuracy: 0.9231
Epoch 624/800
5/4 [==============================] - 19s 4s/step - loss: 0.2023 - accuracy:
0.9145 - val_loss: 0.1696 - val_accuracy: 0.9231
Epoch 625/800
5/4 [==============================] - 20s 4s/step - loss: 0.3194 - accuracy:
0.8553 - val_loss: 0.1670 - val_accuracy: 0.9231
Epoch 626/800
5/4 [==============================] - 19s 4s/step - loss: 0.3513 - accuracy:
0.8553 - val_loss: 0.1715 - val_accuracy: 0.9231
Epoch 627/800
5/4 [==============================] - 23s 5s/step - loss: 0.3255 - accuracy:
0.8947 - val_loss: 0.1685 - val_accuracy: 0.9487
Epoch 628/800
5/4 [==============================] - 19s 4s/step - loss: 0.2910 - accuracy:
0.8750 - val_loss: 0.1705 - val_accuracy: 0.9487
Epoch 629/800
5/4 [==============================] - 19s 4s/step - loss: 0.3760 - accuracy:
0.8618 - val_loss: 0.1759 - val_accuracy: 0.9487
Epoch 630/800
5/4 [==============================] - 20s 4s/step - loss: 0.3207 - accuracy:
0.8816 - val_loss: 0.2173 - val_accuracy: 0.9231
Epoch 631/800
5/4 [==============================] - 19s 4s/step - loss: 0.2358 - accuracy:
0.9013 - val_loss: 0.1775 - val_accuracy: 0.9487
Epoch 632/800
5/4 [==============================] - 19s 4s/step - loss: 0.3207 - accuracy:
0.8618 - val_loss: 0.1742 - val_accuracy: 0.9487
Epoch 633/800
5/4 [==============================] - 20s 4s/step - loss: 0.2969 - accuracy:
0.8882 - val_loss: 0.1760 - val_accuracy: 0.9231
Epoch 634/800
5/4 [==============================] - 19s 4s/step - loss: 0.2085 - accuracy:
0.9276 - val_loss: 0.1811 - val_accuracy: 0.9231
```

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Epoch 635/800
5/4 [==============================] - 19s 4s/step - loss: 0.2914 - accuracy:
0.8816 - val_loss: 0.2069 - val_accuracy: 0.9231
Epoch 636/800
5/4 [==============================] - 20s 4s/step - loss: 0.1700 - accuracy:
0.9211 - val_loss: 0.1923 - val_accuracy: 0.9231
Epoch 637/800
5/4 [==============================] - 19s 4s/step - loss: 0.2819 - accuracy:
0.8684 - val_loss: 0.1805 - val_accuracy: 0.9231
Epoch 638/800
5/4 [==============================] - 19s 4s/step - loss: 0.2098 - accuracy:
0.9211 - val_loss: 0.1752 - val_accuracy: 0.9487
Epoch 639/800
5/4 [==============================] - 19s 4s/step - loss: 0.3829 - accuracy:
0.8487 - val_loss: 0.1843 - val_accuracy: 0.9231
Epoch 640/800
5/4 [==============================] - 20s 4s/step - loss: 0.2947 - accuracy:
0.8618 - val_loss: 0.1727 - val_accuracy: 0.9487
Epoch 641/800
5/4 [==============================] - 19s 4s/step - loss: 0.2554 - accuracy:
0.9079 - val_loss: 0.1901 - val_accuracy: 0.9231
Epoch 642/800
5/4 [==============================] - 20s 4s/step - loss: 0.2887 - accuracy:
0.8553 - val_loss: 0.2208 - val_accuracy: 0.9231
Epoch 643/800
5/4 [==============================] - 19s 4s/step - loss: 0.3761 - accuracy:
0.8750 - val_loss: 0.2030 - val_accuracy: 0.8974
Epoch 644/800
5/4 [==============================] - 19s 4s/step - loss: 0.4514 - accuracy:
0.8421 - val_loss: 0.2805 - val_accuracy: 0.8462
Epoch 645/800
5/4 [==============================] - 19s 4s/step - loss: 0.2035 - accuracy:
0.9079 - val_loss: 0.2378 - val_accuracy: 0.9231
Epoch 646/800
5/4 [==============================] - 20s 4s/step - loss: 0.3182 - accuracy:
0.8553 - val_loss: 0.1877 - val_accuracy: 0.9231
Epoch 647/800
5/4 [==============================] - 19s 4s/step - loss: 0.2350 - accuracy:
0.8947 - val_loss: 0.1905 - val_accuracy: 0.9231
Epoch 648/800
5/4 [==============================] - 20s 4s/step - loss: 0.3312 - accuracy:
0.8618 - val_loss: 0.1992 - val_accuracy: 0.8974
Epoch 649/800
5/4 [==============================] - 20s 4s/step - loss: 0.2478 - accuracy:
0.9013 - val_loss: 0.2121 - val_accuracy: 0.8974
Epoch 650/800
5/4 [==============================] - 19s 4s/step - loss: 0.2338 - accuracy:
0.8947 - val_loss: 0.1852 - val_accuracy: 0.9231
```

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Epoch 651/800
5/4 [==============================] - 19s 4s/step - loss: 0.2977 - accuracy:
0.8816 - val_loss: 0.2035 - val_accuracy: 0.8974
Epoch 652/800
5/4 [==============================] - 19s 4s/step - loss: 0.3503 - accuracy:
0.8487 - val_loss: 0.2006 - val_accuracy: 0.9231
Epoch 653/800
5/4 [==============================] - 19s 4s/step - loss: 0.2609 - accuracy:
0.8947 - val_loss: 0.1942 - val_accuracy: 0.9231
Epoch 654/800
5/4 [==============================] - 19s 4s/step - loss: 0.3969 - accuracy:
0.8618 - val_loss: 0.2202 - val_accuracy: 0.8974
Epoch 655/800
5/4 [==============================] - 20s 4s/step - loss: 0.2591 - accuracy:
0.8882 - val_loss: 0.2041 - val_accuracy: 0.8974
Epoch 656/800
5/4 [==============================] - 19s 4s/step - loss: 0.3937 - accuracy:
0.8421 - val_loss: 0.1938 - val_accuracy: 0.9231
Epoch 657/800
5/4 [==============================] - 19s 4s/step - loss: 0.3188 - accuracy:
0.9013 - val_loss: 0.2023 - val_accuracy: 0.9231
Epoch 658/800
5/4 [==============================] - 19s 4s/step - loss: 0.2402 - accuracy:
0.8750 - val_loss: 0.1973 - val_accuracy: 0.9231
Epoch 659/800
5/4 [==============================] - 19s 4s/step - loss: 0.2911 - accuracy:
0.8947 - val_loss: 0.2219 - val_accuracy: 0.8974
Epoch 660/800
5/4 [==============================] - 20s 4s/step - loss: 0.3647 - accuracy:
0.8816 - val_loss: 0.2487 - val_accuracy: 0.8718
Epoch 661/800
5/4 [==============================] - 19s 4s/step - loss: 0.2604 - accuracy:
0.9079 - val_loss: 0.2140 - val_accuracy: 0.9231
Epoch 662/800
5/4 [==============================] - 20s 4s/step - loss: 0.3973 - accuracy:
0.8355 - val_loss: 0.2254 - val_accuracy: 0.9231
Epoch 663/800
5/4 [==============================] - 19s 4s/step - loss: 0.3225 - accuracy:
0.8750 - val_loss: 0.2583 - val_accuracy: 0.8974
Epoch 664/800
5/4 [==============================] - 19s 4s/step - loss: 0.2651 - accuracy:
0.8816 - val_loss: 0.3112 - val_accuracy: 0.8462
Epoch 665/800
5/4 [==============================] - 19s 4s/step - loss: 0.3726 - accuracy:
0.8816 - val_loss: 0.2380 - val_accuracy: 0.8974
Epoch 666/800
5/4 [==============================] - 19s 4s/step - loss: 0.2997 - accuracy:
0.8816 - val_loss: 0.2668 - val_accuracy: 0.8718
```

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Epoch 667/800
5/4 [==============================] - 19s 4s/step - loss: 0.3344 - accuracy:
0.8684 - val_loss: 0.2444 - val_accuracy: 0.8974
Epoch 668/800
5/4 [==============================] - 19s 4s/step - loss: 0.3067 - accuracy:
0.8487 - val_loss: 0.3076 - val_accuracy: 0.8462
Epoch 669/800
5/4 [==============================] - 19s 4s/step - loss: 0.3842 - accuracy:
0.8816 - val_loss: 0.2490 - val_accuracy: 0.8718
Epoch 670/800
5/4 [==============================] - 19s 4s/step - loss: 0.3588 - accuracy:
0.8816 - val_loss: 0.2366 - val_accuracy: 0.8974
Epoch 671/800
5/4 [==============================] - 20s 4s/step - loss: 0.3406 - accuracy:
0.8684 - val_loss: 0.2550 - val_accuracy: 0.8718
Epoch 672/800
5/4 [==============================] - 20s 4s/step - loss: 0.4261 - accuracy:
0.8487 - val_loss: 0.2979 - val_accuracy: 0.8205
Epoch 673/800
5/4 [==============================] - 19s 4s/step - loss: 0.3490 - accuracy:
0.8750 - val_loss: 0.2374 - val_accuracy: 0.8974
Epoch 674/800
5/4 [==============================] - 19s 4s/step - loss: 0.3407 - accuracy:
0.8684 - val_loss: 0.2531 - val_accuracy: 0.8718
Epoch 675/800
5/4 [==============================] - 19s 4s/step - loss: 0.3688 - accuracy:
0.8618 - val_loss: 0.2564 - val_accuracy: 0.8462
Epoch 676/800
5/4 [==============================] - 19s 4s/step - loss: 0.2383 - accuracy:
0.9079 - val_loss: 0.2145 - val_accuracy: 0.8974
Epoch 677/800
5/4 [==============================] - 20s 4s/step - loss: 0.3423 - accuracy:
0.8684 - val_loss: 0.2110 - val_accuracy: 0.9231
Epoch 678/800
5/4 [==============================] - 19s 4s/step - loss: 0.2648 - accuracy:
0.8684 - val_loss: 0.3203 - val_accuracy: 0.8205
Epoch 679/800
5/4 [==============================] - 19s 4s/step - loss: 0.3418 - accuracy:
0.8750 - val_loss: 0.2240 - val_accuracy: 0.8718
Epoch 680/800
5/4 [==============================] - 19s 4s/step - loss: 0.2577 - accuracy:
0.9013 - val_loss: 0.1712 - val_accuracy: 0.9487
Epoch 681/800
5/4 [==============================] - 19s 4s/step - loss: 0.4021 - accuracy:
0.8618 - val_loss: 0.1704 - val_accuracy: 0.9231
Epoch 682/800
5/4 [==============================] - 19s 4s/step - loss: 0.3013 - accuracy:
0.8553 - val_loss: 0.2352 - val_accuracy: 0.8462
```

```
Epoch 683/800
5/4 [==============================] - 19s 4s/step - loss: 0.3915 - accuracy:
0.8092 - val_loss: 0.1800 - val_accuracy: 0.9231
Epoch 684/800
5/4 [==============================] - 19s 4s/step - loss: 0.2521 - accuracy:
0.8684 - val_loss: 0.1869 - val_accuracy: 0.9231
Epoch 685/800
5/4 [==============================] - 20s 4s/step - loss: 0.3451 - accuracy:
0.8487 - val_loss: 0.1932 - val_accuracy: 0.9231
Epoch 686/800
5/4 [==============================] - 20s 4s/step - loss: 0.4228 - accuracy:
0.8618 - val_loss: 0.1962 - val_accuracy: 0.8974
Epoch 687/800
5/4 [==============================] - 20s 4s/step - loss: 0.3242 - accuracy:
0.8684 - val_loss: 0.2215 - val_accuracy: 0.8974
Epoch 688/800
5/4 [==============================] - 19s 4s/step - loss: 0.3007 - accuracy:
0.8750 - val_loss: 0.2186 - val_accuracy: 0.8974
Epoch 689/800
5/4 [==============================] - 19s 4s/step - loss: 0.2230 - accuracy:
0.8947 - val_loss: 0.2055 - val_accuracy: 0.8974
Epoch 690/800
5/4 [==============================] - 20s 4s/step - loss: 0.2160 - accuracy:
0.9079 - val_loss: 0.2921 - val_accuracy: 0.8462
Epoch 691/800
5/4 [==============================] - 20s 4s/step - loss: 0.2234 - accuracy:
0.9145 - val_loss: 0.1897 - val_accuracy: 0.8974
Epoch 692/800
5/4 [==============================] - 19s 4s/step - loss: 0.2383 - accuracy:
0.9145 - val_loss: 0.1814 - val_accuracy: 0.8974
Epoch 693/800
5/4 [==============================] - 19s 4s/step - loss: 0.2565 - accuracy:
0.8750 - val_loss: 0.1827 - val_accuracy: 0.8974
Epoch 694/800
5/4 [==============================] - 19s 4s/step - loss: 0.2761 - accuracy:
0.9145 - val_loss: 0.1974 - val_accuracy: 0.9231
Epoch 695/800
5/4 [==============================] - 19s 4s/step - loss: 0.3311 - accuracy:
0.8487 - val_loss: 0.1735 - val_accuracy: 0.8974
Epoch 696/800
5/4 [==============================] - 19s 4s/step - loss: 0.3580 - accuracy:
0.8816 - val_loss: 0.2451 - val_accuracy: 0.8974
Epoch 697/800
5/4 [==============================] - 21s 4s/step - loss: 0.4279 - accuracy:
0.8750 - val_loss: 0.1919 - val_accuracy: 0.8974
Epoch 698/800
5/4 [==============================] - 20s 4s/step - loss: 0.3101 - accuracy:
0.8553 - val_loss: 0.2014 - val_accuracy: 0.8974
```

```
Epoch 699/800
5/4 [==============================] - 21s 4s/step - loss: 0.3702 - accuracy:
0.8618 - val_loss: 0.3426 - val_accuracy: 0.8462
Epoch 700/800
5/4 [==============================] - 21s 4s/step - loss: 0.3465 - accuracy:
0.8684 - val_loss: 0.2112 - val_accuracy: 0.8974
Epoch 701/800
5/4 [==============================] - 20s 4s/step - loss: 0.1943 - accuracy:
0.9079 - val_loss: 0.2020 - val_accuracy: 0.9231
Epoch 702/800
5/4 [==============================] - 21s 4s/step - loss: 0.3495 - accuracy:
0.8487 - val_loss: 0.2055 - val_accuracy: 0.9231
Epoch 703/800
5/4 [==============================] - 20s 4s/step - loss: 0.3215 - accuracy:
0.8224 - val_loss: 0.2756 - val_accuracy: 0.8462
Epoch 704/800
5/4 [==============================] - 20s 4s/step - loss: 0.3330 - accuracy:
0.8684 - val_loss: 0.1951 - val_accuracy: 0.9231
Epoch 705/800
5/4 [==============================] - 19s 4s/step - loss: 0.3301 - accuracy:
0.8618 - val_loss: 0.1967 - val_accuracy: 0.9487
Epoch 706/800
5/4 [==============================] - 19s 4s/step - loss: 0.3434 - accuracy:
0.8684 - val_loss: 0.2302 - val_accuracy: 0.9231
Epoch 707/800
5/4 [==============================] - 20s 4s/step - loss: 0.3609 - accuracy:
0.8750 - val_loss: 0.2905 - val_accuracy: 0.8462
Epoch 708/800
5/4 [==============================] - 20s 4s/step - loss: 0.2901 - accuracy:
0.8947 - val_loss: 0.2098 - val_accuracy: 0.8974
Epoch 709/800
5/4 [==============================] - 20s 4s/step - loss: 0.3125 - accuracy:
0.8750 - val_loss: 0.2606 - val_accuracy: 0.8718
Epoch 710/800
5/4 [==============================] - 20s 4s/step - loss: 0.3444 - accuracy:
0.8882 - val_loss: 0.2306 - val_accuracy: 0.8974
Epoch 711/800
5/4 [==============================] - 20s 4s/step - loss: 0.3659 - accuracy:
0.8684 - val_loss: 0.2193 - val_accuracy: 0.8974
Epoch 712/800
5/4 [==============================] - 20s 4s/step - loss: 0.2041 - accuracy:
0.8947 - val_loss: 0.4766 - val_accuracy: 0.8462
Epoch 713/800
5/4 [==============================] - 20s 4s/step - loss: 0.5135 - accuracy:
0.8092 - val_loss: 0.2072 - val_accuracy: 0.8974
Epoch 714/800
5/4 [==============================] - 21s 4s/step - loss: 0.4106 - accuracy:
0.8355 - val_loss: 0.2005 - val_accuracy: 0.8974
```

```
Epoch 715/800
5/4 [==============================] - 20s 4s/step - loss: 0.3513 - accuracy:
0.8816 - val_loss: 0.3574 - val_accuracy: 0.8205
Epoch 716/800
5/4 [==============================] - 20s 4s/step - loss: 0.2732 - accuracy:
0.9013 - val_loss: 0.2133 - val_accuracy: 0.8974
Epoch 717/800
5/4 [==============================] - 19s 4s/step - loss: 0.3173 - accuracy:
0.8750 - val_loss: 0.2123 - val_accuracy: 0.8974
Epoch 718/800
5/4 [==============================] - 19s 4s/step - loss: 0.2389 - accuracy:
0.8947 - val_loss: 0.2882 - val_accuracy: 0.8462
Epoch 719/800
5/4 [==============================] - 19s 4s/step - loss: 0.2758 - accuracy:
0.9145 - val_loss: 0.2502 - val_accuracy: 0.8462
Epoch 720/800
5/4 [==============================] - 19s 4s/step - loss: 0.2834 - accuracy:
0.9013 - val_loss: 0.2152 - val_accuracy: 0.9231
Epoch 721/800
5/4 [==============================] - 20s 4s/step - loss: 0.3655 - accuracy:
0.8618 - val_loss: 0.2560 - val_accuracy: 0.8974
Epoch 722/800
5/4 [==============================] - 20s 4s/step - loss: 0.3190 - accuracy:
0.8816 - val_loss: 0.2771 - val_accuracy: 0.8462
Epoch 723/800
5/4 [==============================] - 20s 4s/step - loss: 0.3073 - accuracy:
0.8487 - val_loss: 0.2170 - val_accuracy: 0.8974
Epoch 724/800
5/4 [==============================] - 19s 4s/step - loss: 0.2972 - accuracy:
0.9013 - val_loss: 0.2516 - val_accuracy: 0.8974
Epoch 725/800
5/4 [==============================] - 20s 4s/step - loss: 0.4379 - accuracy:
0.8553 - val_loss: 0.2013 - val_accuracy: 0.9231
Epoch 726/800
5/4 [==============================] - 19s 4s/step - loss: 0.3181 - accuracy:
0.8553 - val_loss: 0.1836 - val_accuracy: 0.8974
Epoch 727/800
5/4 [==============================] - 19s 4s/step - loss: 0.3203 - accuracy:
0.8553 - val_loss: 0.2320 - val_accuracy: 0.8974
Epoch 728/800
5/4 [==============================] - 20s 4s/step - loss: 0.2563 - accuracy:
0.9013 - val_loss: 0.1898 - val_accuracy: 0.9231
Epoch 729/800
5/4 [==============================] - 20s 4s/step - loss: 0.3092 - accuracy:
0.8618 - val_loss: 0.2070 - val_accuracy: 0.9231
Epoch 730/800
5/4 [==============================] - 19s 4s/step - loss: 0.4442 - accuracy:
0.8618 - val_loss: 0.2079 - val_accuracy: 0.9231
```

```
Epoch 731/800
5/4 [==============================] - 20s 4s/step - loss: 0.2853 - accuracy:
0.8618 - val_loss: 0.2094 - val_accuracy: 0.8974
Epoch 732/800
5/4 [==============================] - 19s 4s/step - loss: 0.3136 - accuracy:
0.8750 - val_loss: 0.2212 - val_accuracy: 0.9231
Epoch 733/800
5/4 [==============================] - 19s 4s/step - loss: 0.2770 - accuracy:
0.8816 - val_loss: 0.2236 - val_accuracy: 0.9231
Epoch 734/800
5/4 [==============================] - 19s 4s/step - loss: 0.2838 - accuracy:
0.8816 - val_loss: 0.2219 - val_accuracy: 0.9231
Epoch 735/800
5/4 [==============================] - 20s 4s/step - loss: 0.3137 - accuracy:
0.8684 - val_loss: 0.2241 - val_accuracy: 0.9231
Epoch 736/800
5/4 [==============================] - 20s 4s/step - loss: 0.3149 - accuracy:
0.8487 - val_loss: 0.3888 - val_accuracy: 0.8205
Epoch 737/800
5/4 [==============================] - 19s 4s/step - loss: 0.2569 - accuracy:
0.8816 - val_loss: 0.2291 - val_accuracy: 0.8974
Epoch 738/800
5/4 [==============================] - 20s 4s/step - loss: 0.3715 - accuracy:
0.8618 - val_loss: 0.2404 - val_accuracy: 0.8974
Epoch 739/800
5/4 [==============================] - 19s 4s/step - loss: 0.3178 - accuracy:
0.8618 - val_loss: 0.3120 - val_accuracy: 0.8718
Epoch 740/800
5/4 [==============================] - 20s 4s/step - loss: 0.3609 - accuracy:
0.8684 - val_loss: 0.2646 - val_accuracy: 0.9231
Epoch 741/800
5/4 [==============================] - 19s 4s/step - loss: 0.3967 - accuracy:
0.8553 - val_loss: 0.2478 - val_accuracy: 0.8974
Epoch 742/800
5/4 [==============================] - 20s 4s/step - loss: 0.2885 - accuracy:
0.8816 - val_loss: 0.2672 - val_accuracy: 0.9231
Epoch 743/800
5/4 [==============================] - 19s 4s/step - loss: 0.2530 - accuracy:
0.8882 - val_loss: 0.2259 - val_accuracy: 0.8974
Epoch 744/800
5/4 [==============================] - 19s 4s/step - loss: 0.2997 - accuracy:
0.8553 - val_loss: 0.2141 - val_accuracy: 0.8974
Epoch 745/800
5/4 [==============================] - 19s 4s/step - loss: 0.3658 - accuracy:
0.8355 - val_loss: 0.2046 - val_accuracy: 0.8974
Epoch 746/800
5/4 [==============================] - 20s 4s/step - loss: 0.3326 - accuracy:
0.8750 - val_loss: 0.2089 - val_accuracy: 0.9231
```

```
Epoch 747/800
5/4 [==============================] - 20s 4s/step - loss: 0.3869 - accuracy:
0.8421 - val_loss: 0.2583 - val_accuracy: 0.8974
Epoch 748/800
5/4 [==============================] - 20s 4s/step - loss: 0.2620 - accuracy:
0.9013 - val_loss: 0.2081 - val_accuracy: 0.9231
Epoch 749/800
5/4 [==============================] - 19s 4s/step - loss: 0.2568 - accuracy:
0.8816 - val_loss: 0.1814 - val_accuracy: 0.9231
Epoch 750/800
5/4 [==============================] - 20s 4s/step - loss: 0.2467 - accuracy:
0.8684 - val_loss: 0.1692 - val_accuracy: 0.9231
Epoch 751/800
5/4 [==============================] - 19s 4s/step - loss: 0.2564 - accuracy:
0.9013 - val_loss: 0.1874 - val_accuracy: 0.9231
Epoch 752/800
5/4 [==============================] - 20s 4s/step - loss: 0.2313 - accuracy:
0.9013 - val_loss: 0.1851 - val_accuracy: 0.9231
Epoch 753/800
5/4 [==============================] - 19s 4s/step - loss: 0.4373 - accuracy:
0.8487 - val_loss: 0.2065 - val_accuracy: 0.8974
Epoch 754/800
5/4 [==============================] - 20s 4s/step - loss: 0.2474 - accuracy:
0.9276 - val_loss: 0.1820 - val_accuracy: 0.9487
Epoch 755/800
5/4 [==============================] - 20s 4s/step - loss: 0.3348 - accuracy:
0.8487 - val_loss: 0.2297 - val_accuracy: 0.8718
Epoch 756/800
5/4 [==============================] - 19s 4s/step - loss: 0.5387 - accuracy:
0.7763 - val_loss: 0.2382 - val_accuracy: 0.8974
Epoch 757/800
5/4 [==============================] - 19s 4s/step - loss: 0.3056 - accuracy:
0.8750 - val_loss: 0.1719 - val_accuracy: 0.9231
Epoch 758/800
5/4 [==============================] - 19s 4s/step - loss: 0.3404 - accuracy:
0.8618 - val_loss: 0.1912 - val_accuracy: 0.9231
Epoch 759/800
5/4 [==============================] - 19s 4s/step - loss: 0.3476 - accuracy:
0.8553 - val_loss: 0.1944 - val_accuracy: 0.9231
Epoch 760/800
5/4 [==============================] - 19s 4s/step - loss: 0.3309 - accuracy:
0.8355 - val_loss: 0.1781 - val_accuracy: 0.8974
Epoch 761/800
5/4 [==============================] - 20s 4s/step - loss: 0.2200 - accuracy:
0.9079 - val_loss: 0.2141 - val_accuracy: 0.8974
Epoch 762/800
5/4 [==============================] - 19s 4s/step - loss: 0.4214 - accuracy:
0.8553 - val_loss: 0.1926 - val_accuracy: 0.9231
```

```
Epoch 763/800
5/4 [==============================] - 19s 4s/step - loss: 0.2678 - accuracy:
0.8618 - val_loss: 0.2534 - val_accuracy: 0.8718
Epoch 764/800
5/4 [==============================] - 19s 4s/step - loss: 0.2767 - accuracy:
0.8684 - val_loss: 0.1854 - val_accuracy: 0.8974
Epoch 765/800
5/4 [==============================] - 20s 4s/step - loss: 0.3498 - accuracy:
0.8750 - val_loss: 0.1792 - val_accuracy: 0.8974
Epoch 766/800
5/4 [==============================] - 19s 4s/step - loss: 0.3731 - accuracy:
0.8553 - val_loss: 0.2555 - val_accuracy: 0.8718
Epoch 767/800
5/4 [==============================] - 20s 4s/step - loss: 0.3208 - accuracy:
0.8750 - val_loss: 0.1998 - val_accuracy: 0.9231
Epoch 768/800
5/4 [==============================] - 20s 4s/step - loss: 0.3420 - accuracy:
0.8882 - val_loss: 0.1841 - val_accuracy: 0.9231
Epoch 769/800
5/4 [==============================] - 19s 4s/step - loss: 0.2662 - accuracy:
0.8882 - val_loss: 0.1770 - val_accuracy: 0.9231
Epoch 770/800
5/4 [==============================] - 20s 4s/step - loss: 0.2648 - accuracy:
0.9013 - val_loss: 0.2054 - val_accuracy: 0.9231
Epoch 771/800
5/4 [==============================] - 20s 4s/step - loss: 0.2495 - accuracy:
0.8750 - val_loss: 0.1958 - val_accuracy: 0.9231
Epoch 772/800
5/4 [==============================] - 20s 4s/step - loss: 0.2376 - accuracy:
0.9079 - val_loss: 0.1750 - val_accuracy: 0.9487
Epoch 773/800
5/4 [==============================] - 19s 4s/step - loss: 0.2605 - accuracy:
0.8882 - val_loss: 0.1983 - val_accuracy: 0.9231
Epoch 774/800
5/4 [==============================] - 20s 4s/step - loss: 0.2581 - accuracy:
0.8947 - val_loss: 0.2183 - val_accuracy: 0.9231
Epoch 775/800
5/4 [==============================] - 19s 4s/step - loss: 0.3192 - accuracy:
0.8816 - val_loss: 0.1816 - val_accuracy: 0.9487
Epoch 776/800
5/4 [==============================] - 19s 4s/step - loss: 0.3281 - accuracy:
0.8553 - val_loss: 0.1936 - val_accuracy: 0.9231
Epoch 777/800
5/4 [==============================] - 20s 4s/step - loss: 0.2838 - accuracy:
0.8947 - val_loss: 0.1908 - val_accuracy: 0.9231
Epoch 778/800
5/4 [==============================] - 20s 4s/step - loss: 0.3042 - accuracy:
0.8816 - val_loss: 0.1774 - val_accuracy: 0.9231
```

```
Epoch 779/800
5/4 [==============================] - 19s 4s/step - loss: 0.4035 - accuracy:
0.8355 - val_loss: 0.2039 - val_accuracy: 0.8974
Epoch 780/800
5/4 [==============================] - 19s 4s/step - loss: 0.4704 - accuracy:
0.8355 - val_loss: 0.2061 - val_accuracy: 0.8974
Epoch 781/800
5/4 [==============================] - 19s 4s/step - loss: 0.2881 - accuracy:
0.8882 - val_loss: 0.2089 - val_accuracy: 0.8974
Epoch 782/800
5/4 [==============================] - 19s 4s/step - loss: 0.4148 - accuracy:
0.8224 - val_loss: 0.1981 - val_accuracy: 0.8974
Epoch 783/800
5/4 [==============================] - 20s 4s/step - loss: 0.2604 - accuracy:
0.9013 - val_loss: 0.1886 - val_accuracy: 0.9487
Epoch 784/800
5/4 [==============================] - 19s 4s/step - loss: 0.3584 - accuracy:
0.8684 - val_loss: 0.1693 - val_accuracy: 0.9231
Epoch 785/800
5/4 [==============================] - 19s 4s/step - loss: 0.4135 - accuracy:
0.8355 - val_loss: 0.1623 - val_accuracy: 0.9231
Epoch 786/800
5/4 [==============================] - 20s 4s/step - loss: 0.3686 - accuracy:
0.8750 - val_loss: 0.1507 - val_accuracy: 0.9487
Epoch 787/800
5/4 [==============================] - 19s 4s/step - loss: 0.2460 - accuracy:
0.8816 - val_loss: 0.1837 - val_accuracy: 0.9487
Epoch 788/800
5/4 [==============================] - 19s 4s/step - loss: 0.2927 - accuracy:
0.9079 - val_loss: 0.1638 - val_accuracy: 0.9231
Epoch 789/800
5/4 [==============================] - 21s 4s/step - loss: 0.3921 - accuracy:
0.8553 - val_loss: 0.1791 - val_accuracy: 0.9231
Epoch 790/800
5/4 [==============================] - 20s 4s/step - loss: 0.3296 - accuracy:
0.8882 - val_loss: 0.1751 - val_accuracy: 0.9487
Epoch 791/800
5/4 [==============================] - 19s 4s/step - loss: 0.3719 - accuracy:
0.8553 - val_loss: 0.1653 - val_accuracy: 0.9231
Epoch 792/800
5/4 [==============================] - 19s 4s/step - loss: 0.3853 - accuracy:
0.8553 - val_loss: 0.1755 - val_accuracy: 0.9231
Epoch 793/800
5/4 [==============================] - 19s 4s/step - loss: 0.3470 - accuracy:
0.8816 - val_loss: 0.1982 - val_accuracy: 0.9487
Epoch 794/800
5/4 [==============================] - 19s 4s/step - loss: 0.4030 - accuracy:
0.8553 - val_loss: 0.1703 - val_accuracy: 0.8974
```

```
Epoch 795/800
5/4 [==============================] - 19s 4s/step - loss: 0.2877 - accuracy:
0.9013 - val_loss: 0.2190 - val_accuracy: 0.8974
Epoch 796/800
5/4 [==============================] - 19s 4s/step - loss: 0.4411 - accuracy:
0.8289 - val_loss: 0.1966 - val_accuracy: 0.9487
Epoch 797/800
5/4 [==============================] - 19s 4s/step - loss: 0.3724 - accuracy:
0.8553 - val_loss: 0.1697 - val_accuracy: 0.9231
Epoch 798/800
5/4 [==============================] - 20s 4s/step - loss: 0.3225 - accuracy:
0.8816 - val_loss: 0.2729 - val_accuracy: 0.8718
Epoch 799/800
5/4 [==============================] - 19s 4s/step - loss: 0.3569 - accuracy:
0.8684 - val_loss: 0.1734 - val_accuracy: 0.9487
Epoch 800/800
5/4 [==============================] - 19s 4s/step - loss: 0.2906 - accuracy:
0.8816 - val_loss: 0.1872 - val_accuracy: 0.9231
```

[28]:
```
model.save("model.h5")
print("Saved model to disk")
```

```
Saved model to disk
```

[29]:
```
model = load_model('model.h5', custom_objects = None, compile = True)
y_hat = model.predict(X_test, batch_size = 32)
y_pred_covid = model.predict(covid_x_test, batch_size = 32)

y_test_covid = LabelBinarizer().fit_transform(covid_y_test)
y_test_covid = to_categorical(y_test_covid)
```

[30]:
```
from sklearn.metrics import classification_report

print(classification_report(np.argmax(y_test, axis=1), np.argmax(y_hat,␣
 ↪axis=1)))
```

```
              precision    recall  f1-score   support

           0       0.94      0.89      0.92        19
           1       0.90      0.95      0.93        20

    accuracy                           0.92        39
   macro avg       0.92      0.92      0.92        39
weighted avg       0.92      0.92      0.92        39
```

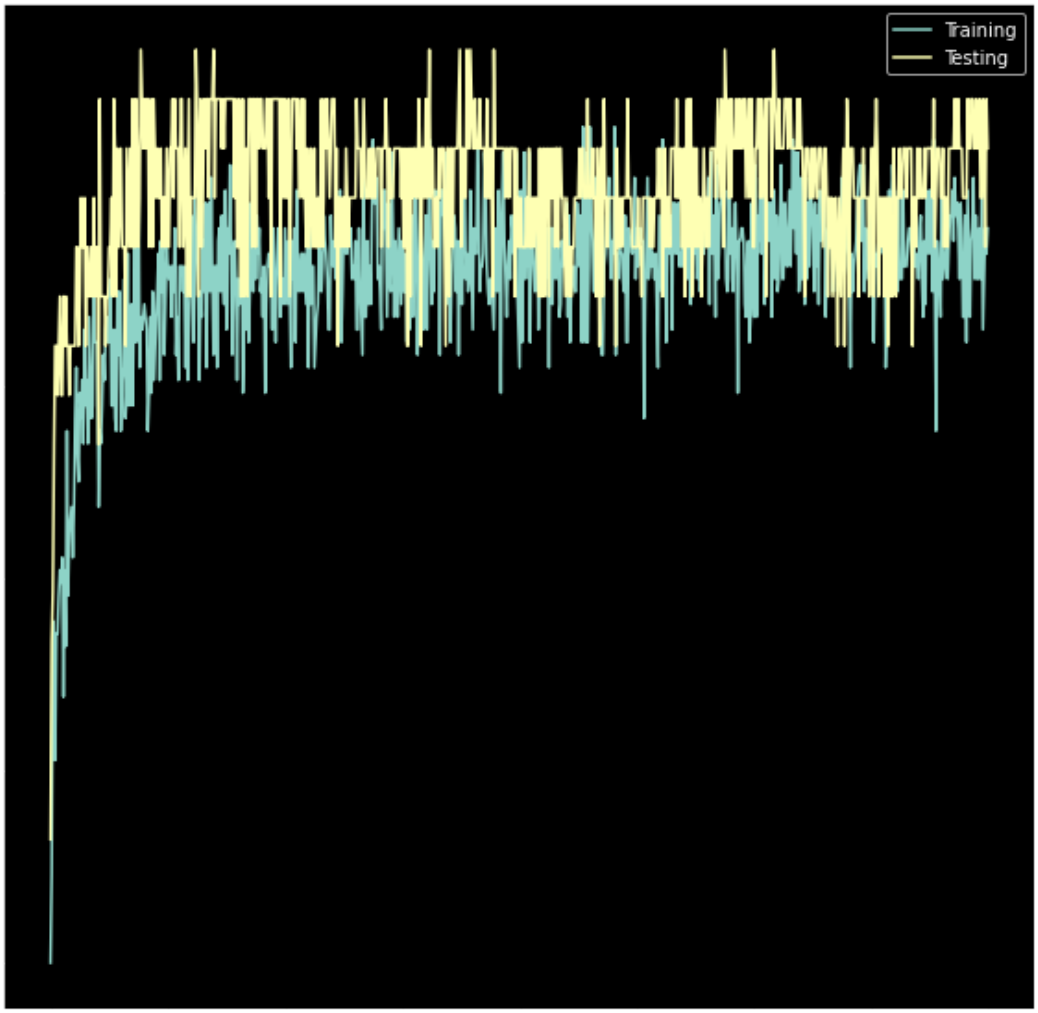
[31]:
```
plt.figure(figsize=(10,10))
plt.style.use('dark_background')

plt.plot(history.history['accuracy'])
plt.plot(history.history['val_accuracy'])

plt.title('Model Accuracy')
plt.ylabel('Accuracy')
plt.xlabel('Epoch')

plt.legend(['Training', 'Testing'])

plt.show()
```



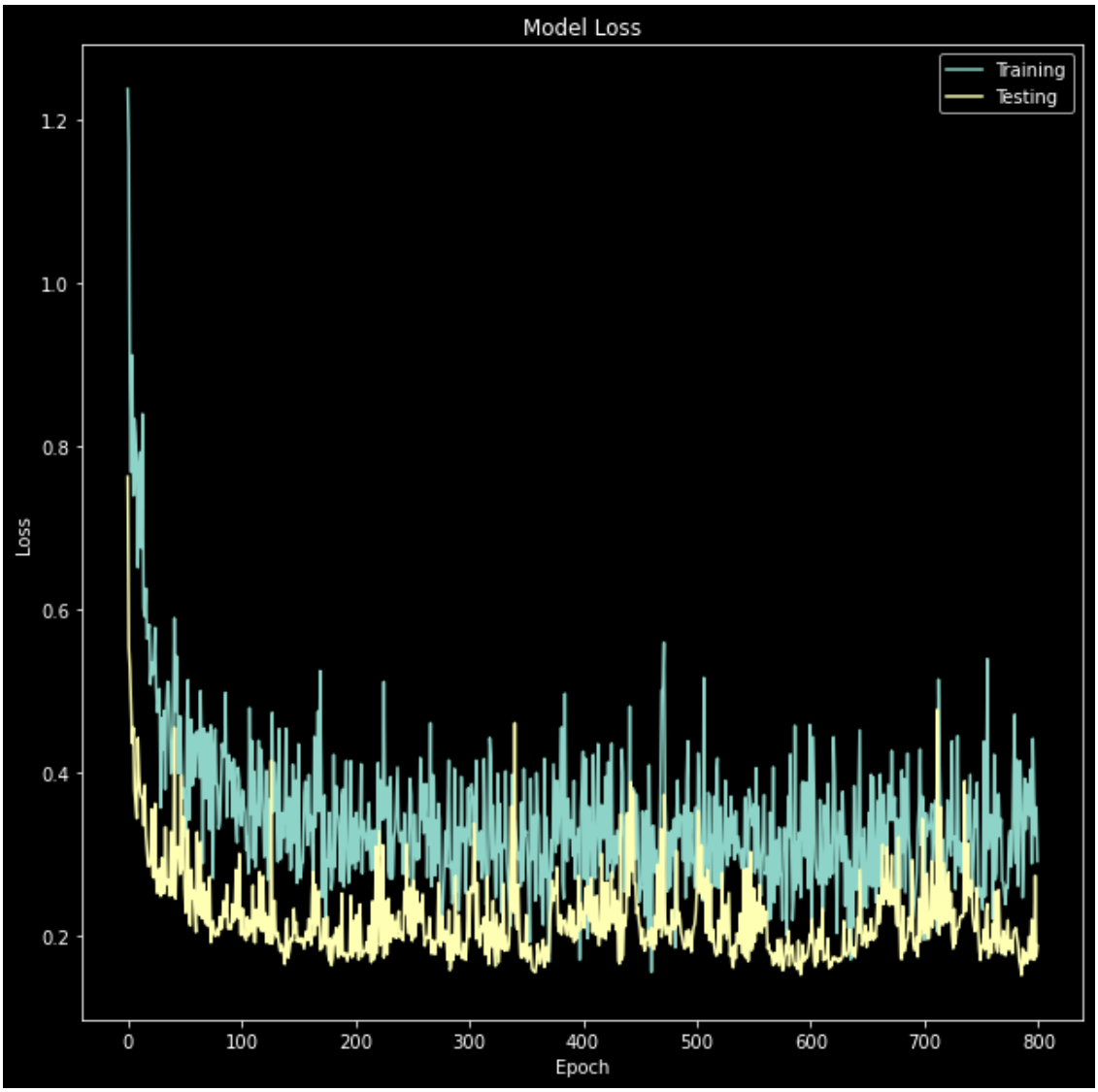
[32]:
```
plt.figure(figsize=(10,10))
plt.style.use('dark_background')

plt.plot(history.history['loss'])
plt.plot(history.history['val_loss'])

plt.title('Model Loss')
plt.ylabel('Loss')
plt.xlabel('Epoch')

plt.legend(['Training', 'Testing'])

plt.show()
```



[ ]: