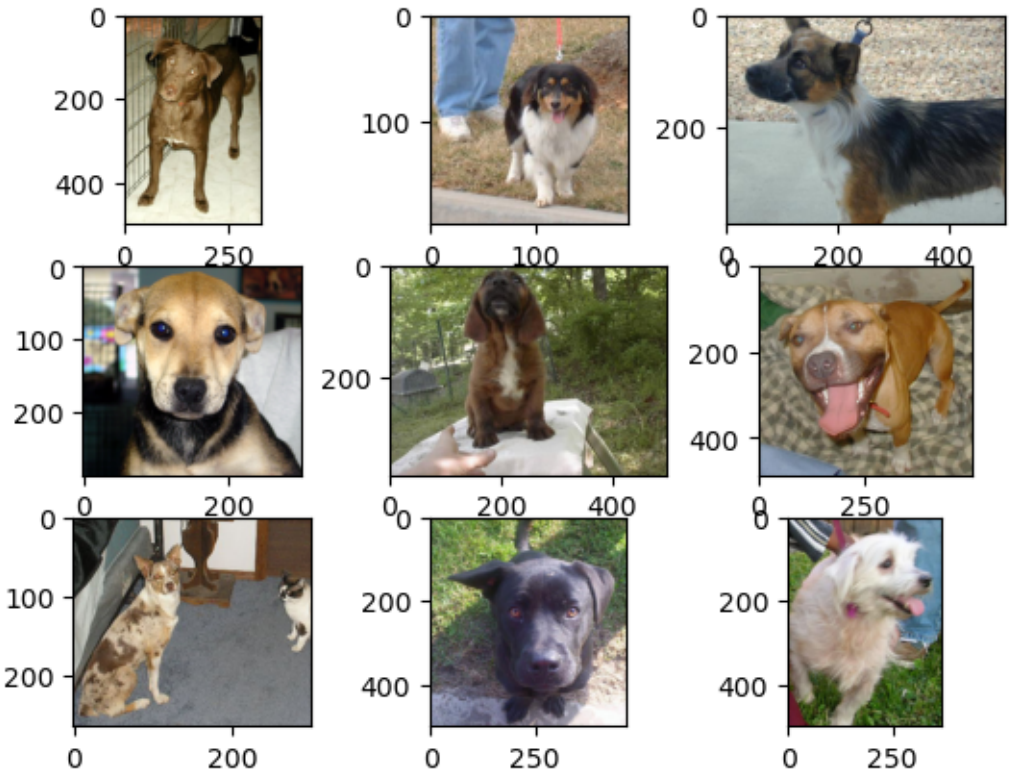
Pet_classification_using_CNN

March 26, 2023

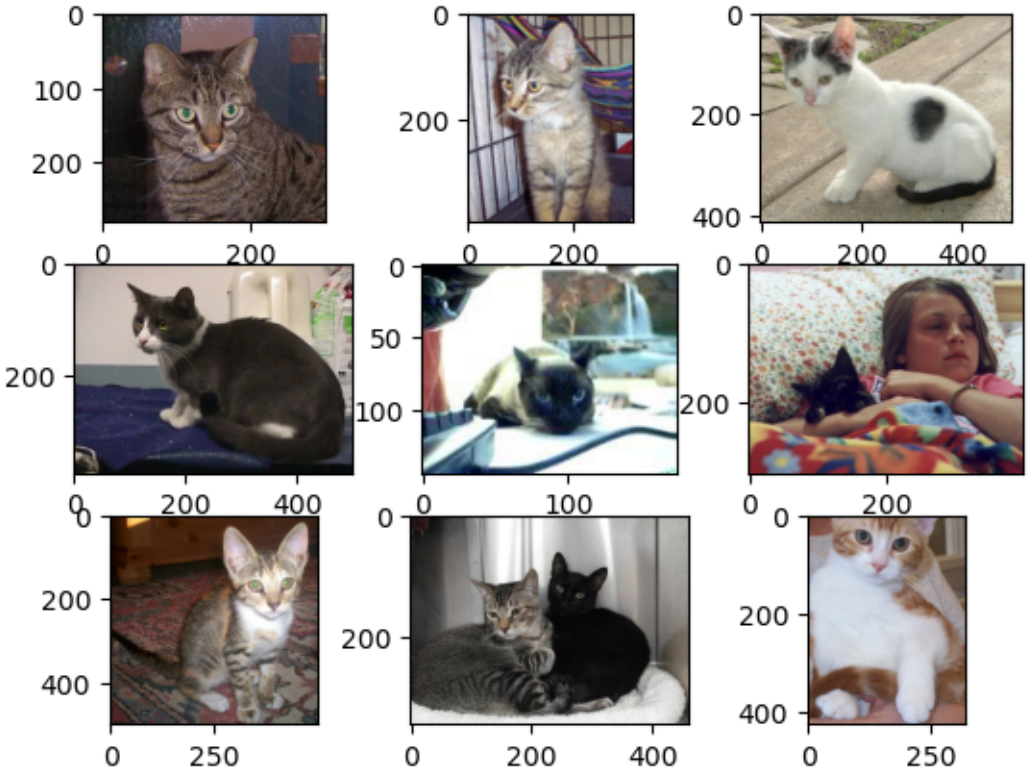
[1]:
```
#Import required libraries
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D,Dense,MaxPooling2D,Flatten,Dropout
import matplotlib.pyplot as plt
from matplotlib.image import imread
```

[2]:
```
#Lets import the data and print some images
folder='C:/Users/lenovo/Jupyter Data Science/Data Science/Deep Learning/Pet␣
 ↪class CNN/data/train/dogs/'
for i in range(9):
    plt.subplot(330+1+i)
    filename=folder+str(i+1)+'.jpg'
    image=imread(filename)
    plt.imshow(image)
plt.show()
```



[3]:
```
Folder='C:/Users/lenovo/Jupyter Data Science/Data Science/Deep Learning/Pet␣
 ↪class CNN/data/train/cats/'
for i in range(9):
  plt.subplot(330+1+i)
  filename=Folder+str(i+1)+'.jpg'
  image=imread(filename)
  plt.imshow(image)

plt.show()
```



0.0.1 Lets do Data Augmentation

[4]:
```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

[5]:
```
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.
↪2,horizontal_flip=True)
test_datagen=ImageDataGenerator(rescale=1./255)
```

0.0.2 Create training and testing set

[6]:
```
train_set=train_datagen.flow_from_directory('C:/Users/lenovo/Jupyter Data␣
↪Science/Data Science/Deep Learning/Pet class CNN/data/train/',
                                            target_size=(64,64),
                                            batch_size=32,
                                            class_mode='binary')
test_set=test_datagen.flow_from_directory('C:/Users/lenovo/Jupyter Data Science/
↪Data Science/Deep Learning/Pet class CNN/data/test/',
                                          target_size=(64,64),
                                          batch_size=32,
```

```
                                                class_mode='binary')
```

```
Found 40 images belonging to 2 classes.
Found 20 images belonging to 2 classes.
```

[7]:
```
train_set.class_indices
```

[7]:
```
{'cats': 0, 'dogs': 1}
```

[ ]:
```

```

0.1 Create CNN Architecture

[13]:
```
model=Sequential()
#First CNN layer
model.add(Conv2D(32,(5,5),activation='relu',input_shape=(64,64,3)))
model.add(MaxPooling2D(pool_size=(2,2),strides=2))

#second layer
model.add(Conv2D(64,(5,5),activation='relu'))
model.add(MaxPooling2D(pool_size=(2,2),strides=2))

# ANN layer
model.add(Flatten())
model.add(Dense(32,activation='relu'))
model.add(Dropout(0.4))

#output layer
model.add(Dense(1,activation='sigmoid'))
```

[14]:
```
model.summary()
```

```
Model: "sequential_1"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d_2 (Conv2D)           (None, 60, 60, 32)        2432

 max_pooling2d_2 (MaxPooling  (None, 30, 30, 32)       0
 2D)

 conv2d_3 (Conv2D)           (None, 26, 26, 64)        51264

 max_pooling2d_3 (MaxPooling  (None, 13, 13, 64)       0
 2D)
```

```
 flatten_1 (Flatten)         (None, 10816)             0

 dense_2 (Dense)             (None, 32)                346144

 dropout_1 (Dropout)         (None, 32)                0

 dense_3 (Dense)             (None, 1)                 33

=================================================================
Total params: 399,873
Trainable params: 399,873
Non-trainable params: 0
_________________________________________________________________
```

[15]:
```
#For the training step, define the loss function and minimize it
from tensorflow.keras.optimizers import SGD
sgd=SGD(lr=0.001)
```

```
WARNING:absl:`lr` is deprecated, please use `learning_rate` instead, or use the
legacy optimizer, e.g.,tf.keras.optimizers.legacy.SGD.
```

[16]:
```
model.compile(loss='binary_crossentropy',optimizer=sgd,metrics=['accuracy'])
```

[17]:
```
result=model.fit(train_set,validation_data=test_set,epochs=100)
```

```
Epoch 1/100
2/2 [==============================] - 2s 885ms/step - loss: 0.6935 - accuracy:
0.5000 - val_loss: 0.6918 - val_accuracy: 0.5000
Epoch 2/100
2/2 [==============================] - 1s 656ms/step - loss: 0.6994 - accuracy:
0.5000 - val_loss: 0.6916 - val_accuracy: 0.5000
Epoch 3/100
2/2 [==============================] - 1s 546ms/step - loss: 0.6894 - accuracy:
0.5500 - val_loss: 0.6882 - val_accuracy: 0.5000
Epoch 4/100
2/2 [==============================] - 1s 292ms/step - loss: 0.6973 - accuracy:
0.4000 - val_loss: 0.6889 - val_accuracy: 0.5000
Epoch 5/100
2/2 [==============================] - 1s 602ms/step - loss: 0.7038 - accuracy:
0.5250 - val_loss: 0.6880 - val_accuracy: 0.5500
Epoch 6/100
2/2 [==============================] - 1s 661ms/step - loss: 0.6886 - accuracy:
0.5750 - val_loss: 0.6862 - val_accuracy: 0.6000
Epoch 7/100
2/2 [==============================] - 1s 652ms/step - loss: 0.7009 - accuracy:
0.5000 - val_loss: 0.6870 - val_accuracy: 0.5500
Epoch 8/100
2/2 [==============================] - 1s 618ms/step - loss: 0.6918 - accuracy:
```

```
0.6000 - val_loss: 0.6871 - val_accuracy: 0.5000
Epoch 9/100
2/2 [==============================] - 1s 627ms/step - loss: 0.6994 - accuracy:
0.5000 - val_loss: 0.6885 - val_accuracy: 0.5500
Epoch 10/100
2/2 [==============================] - 1s 251ms/step - loss: 0.6800 - accuracy:
0.6000 - val_loss: 0.6877 - val_accuracy: 0.5000
Epoch 11/100
2/2 [==============================] - 1s 283ms/step - loss: 0.7022 - accuracy:
0.4500 - val_loss: 0.6877 - val_accuracy: 0.6500
Epoch 12/100
2/2 [==============================] - 1s 278ms/step - loss: 0.6976 - accuracy:
0.4000 - val_loss: 0.6902 - val_accuracy: 0.5000
Epoch 13/100
2/2 [==============================] - 1s 299ms/step - loss: 0.6940 - accuracy:
0.4750 - val_loss: 0.6915 - val_accuracy: 0.5000
Epoch 14/100
2/2 [==============================] - 1s 301ms/step - loss: 0.6879 - accuracy:
0.5250 - val_loss: 0.6943 - val_accuracy: 0.5000
Epoch 15/100
2/2 [==============================] - 1s 256ms/step - loss: 0.6839 - accuracy:
0.5250 - val_loss: 0.6934 - val_accuracy: 0.5000
Epoch 16/100
2/2 [==============================] - 1s 239ms/step - loss: 0.7018 - accuracy:
0.4500 - val_loss: 0.6924 - val_accuracy: 0.5000
Epoch 17/100
2/2 [==============================] - 1s 581ms/step - loss: 0.6921 - accuracy:
0.6000 - val_loss: 0.6892 - val_accuracy: 0.5000
Epoch 18/100
2/2 [==============================] - 1s 236ms/step - loss: 0.6827 - accuracy:
0.5750 - val_loss: 0.6889 - val_accuracy: 0.5000
Epoch 19/100
2/2 [==============================] - 1s 582ms/step - loss: 0.6712 - accuracy:
0.6000 - val_loss: 0.6877 - val_accuracy: 0.5000
Epoch 20/100
2/2 [==============================] - 1s 500ms/step - loss: 0.6891 - accuracy:
0.5000 - val_loss: 0.6874 - val_accuracy: 0.7000
Epoch 21/100
2/2 [==============================] - 1s 520ms/step - loss: 0.6845 - accuracy:
0.5000 - val_loss: 0.6893 - val_accuracy: 0.5000
Epoch 22/100
2/2 [==============================] - 1s 495ms/step - loss: 0.6979 - accuracy:
0.5000 - val_loss: 0.6871 - val_accuracy: 0.6000
Epoch 23/100
2/2 [==============================] - 1s 238ms/step - loss: 0.6874 - accuracy:
0.4750 - val_loss: 0.6876 - val_accuracy: 0.6000
Epoch 24/100
2/2 [==============================] - 1s 521ms/step - loss: 0.6924 - accuracy:
```

```
0.4500 - val_loss: 0.6875 - val_accuracy: 0.5500
Epoch 25/100
2/2 [==============================] - 1s 687ms/step - loss: 0.6780 - accuracy:
0.6000 - val_loss: 0.6879 - val_accuracy: 0.6000
Epoch 26/100
2/2 [==============================] - 1s 243ms/step - loss: 0.6877 - accuracy:
0.4750 - val_loss: 0.6863 - val_accuracy: 0.6000
Epoch 27/100
2/2 [==============================] - 1s 604ms/step - loss: 0.6998 - accuracy:
0.4500 - val_loss: 0.6846 - val_accuracy: 0.5000
Epoch 28/100
2/2 [==============================] - 1s 238ms/step - loss: 0.6978 - accuracy:
0.5000 - val_loss: 0.6860 - val_accuracy: 0.5000
Epoch 29/100
2/2 [==============================] - 1s 206ms/step - loss: 0.7030 - accuracy:
0.4500 - val_loss: 0.6876 - val_accuracy: 0.6000
Epoch 30/100
2/2 [==============================] - 1s 229ms/step - loss: 0.6921 - accuracy:
0.5250 - val_loss: 0.6882 - val_accuracy: 0.6500
Epoch 31/100
2/2 [==============================] - 1s 517ms/step - loss: 0.6809 - accuracy:
0.5500 - val_loss: 0.6890 - val_accuracy: 0.5500
Epoch 32/100
2/2 [==============================] - 1s 510ms/step - loss: 0.6806 - accuracy:
0.5750 - val_loss: 0.6895 - val_accuracy: 0.5000
Epoch 33/100
2/2 [==============================] - 1s 205ms/step - loss: 0.6919 - accuracy:
0.4500 - val_loss: 0.6893 - val_accuracy: 0.5500
Epoch 34/100
2/2 [==============================] - 1s 556ms/step - loss: 0.6911 - accuracy:
0.5500 - val_loss: 0.6905 - val_accuracy: 0.5000
Epoch 35/100
2/2 [==============================] - 1s 532ms/step - loss: 0.6663 - accuracy:
0.5750 - val_loss: 0.6894 - val_accuracy: 0.5000
Epoch 36/100
2/2 [==============================] - 1s 578ms/step - loss: 0.6886 - accuracy:
0.6000 - val_loss: 0.6892 - val_accuracy: 0.5000
Epoch 37/100
2/2 [==============================] - 1s 594ms/step - loss: 0.6857 - accuracy:
0.5750 - val_loss: 0.6903 - val_accuracy: 0.5000
Epoch 38/100
2/2 [==============================] - 1s 238ms/step - loss: 0.6842 - accuracy:
0.5000 - val_loss: 0.6904 - val_accuracy: 0.5000
Epoch 39/100
2/2 [==============================] - 1s 562ms/step - loss: 0.6965 - accuracy:
0.4750 - val_loss: 0.6874 - val_accuracy: 0.5500
Epoch 40/100
2/2 [==============================] - 1s 569ms/step - loss: 0.6862 - accuracy:
```

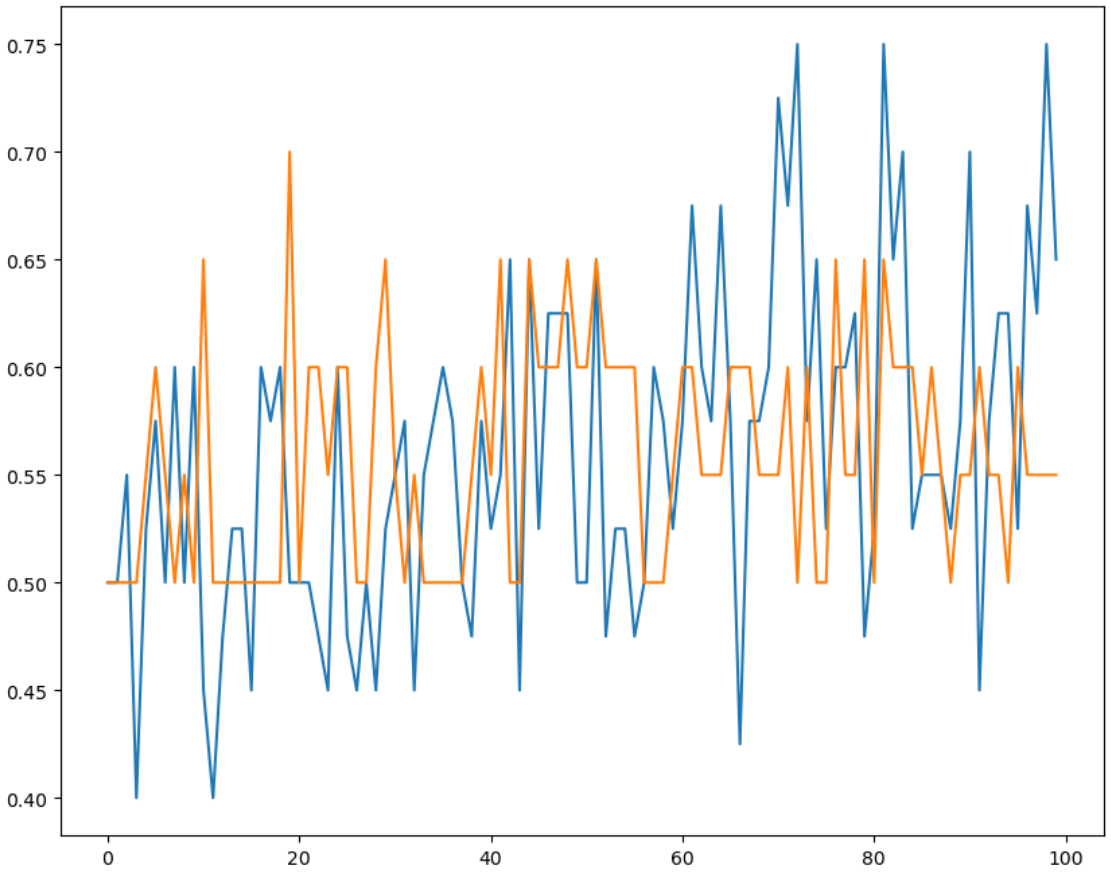
```
0.5750 - val_loss: 0.6844 - val_accuracy: 0.6000
Epoch 41/100
2/2 [==============================] - 1s 628ms/step - loss: 0.6907 - accuracy:
0.5250 - val_loss: 0.6859 - val_accuracy: 0.5500
Epoch 42/100
2/2 [==============================] - 1s 533ms/step - loss: 0.6907 - accuracy:
0.5500 - val_loss: 0.6836 - val_accuracy: 0.6500
Epoch 43/100
2/2 [==============================] - 1s 220ms/step - loss: 0.6687 - accuracy:
0.6500 - val_loss: 0.6884 - val_accuracy: 0.5000
Epoch 44/100
2/2 [==============================] - 1s 493ms/step - loss: 0.7420 - accuracy:
0.4500 - val_loss: 0.6870 - val_accuracy: 0.5000
Epoch 45/100
2/2 [==============================] - 1s 516ms/step - loss: 0.6793 - accuracy:
0.6500 - val_loss: 0.6850 - val_accuracy: 0.6500
Epoch 46/100
2/2 [==============================] - 1s 219ms/step - loss: 0.6907 - accuracy:
0.5250 - val_loss: 0.6869 - val_accuracy: 0.6000
Epoch 47/100
2/2 [==============================] - 1s 540ms/step - loss: 0.6827 - accuracy:
0.6250 - val_loss: 0.6861 - val_accuracy: 0.6000
Epoch 48/100
2/2 [==============================] - 1s 518ms/step - loss: 0.6845 - accuracy:
0.6250 - val_loss: 0.6857 - val_accuracy: 0.6000
Epoch 49/100
2/2 [==============================] - 1s 499ms/step - loss: 0.6693 - accuracy:
0.6250 - val_loss: 0.6848 - val_accuracy: 0.6500
Epoch 50/100
2/2 [==============================] - 1s 532ms/step - loss: 0.7024 - accuracy:
0.5000 - val_loss: 0.6854 - val_accuracy: 0.6000
Epoch 51/100
2/2 [==============================] - 1s 500ms/step - loss: 0.7016 - accuracy:
0.5000 - val_loss: 0.6812 - val_accuracy: 0.6000
Epoch 52/100
2/2 [==============================] - 1s 531ms/step - loss: 0.6621 - accuracy:
0.6500 - val_loss: 0.6840 - val_accuracy: 0.6500
Epoch 53/100
2/2 [==============================] - 1s 504ms/step - loss: 0.7024 - accuracy:
0.4750 - val_loss: 0.6843 - val_accuracy: 0.6000
Epoch 54/100
2/2 [==============================] - 1s 219ms/step - loss: 0.6846 - accuracy:
0.5250 - val_loss: 0.6841 - val_accuracy: 0.6000
Epoch 55/100
2/2 [==============================] - 1s 520ms/step - loss: 0.6837 - accuracy:
0.5250 - val_loss: 0.6861 - val_accuracy: 0.6000
Epoch 56/100
2/2 [==============================] - 1s 530ms/step - loss: 0.6913 - accuracy:
```

```
0.4750 - val_loss: 0.6866 - val_accuracy: 0.6000
Epoch 57/100
2/2 [==============================] - 1s 500ms/step - loss: 0.6953 - accuracy:
0.5000 - val_loss: 0.6886 - val_accuracy: 0.5000
Epoch 58/100
2/2 [==============================] - 1s 219ms/step - loss: 0.6752 - accuracy:
0.6000 - val_loss: 0.6948 - val_accuracy: 0.5000
Epoch 59/100
2/2 [==============================] - 1s 249ms/step - loss: 0.6898 - accuracy:
0.5750 - val_loss: 0.6898 - val_accuracy: 0.5000
Epoch 60/100
2/2 [==============================] - 1s 573ms/step - loss: 0.6831 - accuracy:
0.5250 - val_loss: 0.6878 - val_accuracy: 0.5500
Epoch 61/100
2/2 [==============================] - 1s 252ms/step - loss: 0.6698 - accuracy:
0.5750 - val_loss: 0.6860 - val_accuracy: 0.6000
Epoch 62/100
2/2 [==============================] - 1s 562ms/step - loss: 0.6605 - accuracy:
0.6750 - val_loss: 0.6836 - val_accuracy: 0.6000
Epoch 63/100
2/2 [==============================] - 1s 589ms/step - loss: 0.6786 - accuracy:
0.6000 - val_loss: 0.6829 - val_accuracy: 0.5500
Epoch 64/100
2/2 [==============================] - 1s 294ms/step - loss: 0.6729 - accuracy:
0.5750 - val_loss: 0.6807 - val_accuracy: 0.5500
Epoch 65/100
2/2 [==============================] - 1s 341ms/step - loss: 0.6625 - accuracy:
0.6750 - val_loss: 0.6817 - val_accuracy: 0.5500
Epoch 66/100
2/2 [==============================] - 1s 598ms/step - loss: 0.6883 - accuracy:
0.5750 - val_loss: 0.6829 - val_accuracy: 0.6000
Epoch 67/100
2/2 [==============================] - 1s 535ms/step - loss: 0.7005 - accuracy:
0.4250 - val_loss: 0.6849 - val_accuracy: 0.6000
Epoch 68/100
2/2 [==============================] - 1s 575ms/step - loss: 0.6867 - accuracy:
0.5750 - val_loss: 0.6827 - val_accuracy: 0.6000
Epoch 69/100
2/2 [==============================] - 1s 267ms/step - loss: 0.6628 - accuracy:
0.5750 - val_loss: 0.6821 - val_accuracy: 0.5500
Epoch 70/100
2/2 [==============================] - 1s 630ms/step - loss: 0.6574 - accuracy:
0.6000 - val_loss: 0.6806 - val_accuracy: 0.5500
Epoch 71/100
2/2 [==============================] - 1s 214ms/step - loss: 0.6549 - accuracy:
0.7250 - val_loss: 0.6814 - val_accuracy: 0.5500
Epoch 72/100
2/2 [==============================] - 1s 553ms/step - loss: 0.6746 - accuracy:
```

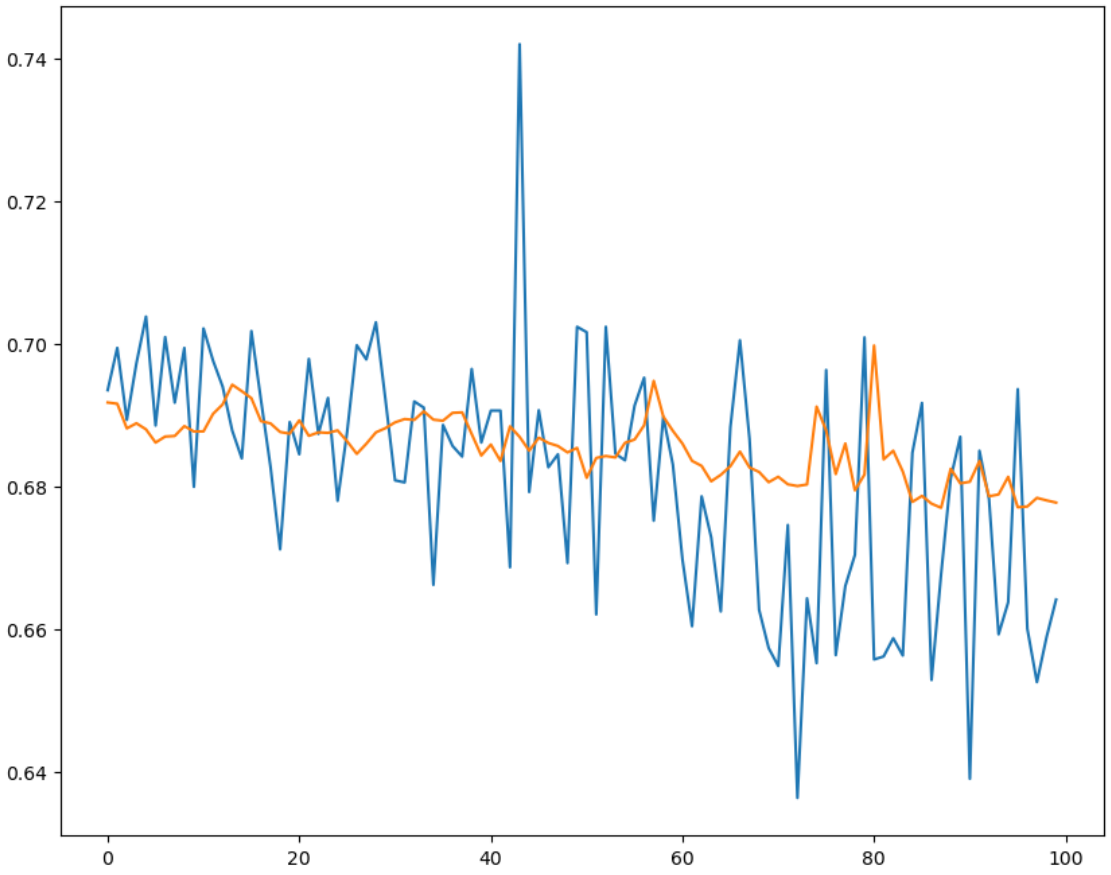
```
0.6750 - val_loss: 0.6803 - val_accuracy: 0.6000
Epoch 73/100
2/2 [==============================] - 1s 330ms/step - loss: 0.6364 - accuracy:
0.7500 - val_loss: 0.6801 - val_accuracy: 0.5000
Epoch 74/100
2/2 [==============================] - 1s 234ms/step - loss: 0.6644 - accuracy:
0.5750 - val_loss: 0.6803 - val_accuracy: 0.6000
Epoch 75/100
2/2 [==============================] - 1s 246ms/step - loss: 0.6553 - accuracy:
0.6500 - val_loss: 0.6912 - val_accuracy: 0.5000
Epoch 76/100
2/2 [==============================] - 1s 546ms/step - loss: 0.6963 - accuracy:
0.5250 - val_loss: 0.6879 - val_accuracy: 0.5000
Epoch 77/100
2/2 [==============================] - 1s 222ms/step - loss: 0.6564 - accuracy:
0.6000 - val_loss: 0.6818 - val_accuracy: 0.6500
Epoch 78/100
2/2 [==============================] - 1s 249ms/step - loss: 0.6661 - accuracy:
0.6000 - val_loss: 0.6860 - val_accuracy: 0.5500
Epoch 79/100
2/2 [==============================] - 1s 260ms/step - loss: 0.6704 - accuracy:
0.6250 - val_loss: 0.6795 - val_accuracy: 0.5500
Epoch 80/100
2/2 [==============================] - 1s 708ms/step - loss: 0.7009 - accuracy:
0.4750 - val_loss: 0.6817 - val_accuracy: 0.6500
Epoch 81/100
2/2 [==============================] - 1s 262ms/step - loss: 0.6558 - accuracy:
0.5250 - val_loss: 0.6998 - val_accuracy: 0.5000
Epoch 82/100
2/2 [==============================] - 1s 596ms/step - loss: 0.6562 - accuracy:
0.7500 - val_loss: 0.6838 - val_accuracy: 0.6500
Epoch 83/100
2/2 [==============================] - 1s 234ms/step - loss: 0.6588 - accuracy:
0.6500 - val_loss: 0.6850 - val_accuracy: 0.6000
Epoch 84/100
2/2 [==============================] - 1s 236ms/step - loss: 0.6564 - accuracy:
0.7000 - val_loss: 0.6821 - val_accuracy: 0.6000
Epoch 85/100
2/2 [==============================] - 1s 656ms/step - loss: 0.6847 - accuracy:
0.5250 - val_loss: 0.6779 - val_accuracy: 0.6000
Epoch 86/100
2/2 [==============================] - 1s 260ms/step - loss: 0.6917 - accuracy:
0.5500 - val_loss: 0.6787 - val_accuracy: 0.5500
Epoch 87/100
2/2 [==============================] - 1s 573ms/step - loss: 0.6529 - accuracy:
0.5500 - val_loss: 0.6776 - val_accuracy: 0.6000
Epoch 88/100
2/2 [==============================] - 1s 651ms/step - loss: 0.6678 - accuracy:
```

```
0.5500 - val_loss: 0.6770 - val_accuracy: 0.5500
Epoch 89/100
2/2 [==============================] - 1s 257ms/step - loss: 0.6812 - accuracy:
0.5250 - val_loss: 0.6825 - val_accuracy: 0.5000
Epoch 90/100
2/2 [==============================] - 1s 546ms/step - loss: 0.6870 - accuracy:
0.5750 - val_loss: 0.6805 - val_accuracy: 0.5500
Epoch 91/100
2/2 [==============================] - 1s 238ms/step - loss: 0.6391 - accuracy:
0.7000 - val_loss: 0.6807 - val_accuracy: 0.5500
Epoch 92/100
2/2 [==============================] - 1s 239ms/step - loss: 0.6850 - accuracy:
0.4500 - val_loss: 0.6836 - val_accuracy: 0.6000
Epoch 93/100
2/2 [==============================] - 1s 716ms/step - loss: 0.6783 - accuracy:
0.5750 - val_loss: 0.6786 - val_accuracy: 0.5500
Epoch 94/100
2/2 [==============================] - 1s 203ms/step - loss: 0.6593 - accuracy:
0.6250 - val_loss: 0.6789 - val_accuracy: 0.5500
Epoch 95/100
2/2 [==============================] - 1s 251ms/step - loss: 0.6638 - accuracy:
0.6250 - val_loss: 0.6814 - val_accuracy: 0.5000
Epoch 96/100
2/2 [==============================] - 1s 218ms/step - loss: 0.6937 - accuracy:
0.5250 - val_loss: 0.6771 - val_accuracy: 0.6000
Epoch 97/100
2/2 [==============================] - 1s 245ms/step - loss: 0.6601 - accuracy:
0.6750 - val_loss: 0.6772 - val_accuracy: 0.5500
Epoch 98/100
2/2 [==============================] - 1s 479ms/step - loss: 0.6526 - accuracy:
0.6250 - val_loss: 0.6784 - val_accuracy: 0.5500
Epoch 99/100
2/2 [==============================] - 1s 552ms/step - loss: 0.6589 - accuracy:
0.7500 - val_loss: 0.6781 - val_accuracy: 0.5500
Epoch 100/100
2/2 [==============================] - 1s 225ms/step - loss: 0.6642 - accuracy:
0.6500 - val_loss: 0.6778 - val_accuracy: 0.5500
```

[20]:
```
#Plotting accuracy graph
plt.figure(figsize=(10,8))
plt.plot(result.history['accuracy'])
plt.plot(result.history['val_accuracy'])
plt.show()
```



[21]:
```
#Plotting loss graph
plt.figure(figsize=(10,8))
plt.plot(result.history['loss'])
plt.plot(result.history['val_loss'])
plt.show()
```



[22]:
```
result1=model.fit(train_set,validation_data=test_set,epochs=200)
```

```
Epoch 1/200
2/2 [==============================] - 1s 362ms/step - loss: 0.6687 - accuracy:
0.5750 - val_loss: 0.6813 - val_accuracy: 0.5500
Epoch 2/200
2/2 [==============================] - 1s 206ms/step - loss: 0.6616 - accuracy:
0.5750 - val_loss: 0.6788 - val_accuracy: 0.6500
Epoch 3/200
2/2 [==============================] - 1s 226ms/step - loss: 0.6313 - accuracy:
0.7500 - val_loss: 0.6771 - val_accuracy: 0.5000
Epoch 4/200
2/2 [==============================] - 1s 532ms/step - loss: 0.6639 - accuracy:
0.6000 - val_loss: 0.6755 - val_accuracy: 0.6000
Epoch 5/200
2/2 [==============================] - 1s 233ms/step - loss: 0.6345 - accuracy:
0.7000 - val_loss: 0.6790 - val_accuracy: 0.5500
Epoch 6/200
2/2 [==============================] - 1s 532ms/step - loss: 0.6708 - accuracy:
0.5500 - val_loss: 0.6772 - val_accuracy: 0.5500
```

```
Epoch 7/200
2/2 [==============================] - 1s 248ms/step - loss: 0.6600 - accuracy:
0.6000 - val_loss: 0.6794 - val_accuracy: 0.6500
Epoch 8/200
2/2 [==============================] - 1s 270ms/step - loss: 0.6732 - accuracy:
0.5500 - val_loss: 0.6801 - val_accuracy: 0.6000
Epoch 9/200
2/2 [==============================] - 1s 208ms/step - loss: 0.6271 - accuracy:
0.7250 - val_loss: 0.6853 - val_accuracy: 0.6000
Epoch 10/200
2/2 [==============================] - 1s 216ms/step - loss: 0.6209 - accuracy:
0.6750 - val_loss: 0.6786 - val_accuracy: 0.5500
Epoch 11/200
2/2 [==============================] - 1s 251ms/step - loss: 0.6567 - accuracy:
0.6000 - val_loss: 0.6803 - val_accuracy: 0.5000
Epoch 12/200
2/2 [==============================] - 1s 263ms/step - loss: 0.6615 - accuracy:
0.6750 - val_loss: 0.6799 - val_accuracy: 0.5500
Epoch 13/200
2/2 [==============================] - 1s 283ms/step - loss: 0.6581 - accuracy:
0.6750 - val_loss: 0.6959 - val_accuracy: 0.5500
Epoch 14/200
2/2 [==============================] - 1s 589ms/step - loss: 0.6323 - accuracy:
0.6250 - val_loss: 0.6923 - val_accuracy: 0.6000
Epoch 15/200
2/2 [==============================] - 1s 309ms/step - loss: 0.6806 - accuracy:
0.5250 - val_loss: 0.6784 - val_accuracy: 0.5000
Epoch 16/200
2/2 [==============================] - 1s 358ms/step - loss: 0.6566 - accuracy:
0.6500 - val_loss: 0.6809 - val_accuracy: 0.4500
Epoch 17/200
2/2 [==============================] - 1s 762ms/step - loss: 0.6567 - accuracy:
0.6000 - val_loss: 0.6796 - val_accuracy: 0.4500
Epoch 18/200
2/2 [==============================] - 1s 350ms/step - loss: 0.6554 - accuracy:
0.6500 - val_loss: 0.6885 - val_accuracy: 0.5500
Epoch 19/200
2/2 [==============================] - 1s 787ms/step - loss: 0.6296 - accuracy:
0.7750 - val_loss: 0.6846 - val_accuracy: 0.5500
Epoch 20/200
2/2 [==============================] - 1s 357ms/step - loss: 0.6589 - accuracy:
0.6250 - val_loss: 0.6868 - val_accuracy: 0.6000
Epoch 21/200
2/2 [==============================] - 1s 253ms/step - loss: 0.6580 - accuracy:
0.6500 - val_loss: 0.6833 - val_accuracy: 0.6000
Epoch 22/200
2/2 [==============================] - 1s 264ms/step - loss: 0.6402 - accuracy:
0.7000 - val_loss: 0.6977 - val_accuracy: 0.5500
```

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Epoch 23/200
2/2 [==============================] - 1s 517ms/step - loss: 0.6632 - accuracy:
0.6000 - val_loss: 0.6805 - val_accuracy: 0.4500
Epoch 24/200
2/2 [==============================] - 1s 236ms/step - loss: 0.6729 - accuracy:
0.6000 - val_loss: 0.6968 - val_accuracy: 0.5500
Epoch 25/200
2/2 [==============================] - 1s 490ms/step - loss: 0.6440 - accuracy:
0.5500 - val_loss: 0.6918 - val_accuracy: 0.5500
Epoch 26/200
2/2 [==============================] - 1s 225ms/step - loss: 0.6548 - accuracy:
0.6750 - val_loss: 0.6851 - val_accuracy: 0.6000
Epoch 27/200
2/2 [==============================] - 1s 543ms/step - loss: 0.6391 - accuracy:
0.7000 - val_loss: 0.6846 - val_accuracy: 0.6000
Epoch 28/200
2/2 [==============================] - 1s 242ms/step - loss: 0.6331 - accuracy:
0.7250 - val_loss: 0.6858 - val_accuracy: 0.6000
Epoch 29/200
2/2 [==============================] - 1s 246ms/step - loss: 0.6609 - accuracy:
0.6000 - val_loss: 0.6823 - val_accuracy: 0.5000
Epoch 30/200
2/2 [==============================] - 1s 568ms/step - loss: 0.6695 - accuracy:
0.6250 - val_loss: 0.6894 - val_accuracy: 0.5500
Epoch 31/200
2/2 [==============================] - 1s 215ms/step - loss: 0.6492 - accuracy:
0.6250 - val_loss: 0.6958 - val_accuracy: 0.5500
Epoch 32/200
2/2 [==============================] - 1s 321ms/step - loss: 0.6618 - accuracy:
0.6000 - val_loss: 0.6984 - val_accuracy: 0.5500
Epoch 33/200
2/2 [==============================] - 1s 667ms/step - loss: 0.6470 - accuracy:
0.6750 - val_loss: 0.6853 - val_accuracy: 0.5500
Epoch 34/200
2/2 [==============================] - 1s 569ms/step - loss: 0.6398 - accuracy:
0.6750 - val_loss: 0.6907 - val_accuracy: 0.5500
Epoch 35/200
2/2 [==============================] - 1s 288ms/step - loss: 0.6559 - accuracy:
0.6000 - val_loss: 0.6866 - val_accuracy: 0.5500
Epoch 36/200
2/2 [==============================] - 1s 318ms/step - loss: 0.6514 - accuracy:
0.6000 - val_loss: 0.6850 - val_accuracy: 0.6000
Epoch 37/200
2/2 [==============================] - 1s 319ms/step - loss: 0.6547 - accuracy:
0.6750 - val_loss: 0.6870 - val_accuracy: 0.5500
Epoch 38/200
2/2 [==============================] - 1s 700ms/step - loss: 0.6511 - accuracy:
0.6500 - val_loss: 0.6844 - val_accuracy: 0.5000
```

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Epoch 39/200
2/2 [==============================] - 1s 287ms/step - loss: 0.6281 - accuracy:
0.7250 - val_loss: 0.6888 - val_accuracy: 0.5500
Epoch 40/200
2/2 [==============================] - 1s 685ms/step - loss: 0.6387 - accuracy:
0.6500 - val_loss: 0.6906 - val_accuracy: 0.5500
Epoch 41/200
2/2 [==============================] - 1s 605ms/step - loss: 0.6660 - accuracy:
0.5500 - val_loss: 0.6898 - val_accuracy: 0.5000
Epoch 42/200
2/2 [==============================] - 1s 314ms/step - loss: 0.6408 - accuracy:
0.7250 - val_loss: 0.6891 - val_accuracy: 0.5000
Epoch 43/200
2/2 [==============================] - 1s 565ms/step - loss: 0.6272 - accuracy:
0.7500 - val_loss: 0.6931 - val_accuracy: 0.5000
Epoch 44/200
2/2 [==============================] - 1s 235ms/step - loss: 0.6287 - accuracy:
0.7250 - val_loss: 0.6890 - val_accuracy: 0.5000
Epoch 45/200
2/2 [==============================] - 1s 530ms/step - loss: 0.6600 - accuracy:
0.6250 - val_loss: 0.6867 - val_accuracy: 0.5000
Epoch 46/200
2/2 [==============================] - 1s 573ms/step - loss: 0.6349 - accuracy:
0.7750 - val_loss: 0.6861 - val_accuracy: 0.5000
Epoch 47/200
2/2 [==============================] - 1s 254ms/step - loss: 0.6503 - accuracy:
0.6000 - val_loss: 0.6930 - val_accuracy: 0.5500
Epoch 48/200
2/2 [==============================] - 1s 523ms/step - loss: 0.6160 - accuracy:
0.7750 - val_loss: 0.6889 - val_accuracy: 0.6000
Epoch 49/200
2/2 [==============================] - 1s 489ms/step - loss: 0.6556 - accuracy:
0.6000 - val_loss: 0.6820 - val_accuracy: 0.5000
Epoch 50/200
2/2 [==============================] - 1s 238ms/step - loss: 0.6364 - accuracy:
0.7250 - val_loss: 0.6856 - val_accuracy: 0.4500
Epoch 51/200
2/2 [==============================] - 1s 534ms/step - loss: 0.6436 - accuracy:
0.7000 - val_loss: 0.6881 - val_accuracy: 0.5500
Epoch 52/200
2/2 [==============================] - 1s 225ms/step - loss: 0.6215 - accuracy:
0.8250 - val_loss: 0.6772 - val_accuracy: 0.5000
Epoch 53/200
2/2 [==============================] - 1s 245ms/step - loss: 0.6347 - accuracy:
0.6750 - val_loss: 0.6735 - val_accuracy: 0.5000
Epoch 54/200
2/2 [==============================] - 1s 503ms/step - loss: 0.6865 - accuracy:
0.5000 - val_loss: 0.6752 - val_accuracy: 0.6000
```

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Epoch 55/200
2/2 [==============================] - 1s 223ms/step - loss: 0.5919 - accuracy:
0.7250 - val_loss: 0.6815 - val_accuracy: 0.6000
Epoch 56/200
2/2 [==============================] - 1s 231ms/step - loss: 0.6432 - accuracy:
0.5500 - val_loss: 0.6845 - val_accuracy: 0.6000
Epoch 57/200
2/2 [==============================] - 1s 495ms/step - loss: 0.5859 - accuracy:
0.7500 - val_loss: 0.6760 - val_accuracy: 0.5000
Epoch 58/200
2/2 [==============================] - 1s 563ms/step - loss: 0.6314 - accuracy:
0.6500 - val_loss: 0.6809 - val_accuracy: 0.6000
Epoch 59/200
2/2 [==============================] - 1s 267ms/step - loss: 0.6401 - accuracy:
0.7000 - val_loss: 0.6779 - val_accuracy: 0.5000
Epoch 60/200
2/2 [==============================] - 1s 574ms/step - loss: 0.5889 - accuracy:
0.8000 - val_loss: 0.6773 - val_accuracy: 0.4500
Epoch 61/200
2/2 [==============================] - 1s 572ms/step - loss: 0.6423 - accuracy:
0.7000 - val_loss: 0.6747 - val_accuracy: 0.5000
Epoch 62/200
2/2 [==============================] - 1s 583ms/step - loss: 0.6312 - accuracy:
0.7250 - val_loss: 0.6743 - val_accuracy: 0.5000
Epoch 63/200
2/2 [==============================] - 1s 660ms/step - loss: 0.6189 - accuracy:
0.6750 - val_loss: 0.6777 - val_accuracy: 0.5500
Epoch 64/200
2/2 [==============================] - 1s 235ms/step - loss: 0.5831 - accuracy:
0.8250 - val_loss: 0.6917 - val_accuracy: 0.5500
Epoch 65/200
2/2 [==============================] - 1s 226ms/step - loss: 0.5836 - accuracy:
0.7000 - val_loss: 0.6872 - val_accuracy: 0.5000
Epoch 66/200
2/2 [==============================] - 1s 217ms/step - loss: 0.6375 - accuracy:
0.6750 - val_loss: 0.7029 - val_accuracy: 0.5500
Epoch 67/200
2/2 [==============================] - 1s 230ms/step - loss: 0.5990 - accuracy:
0.7250 - val_loss: 0.6825 - val_accuracy: 0.5500
Epoch 68/200
2/2 [==============================] - 1s 219ms/step - loss: 0.6301 - accuracy:
0.5750 - val_loss: 0.6870 - val_accuracy: 0.5000
Epoch 69/200
2/2 [==============================] - 1s 216ms/step - loss: 0.6121 - accuracy:
0.6750 - val_loss: 0.6862 - val_accuracy: 0.5000
Epoch 70/200
2/2 [==============================] - 1s 524ms/step - loss: 0.6338 - accuracy:
0.6500 - val_loss: 0.6813 - val_accuracy: 0.4500
```

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Epoch 71/200
2/2 [==============================] - 1s 221ms/step - loss: 0.5953 - accuracy:
0.6750 - val_loss: 0.6870 - val_accuracy: 0.5000
Epoch 72/200
2/2 [==============================] - 1s 506ms/step - loss: 0.6248 - accuracy:
0.6250 - val_loss: 0.6845 - val_accuracy: 0.5000
Epoch 73/200
2/2 [==============================] - 1s 552ms/step - loss: 0.6186 - accuracy:
0.7000 - val_loss: 0.6800 - val_accuracy: 0.5000
Epoch 74/200
2/2 [==============================] - 1s 514ms/step - loss: 0.6578 - accuracy:
0.6000 - val_loss: 0.6824 - val_accuracy: 0.5000
Epoch 75/200
2/2 [==============================] - 1s 237ms/step - loss: 0.6274 - accuracy:
0.6250 - val_loss: 0.6871 - val_accuracy: 0.5000
Epoch 76/200
2/2 [==============================] - 1s 269ms/step - loss: 0.5974 - accuracy:
0.8000 - val_loss: 0.6944 - val_accuracy: 0.6000
Epoch 77/200
2/2 [==============================] - 1s 217ms/step - loss: 0.6238 - accuracy:
0.6750 - val_loss: 0.6901 - val_accuracy: 0.5500
Epoch 78/200
2/2 [==============================] - 1s 497ms/step - loss: 0.6696 - accuracy:
0.5750 - val_loss: 0.6886 - val_accuracy: 0.5500
Epoch 79/200
2/2 [==============================] - 1s 535ms/step - loss: 0.6160 - accuracy:
0.7000 - val_loss: 0.6791 - val_accuracy: 0.5500
Epoch 80/200
2/2 [==============================] - 1s 237ms/step - loss: 0.6202 - accuracy:
0.7000 - val_loss: 0.6812 - val_accuracy: 0.6000
Epoch 81/200
2/2 [==============================] - 1s 262ms/step - loss: 0.6098 - accuracy:
0.7250 - val_loss: 0.6772 - val_accuracy: 0.6000
Epoch 82/200
2/2 [==============================] - 1s 250ms/step - loss: 0.5938 - accuracy:
0.6750 - val_loss: 0.6883 - val_accuracy: 0.5500
Epoch 83/200
2/2 [==============================] - 1s 275ms/step - loss: 0.6257 - accuracy:
0.6000 - val_loss: 0.6694 - val_accuracy: 0.6000
Epoch 84/200
2/2 [==============================] - 1s 567ms/step - loss: 0.6286 - accuracy:
0.6500 - val_loss: 0.6765 - val_accuracy: 0.5500
Epoch 85/200
2/2 [==============================] - 1s 258ms/step - loss: 0.6027 - accuracy:
0.7750 - val_loss: 0.6687 - val_accuracy: 0.5000
Epoch 86/200
2/2 [==============================] - 1s 263ms/step - loss: 0.5770 - accuracy:
0.7500 - val_loss: 0.6640 - val_accuracy: 0.5500
```

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Epoch 87/200
2/2 [==============================] - 1s 290ms/step - loss: 0.6122 - accuracy:
0.7250 - val_loss: 0.6768 - val_accuracy: 0.6000
Epoch 88/200
2/2 [==============================] - 1s 219ms/step - loss: 0.6093 - accuracy:
0.7250 - val_loss: 0.6652 - val_accuracy: 0.6000
Epoch 89/200
2/2 [==============================] - 1s 217ms/step - loss: 0.5890 - accuracy:
0.7500 - val_loss: 0.6685 - val_accuracy: 0.6000
Epoch 90/200
2/2 [==============================] - 1s 524ms/step - loss: 0.5810 - accuracy:
0.7250 - val_loss: 0.6688 - val_accuracy: 0.5500
Epoch 91/200
2/2 [==============================] - 1s 515ms/step - loss: 0.5824 - accuracy:
0.8500 - val_loss: 0.6709 - val_accuracy: 0.5500
Epoch 92/200
2/2 [==============================] - 1s 233ms/step - loss: 0.5738 - accuracy:
0.7500 - val_loss: 0.6664 - val_accuracy: 0.5500
Epoch 93/200
2/2 [==============================] - 1s 494ms/step - loss: 0.7318 - accuracy:
0.5250 - val_loss: 0.6784 - val_accuracy: 0.5500
Epoch 94/200
2/2 [==============================] - 1s 499ms/step - loss: 0.6202 - accuracy:
0.6000 - val_loss: 0.6702 - val_accuracy: 0.5000
Epoch 95/200
2/2 [==============================] - 1s 223ms/step - loss: 0.5996 - accuracy:
0.7000 - val_loss: 0.6718 - val_accuracy: 0.5000
Epoch 96/200
2/2 [==============================] - 1s 227ms/step - loss: 0.5864 - accuracy:
0.7750 - val_loss: 0.6659 - val_accuracy: 0.5500
Epoch 97/200
2/2 [==============================] - 1s 227ms/step - loss: 0.6030 - accuracy:
0.8000 - val_loss: 0.6749 - val_accuracy: 0.4500
Epoch 98/200
2/2 [==============================] - 1s 218ms/step - loss: 0.6009 - accuracy:
0.7500 - val_loss: 0.6693 - val_accuracy: 0.5000
Epoch 99/200
2/2 [==============================] - 1s 241ms/step - loss: 0.5475 - accuracy:
0.8250 - val_loss: 0.6706 - val_accuracy: 0.5000
Epoch 100/200
2/2 [==============================] - 1s 217ms/step - loss: 0.5786 - accuracy:
0.7500 - val_loss: 0.6671 - val_accuracy: 0.5000
Epoch 101/200
2/2 [==============================] - 1s 230ms/step - loss: 0.5722 - accuracy:
0.8000 - val_loss: 0.6809 - val_accuracy: 0.5000
Epoch 102/200
2/2 [==============================] - 1s 559ms/step - loss: 0.5903 - accuracy:
0.6500 - val_loss: 0.6821 - val_accuracy: 0.5000
```

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Epoch 103/200
2/2 [==============================] - 1s 519ms/step - loss: 0.5788 - accuracy:
0.7750 - val_loss: 0.6903 - val_accuracy: 0.5000
Epoch 104/200
2/2 [==============================] - 1s 271ms/step - loss: 0.5348 - accuracy:
0.8500 - val_loss: 0.6866 - val_accuracy: 0.5000
Epoch 105/200
2/2 [==============================] - 1s 601ms/step - loss: 0.5829 - accuracy:
0.7500 - val_loss: 0.6902 - val_accuracy: 0.5000
Epoch 106/200
2/2 [==============================] - 1s 257ms/step - loss: 0.5761 - accuracy:
0.7500 - val_loss: 0.7008 - val_accuracy: 0.5000
Epoch 107/200
2/2 [==============================] - 1s 631ms/step - loss: 0.5698 - accuracy:
0.7250 - val_loss: 0.7009 - val_accuracy: 0.5000
Epoch 108/200
2/2 [==============================] - 1s 590ms/step - loss: 0.5864 - accuracy:
0.7500 - val_loss: 0.6911 - val_accuracy: 0.5000
Epoch 109/200
2/2 [==============================] - 1s 629ms/step - loss: 0.6161 - accuracy:
0.6250 - val_loss: 0.6849 - val_accuracy: 0.5000
Epoch 110/200
2/2 [==============================] - 1s 280ms/step - loss: 0.5636 - accuracy:
0.6750 - val_loss: 0.6875 - val_accuracy: 0.5000
Epoch 111/200
2/2 [==============================] - 1s 516ms/step - loss: 0.5670 - accuracy:
0.7750 - val_loss: 0.6835 - val_accuracy: 0.5000
Epoch 112/200
2/2 [==============================] - 1s 527ms/step - loss: 0.5048 - accuracy:
0.8500 - val_loss: 0.6794 - val_accuracy: 0.5000
Epoch 113/200
2/2 [==============================] - 1s 516ms/step - loss: 0.7169 - accuracy:
0.5500 - val_loss: 0.6846 - val_accuracy: 0.5500
Epoch 114/200
2/2 [==============================] - 1s 482ms/step - loss: 0.6030 - accuracy:
0.6750 - val_loss: 0.6808 - val_accuracy: 0.5000
Epoch 115/200
2/2 [==============================] - 1s 531ms/step - loss: 0.6015 - accuracy:
0.6500 - val_loss: 0.6804 - val_accuracy: 0.5000
Epoch 116/200
2/2 [==============================] - 1s 547ms/step - loss: 0.5358 - accuracy:
0.7750 - val_loss: 0.6804 - val_accuracy: 0.5000
Epoch 117/200
2/2 [==============================] - 1s 250ms/step - loss: 0.5760 - accuracy:
0.7250 - val_loss: 0.7051 - val_accuracy: 0.5500
Epoch 118/200
2/2 [==============================] - 1s 233ms/step - loss: 0.6075 - accuracy:
0.5750 - val_loss: 0.6954 - val_accuracy: 0.6000
```

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Epoch 119/200
2/2 [==============================] - 1s 232ms/step - loss: 0.5603 - accuracy:
0.6750 - val_loss: 0.6785 - val_accuracy: 0.4500
Epoch 120/200
2/2 [==============================] - 1s 218ms/step - loss: 0.5534 - accuracy:
0.7750 - val_loss: 0.6746 - val_accuracy: 0.6000
Epoch 121/200
2/2 [==============================] - 1s 494ms/step - loss: 0.5646 - accuracy:
0.7750 - val_loss: 0.6664 - val_accuracy: 0.5500
Epoch 122/200
2/2 [==============================] - 1s 309ms/step - loss: 0.5419 - accuracy:
0.7000 - val_loss: 0.6723 - val_accuracy: 0.5500
Epoch 123/200
2/2 [==============================] - 1s 497ms/step - loss: 0.5327 - accuracy:
0.7750 - val_loss: 0.6646 - val_accuracy: 0.5000
Epoch 124/200
2/2 [==============================] - 1s 502ms/step - loss: 0.5747 - accuracy:
0.7000 - val_loss: 0.6698 - val_accuracy: 0.5000
Epoch 125/200
2/2 [==============================] - 1s 525ms/step - loss: 0.5841 - accuracy:
0.7000 - val_loss: 0.6657 - val_accuracy: 0.5000
Epoch 126/200
2/2 [==============================] - 1s 515ms/step - loss: 0.5638 - accuracy:
0.7250 - val_loss: 0.6646 - val_accuracy: 0.5000
Epoch 127/200
2/2 [==============================] - 1s 545ms/step - loss: 0.6188 - accuracy:
0.6500 - val_loss: 0.6661 - val_accuracy: 0.5000
Epoch 128/200
2/2 [==============================] - 1s 265ms/step - loss: 0.5118 - accuracy:
0.8000 - val_loss: 0.6615 - val_accuracy: 0.6000
Epoch 129/200
2/2 [==============================] - 1s 570ms/step - loss: 0.5687 - accuracy:
0.7250 - val_loss: 0.6598 - val_accuracy: 0.6000
Epoch 130/200
2/2 [==============================] - 1s 568ms/step - loss: 0.5241 - accuracy:
0.8000 - val_loss: 0.6606 - val_accuracy: 0.5000
Epoch 131/200
2/2 [==============================] - 1s 672ms/step - loss: 0.5939 - accuracy:
0.6500 - val_loss: 0.6563 - val_accuracy: 0.6000
Epoch 132/200
2/2 [==============================] - 1s 651ms/step - loss: 0.5496 - accuracy:
0.7750 - val_loss: 0.6623 - val_accuracy: 0.4500
Epoch 133/200
2/2 [==============================] - 1s 668ms/step - loss: 0.5795 - accuracy:
0.6750 - val_loss: 0.6576 - val_accuracy: 0.5000
Epoch 134/200
2/2 [==============================] - 1s 528ms/step - loss: 0.5510 - accuracy:
0.7500 - val_loss: 0.6552 - val_accuracy: 0.4500
```

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Epoch 135/200
2/2 [==============================] - 1s 222ms/step - loss: 0.5621 - accuracy:
0.8000 - val_loss: 0.6463 - val_accuracy: 0.5000
Epoch 136/200
2/2 [==============================] - 1s 249ms/step - loss: 0.5266 - accuracy:
0.8000 - val_loss: 0.6479 - val_accuracy: 0.5500
Epoch 137/200
2/2 [==============================] - 1s 236ms/step - loss: 0.5554 - accuracy:
0.7750 - val_loss: 0.6564 - val_accuracy: 0.5500
Epoch 138/200
2/2 [==============================] - 1s 208ms/step - loss: 0.5419 - accuracy:
0.8000 - val_loss: 0.6451 - val_accuracy: 0.6500
Epoch 139/200
2/2 [==============================] - 1s 517ms/step - loss: 0.4994 - accuracy:
0.7750 - val_loss: 0.6333 - val_accuracy: 0.5500
Epoch 140/200
2/2 [==============================] - 1s 221ms/step - loss: 0.5699 - accuracy:
0.7250 - val_loss: 0.6571 - val_accuracy: 0.7000
Epoch 141/200
2/2 [==============================] - 1s 235ms/step - loss: 0.5490 - accuracy:
0.7750 - val_loss: 0.6264 - val_accuracy: 0.5500
Epoch 142/200
2/2 [==============================] - 1s 272ms/step - loss: 0.5559 - accuracy:
0.6500 - val_loss: 0.6573 - val_accuracy: 0.6000
Epoch 143/200
2/2 [==============================] - 1s 568ms/step - loss: 0.6853 - accuracy:
0.5500 - val_loss: 0.6590 - val_accuracy: 0.5500
Epoch 144/200
2/2 [==============================] - 1s 544ms/step - loss: 0.5693 - accuracy:
0.7750 - val_loss: 0.6682 - val_accuracy: 0.5500
Epoch 145/200
2/2 [==============================] - 1s 576ms/step - loss: 0.5547 - accuracy:
0.7000 - val_loss: 0.6586 - val_accuracy: 0.5000
Epoch 146/200
2/2 [==============================] - 1s 223ms/step - loss: 0.5778 - accuracy:
0.7250 - val_loss: 0.6850 - val_accuracy: 0.5000
Epoch 147/200
2/2 [==============================] - 1s 606ms/step - loss: 0.5734 - accuracy:
0.7750 - val_loss: 0.6632 - val_accuracy: 0.5500
Epoch 148/200
2/2 [==============================] - 1s 518ms/step - loss: 0.5201 - accuracy:
0.7250 - val_loss: 0.6591 - val_accuracy: 0.5000
Epoch 149/200
2/2 [==============================] - 1s 262ms/step - loss: 0.5162 - accuracy:
0.9000 - val_loss: 0.6439 - val_accuracy: 0.6000
Epoch 150/200
2/2 [==============================] - 1s 615ms/step - loss: 0.5586 - accuracy:
0.7500 - val_loss: 0.6392 - val_accuracy: 0.6000
```

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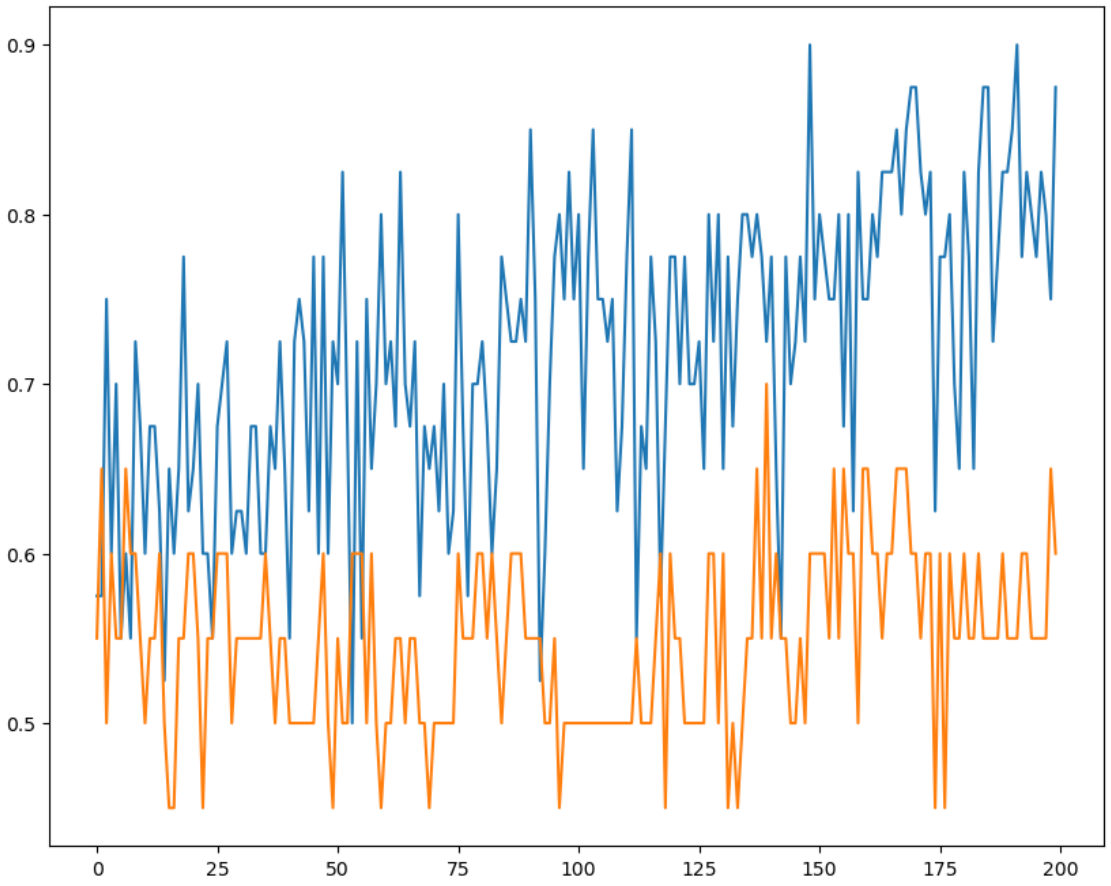
Epoch 151/200
2/2 [==============================] - 1s 343ms/step - loss: 0.4945 - accuracy:
0.8000 - val_loss: 0.6250 - val_accuracy: 0.6000
Epoch 152/200
2/2 [==============================] - 1s 251ms/step - loss: 0.5468 - accuracy:
0.7750 - val_loss: 0.6281 - val_accuracy: 0.6000
Epoch 153/200
2/2 [==============================] - 1s 267ms/step - loss: 0.5156 - accuracy:
0.7500 - val_loss: 0.6422 - val_accuracy: 0.5500
Epoch 154/200
2/2 [==============================] - 1s 621ms/step - loss: 0.5438 - accuracy:
0.7500 - val_loss: 0.6239 - val_accuracy: 0.6500
Epoch 155/200
2/2 [==============================] - 1s 568ms/step - loss: 0.4777 - accuracy:
0.8000 - val_loss: 0.6368 - val_accuracy: 0.5500
Epoch 156/200
2/2 [==============================] - 1s 501ms/step - loss: 0.5744 - accuracy:
0.6750 - val_loss: 0.6263 - val_accuracy: 0.6500
Epoch 157/200
2/2 [==============================] - 1s 230ms/step - loss: 0.4894 - accuracy:
0.8000 - val_loss: 0.6352 - val_accuracy: 0.6000
Epoch 158/200
2/2 [==============================] - 1s 631ms/step - loss: 0.5090 - accuracy:
0.6250 - val_loss: 0.6292 - val_accuracy: 0.6000
Epoch 159/200
2/2 [==============================] - 1s 230ms/step - loss: 0.5110 - accuracy:
0.8250 - val_loss: 0.7906 - val_accuracy: 0.5000
Epoch 160/200
2/2 [==============================] - 1s 503ms/step - loss: 0.6355 - accuracy:
0.7500 - val_loss: 0.6236 - val_accuracy: 0.6500
Epoch 161/200
2/2 [==============================] - 1s 522ms/step - loss: 0.5541 - accuracy:
0.7500 - val_loss: 0.6180 - val_accuracy: 0.6500
Epoch 162/200
2/2 [==============================] - 1s 511ms/step - loss: 0.5131 - accuracy:
0.8000 - val_loss: 0.6351 - val_accuracy: 0.6000
Epoch 163/200
2/2 [==============================] - 1s 215ms/step - loss: 0.5261 - accuracy:
0.7750 - val_loss: 0.6313 - val_accuracy: 0.6000
Epoch 164/200
2/2 [==============================] - 1s 288ms/step - loss: 0.4856 - accuracy:
0.8250 - val_loss: 0.6659 - val_accuracy: 0.5500
Epoch 165/200
2/2 [==============================] - 1s 516ms/step - loss: 0.4714 - accuracy:
0.8250 - val_loss: 0.6515 - val_accuracy: 0.6000
Epoch 166/200
2/2 [==============================] - 1s 494ms/step - loss: 0.5176 - accuracy:
0.8250 - val_loss: 0.6637 - val_accuracy: 0.6000
```

```
Epoch 167/200
2/2 [==============================] - 1s 514ms/step - loss: 0.5024 - accuracy:
0.8500 - val_loss: 0.6432 - val_accuracy: 0.6500
Epoch 168/200
2/2 [==============================] - 1s 222ms/step - loss: 0.4912 - accuracy:
0.8000 - val_loss: 0.6577 - val_accuracy: 0.6500
Epoch 169/200
2/2 [==============================] - 1s 233ms/step - loss: 0.4438 - accuracy:
0.8500 - val_loss: 0.6499 - val_accuracy: 0.6500
Epoch 170/200
2/2 [==============================] - 1s 232ms/step - loss: 0.4667 - accuracy:
0.8750 - val_loss: 0.6728 - val_accuracy: 0.6000
Epoch 171/200
2/2 [==============================] - 1s 501ms/step - loss: 0.4258 - accuracy:
0.8750 - val_loss: 0.6654 - val_accuracy: 0.6000
Epoch 172/200
2/2 [==============================] - 1s 284ms/step - loss: 0.4380 - accuracy:
0.8250 - val_loss: 0.6917 - val_accuracy: 0.5500
Epoch 173/200
2/2 [==============================] - 1s 283ms/step - loss: 0.4670 - accuracy:
0.8000 - val_loss: 0.6460 - val_accuracy: 0.6000
Epoch 174/200
2/2 [==============================] - 1s 286ms/step - loss: 0.4620 - accuracy:
0.8250 - val_loss: 0.6828 - val_accuracy: 0.6000
Epoch 175/200
2/2 [==============================] - 1s 569ms/step - loss: 0.5709 - accuracy:
0.6250 - val_loss: 0.6971 - val_accuracy: 0.4500
Epoch 176/200
2/2 [==============================] - 1s 272ms/step - loss: 0.5178 - accuracy:
0.7750 - val_loss: 0.7225 - val_accuracy: 0.6000
Epoch 177/200
2/2 [==============================] - 1s 603ms/step - loss: 0.5606 - accuracy:
0.7750 - val_loss: 0.6802 - val_accuracy: 0.4500
Epoch 178/200
2/2 [==============================] - 1s 263ms/step - loss: 0.5022 - accuracy:
0.8000 - val_loss: 0.6876 - val_accuracy: 0.6000
Epoch 179/200
2/2 [==============================] - 1s 294ms/step - loss: 0.4861 - accuracy:
0.7000 - val_loss: 0.6606 - val_accuracy: 0.5500
Epoch 180/200
2/2 [==============================] - 1s 491ms/step - loss: 0.6038 - accuracy:
0.6500 - val_loss: 0.6698 - val_accuracy: 0.5500
Epoch 181/200
2/2 [==============================] - 1s 231ms/step - loss: 0.4800 - accuracy:
0.8250 - val_loss: 0.6651 - val_accuracy: 0.6000
Epoch 182/200
2/2 [==============================] - 1s 239ms/step - loss: 0.4731 - accuracy:
0.7750 - val_loss: 0.6814 - val_accuracy: 0.5500
```

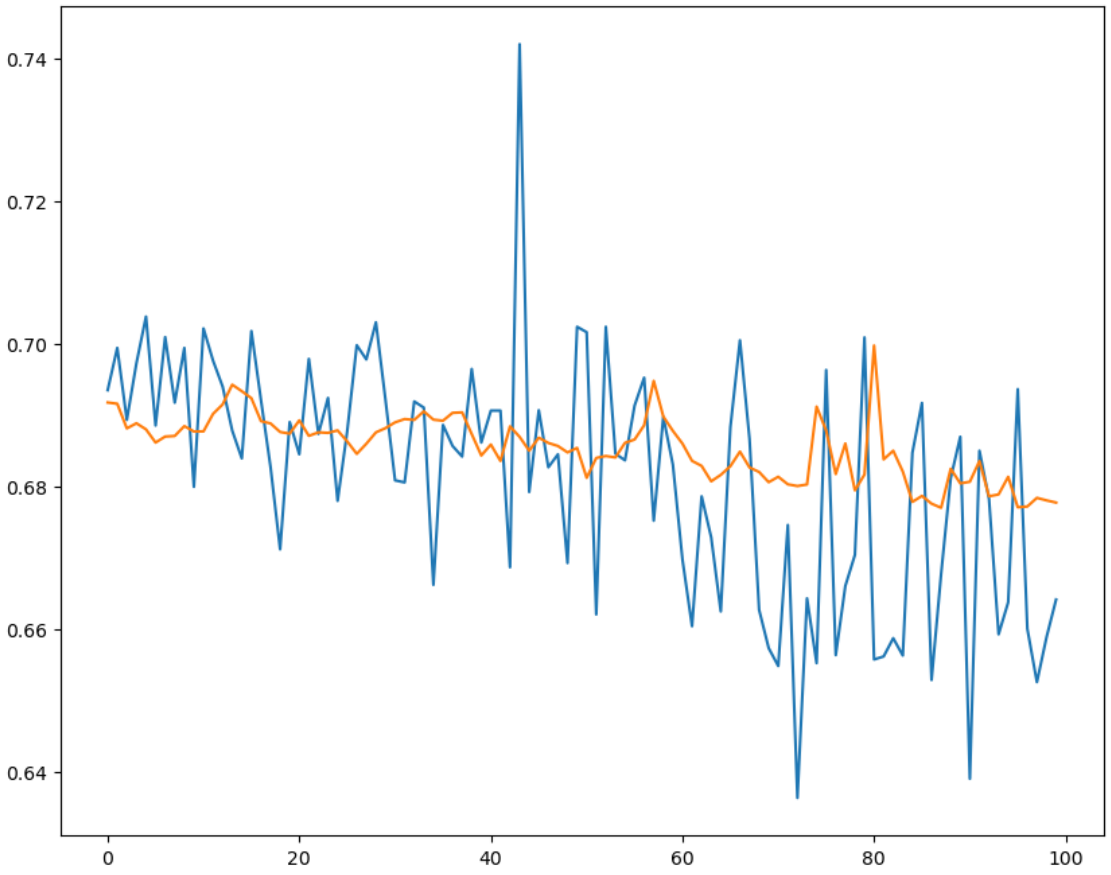
```
Epoch 183/200
2/2 [==============================] - 1s 498ms/step - loss: 0.5257 - accuracy:
0.6500 - val_loss: 0.6584 - val_accuracy: 0.5500
Epoch 184/200
2/2 [==============================] - 1s 232ms/step - loss: 0.4582 - accuracy:
0.8250 - val_loss: 0.6833 - val_accuracy: 0.6000
Epoch 185/200
2/2 [==============================] - 1s 241ms/step - loss: 0.4620 - accuracy:
0.8750 - val_loss: 0.6416 - val_accuracy: 0.5500
Epoch 186/200
2/2 [==============================] - 1s 524ms/step - loss: 0.4455 - accuracy:
0.8750 - val_loss: 0.6377 - val_accuracy: 0.5500
Epoch 187/200
2/2 [==============================] - 1s 246ms/step - loss: 0.5097 - accuracy:
0.7250 - val_loss: 0.6490 - val_accuracy: 0.5500
Epoch 188/200
2/2 [==============================] - 1s 501ms/step - loss: 0.5121 - accuracy:
0.7750 - val_loss: 0.6843 - val_accuracy: 0.5500
Epoch 189/200
2/2 [==============================] - 1s 492ms/step - loss: 0.4700 - accuracy:
0.8250 - val_loss: 0.6681 - val_accuracy: 0.6000
Epoch 190/200
2/2 [==============================] - 1s 239ms/step - loss: 0.4313 - accuracy:
0.8250 - val_loss: 0.6599 - val_accuracy: 0.5500
Epoch 191/200
2/2 [==============================] - 1s 534ms/step - loss: 0.4508 - accuracy:
0.8500 - val_loss: 0.6467 - val_accuracy: 0.5500
Epoch 192/200
2/2 [==============================] - 1s 313ms/step - loss: 0.4133 - accuracy:
0.9000 - val_loss: 0.6368 - val_accuracy: 0.5500
Epoch 193/200
2/2 [==============================] - 1s 679ms/step - loss: 0.4335 - accuracy:
0.7750 - val_loss: 0.6581 - val_accuracy: 0.6000
Epoch 194/200
2/2 [==============================] - 1s 610ms/step - loss: 0.4321 - accuracy:
0.8250 - val_loss: 0.6678 - val_accuracy: 0.6000
Epoch 195/200
2/2 [==============================] - 1s 288ms/step - loss: 0.4373 - accuracy:
0.8000 - val_loss: 0.6624 - val_accuracy: 0.5500
Epoch 196/200
2/2 [==============================] - 1s 615ms/step - loss: 0.4448 - accuracy:
0.7750 - val_loss: 0.6686 - val_accuracy: 0.5500
Epoch 197/200
2/2 [==============================] - 1s 651ms/step - loss: 0.4521 - accuracy:
0.8250 - val_loss: 0.6791 - val_accuracy: 0.5500
Epoch 198/200
2/2 [==============================] - 1s 315ms/step - loss: 0.4867 - accuracy:
0.8000 - val_loss: 0.7320 - val_accuracy: 0.5500
```

```
Epoch 199/200
2/2 [==============================] - 1s 669ms/step - loss: 0.5262 - accuracy:
0.7500 - val_loss: 0.6714 - val_accuracy: 0.6500
Epoch 200/200
2/2 [==============================] - 1s 325ms/step - loss: 0.4243 - accuracy:
0.8750 - val_loss: 0.6431 - val_accuracy: 0.6000
```

[25]:
```
#Plotting accuracy graph
plt.figure(figsize=(10,8))
plt.plot(result1.history['accuracy'])
plt.plot(result1.history['val_accuracy'])
plt.show()
```



[26]:
```
#Plotting loss graph
plt.figure(figsize=(10,8))
plt.plot(result.history['loss'])
plt.plot(result.history['val_loss'])
plt.show()
```



[27]:
```
result2=model.fit(train_set,validation_data=test_set,epochs=300)
```

```
Epoch 1/300
2/2 [==============================] - 1s 616ms/step - loss: 0.5149 - accuracy:
0.7250 - val_loss: 0.6537 - val_accuracy: 0.5000
Epoch 2/300
2/2 [==============================] - 1s 218ms/step - loss: 0.4020 - accuracy:
0.8500 - val_loss: 0.6324 - val_accuracy: 0.5500
Epoch 3/300
2/2 [==============================] - 1s 532ms/step - loss: 0.4837 - accuracy:
0.7250 - val_loss: 0.6303 - val_accuracy: 0.6000
Epoch 4/300
2/2 [==============================] - 1s 488ms/step - loss: 0.4547 - accuracy:
0.8750 - val_loss: 0.6117 - val_accuracy: 0.6000
Epoch 5/300
2/2 [==============================] - 1s 214ms/step - loss: 0.4767 - accuracy:
0.7750 - val_loss: 0.6636 - val_accuracy: 0.6500
Epoch 6/300
2/2 [==============================] - 1s 543ms/step - loss: 0.3650 - accuracy:
0.9000 - val_loss: 0.5895 - val_accuracy: 0.7000
```

```
Epoch 7/300
2/2 [==============================] - 1s 231ms/step - loss: 0.3744 - accuracy:
0.9250 - val_loss: 0.6169 - val_accuracy: 0.7500
Epoch 8/300
2/2 [==============================] - 1s 215ms/step - loss: 0.4544 - accuracy:
0.8250 - val_loss: 0.6238 - val_accuracy: 0.5500
Epoch 9/300
2/2 [==============================] - 1s 235ms/step - loss: 0.4236 - accuracy:
0.8500 - val_loss: 0.6332 - val_accuracy: 0.6000
Epoch 10/300
2/2 [==============================] - 1s 208ms/step - loss: 0.4843 - accuracy:
0.8000 - val_loss: 0.6561 - val_accuracy: 0.6000
Epoch 11/300
2/2 [==============================] - 1s 231ms/step - loss: 0.4798 - accuracy:
0.7750 - val_loss: 0.6269 - val_accuracy: 0.6500
Epoch 12/300
2/2 [==============================] - 1s 230ms/step - loss: 0.4241 - accuracy:
0.8500 - val_loss: 0.6381 - val_accuracy: 0.6500
Epoch 13/300
2/2 [==============================] - 1s 512ms/step - loss: 0.3406 - accuracy:
0.8750 - val_loss: 0.6643 - val_accuracy: 0.5500
Epoch 14/300
2/2 [==============================] - 1s 503ms/step - loss: 0.3961 - accuracy:
0.8500 - val_loss: 0.6649 - val_accuracy: 0.5500
Epoch 15/300
2/2 [==============================] - 1s 500ms/step - loss: 0.3787 - accuracy:
0.8500 - val_loss: 0.6512 - val_accuracy: 0.6000
Epoch 16/300
2/2 [==============================] - 1s 475ms/step - loss: 0.3659 - accuracy:
0.8500 - val_loss: 0.6478 - val_accuracy: 0.5500
Epoch 17/300
2/2 [==============================] - 1s 607ms/step - loss: 0.4030 - accuracy:
0.8500 - val_loss: 0.6660 - val_accuracy: 0.5500
Epoch 18/300
2/2 [==============================] - 1s 564ms/step - loss: 0.4120 - accuracy:
0.9000 - val_loss: 0.6502 - val_accuracy: 0.6000
Epoch 19/300
2/2 [==============================] - 1s 553ms/step - loss: 0.4345 - accuracy:
0.7750 - val_loss: 0.6399 - val_accuracy: 0.6500
Epoch 20/300
2/2 [==============================] - 1s 248ms/step - loss: 0.4461 - accuracy:
0.8750 - val_loss: 0.5935 - val_accuracy: 0.7000
Epoch 21/300
2/2 [==============================] - 1s 267ms/step - loss: 0.3851 - accuracy:
0.9000 - val_loss: 0.5998 - val_accuracy: 0.7000
Epoch 22/300
2/2 [==============================] - 1s 253ms/step - loss: 0.4233 - accuracy:
0.8500 - val_loss: 0.6301 - val_accuracy: 0.6000
```

```
Epoch 23/300
2/2 [==============================] - 1s 552ms/step - loss: 0.4467 - accuracy:
0.8000 - val_loss: 0.6403 - val_accuracy: 0.5500
Epoch 24/300
2/2 [==============================] - 1s 492ms/step - loss: 0.4179 - accuracy:
0.8500 - val_loss: 0.6281 - val_accuracy: 0.6500
Epoch 25/300
2/2 [==============================] - 1s 525ms/step - loss: 0.3696 - accuracy:
0.8500 - val_loss: 0.5787 - val_accuracy: 0.6500
Epoch 26/300
2/2 [==============================] - 1s 573ms/step - loss: 0.3668 - accuracy:
0.8750 - val_loss: 0.5557 - val_accuracy: 0.7500
Epoch 27/300
2/2 [==============================] - 1s 207ms/step - loss: 0.3268 - accuracy:
0.9250 - val_loss: 0.5910 - val_accuracy: 0.7000
Epoch 28/300
2/2 [==============================] - 1s 501ms/step - loss: 0.3538 - accuracy:
0.8750 - val_loss: 0.5714 - val_accuracy: 0.7000
Epoch 29/300
2/2 [==============================] - 1s 230ms/step - loss: 0.3277 - accuracy:
0.8750 - val_loss: 0.5930 - val_accuracy: 0.7000
Epoch 30/300
2/2 [==============================] - 1s 506ms/step - loss: 0.3866 - accuracy:
0.8000 - val_loss: 0.6542 - val_accuracy: 0.7500
Epoch 31/300
2/2 [==============================] - 1s 543ms/step - loss: 0.2989 - accuracy:
0.9250 - val_loss: 0.6046 - val_accuracy: 0.7000
Epoch 32/300
2/2 [==============================] - 1s 516ms/step - loss: 0.3981 - accuracy:
0.8250 - val_loss: 0.6161 - val_accuracy: 0.6000
Epoch 33/300
2/2 [==============================] - 1s 231ms/step - loss: 0.3575 - accuracy:
0.8000 - val_loss: 0.6036 - val_accuracy: 0.6500
Epoch 34/300
2/2 [==============================] - 1s 511ms/step - loss: 0.3395 - accuracy:
0.8500 - val_loss: 0.6059 - val_accuracy: 0.7000
Epoch 35/300
2/2 [==============================] - 1s 221ms/step - loss: 0.4430 - accuracy:
0.8500 - val_loss: 0.6371 - val_accuracy: 0.7000
Epoch 36/300
2/2 [==============================] - 1s 224ms/step - loss: 0.3768 - accuracy:
0.8250 - val_loss: 0.7315 - val_accuracy: 0.6000
Epoch 37/300
2/2 [==============================] - 1s 515ms/step - loss: 0.4162 - accuracy:
0.8000 - val_loss: 0.5648 - val_accuracy: 0.6500
Epoch 38/300
2/2 [==============================] - 1s 225ms/step - loss: 0.3764 - accuracy:
0.9000 - val_loss: 0.6357 - val_accuracy: 0.6000
```

```
Epoch 39/300
2/2 [==============================] - 1s 504ms/step - loss: 0.3312 - accuracy:
0.8750 - val_loss: 0.6170 - val_accuracy: 0.6000
Epoch 40/300
2/2 [==============================] - 1s 261ms/step - loss: 0.3462 - accuracy:
0.8750 - val_loss: 0.6292 - val_accuracy: 0.6500
Epoch 41/300
2/2 [==============================] - 1s 257ms/step - loss: 0.3798 - accuracy:
0.9000 - val_loss: 0.6766 - val_accuracy: 0.6000
Epoch 42/300
2/2 [==============================] - 1s 237ms/step - loss: 0.3451 - accuracy:
0.8750 - val_loss: 0.6239 - val_accuracy: 0.6000
Epoch 43/300
2/2 [==============================] - 1s 554ms/step - loss: 0.4027 - accuracy:
0.8500 - val_loss: 0.6741 - val_accuracy: 0.6000
Epoch 44/300
2/2 [==============================] - 1s 270ms/step - loss: 0.4326 - accuracy:
0.8750 - val_loss: 0.6252 - val_accuracy: 0.5500
Epoch 45/300
2/2 [==============================] - 1s 590ms/step - loss: 0.3752 - accuracy:
0.9000 - val_loss: 0.6001 - val_accuracy: 0.6000
Epoch 46/300
2/2 [==============================] - 1s 251ms/step - loss: 0.3404 - accuracy:
0.9000 - val_loss: 0.6875 - val_accuracy: 0.7000
Epoch 47/300
2/2 [==============================] - 1s 217ms/step - loss: 0.3659 - accuracy:
0.8250 - val_loss: 0.6534 - val_accuracy: 0.6500
Epoch 48/300
2/2 [==============================] - 1s 231ms/step - loss: 0.3035 - accuracy:
0.8750 - val_loss: 0.5940 - val_accuracy: 0.6000
Epoch 49/300
2/2 [==============================] - 1s 530ms/step - loss: 0.3856 - accuracy:
0.8250 - val_loss: 0.6096 - val_accuracy: 0.7000
Epoch 50/300
2/2 [==============================] - 1s 522ms/step - loss: 0.3805 - accuracy:
0.8500 - val_loss: 0.6538 - val_accuracy: 0.7000
Epoch 51/300
2/2 [==============================] - 1s 237ms/step - loss: 0.3375 - accuracy:
0.9000 - val_loss: 0.6667 - val_accuracy: 0.6500
Epoch 52/300
2/2 [==============================] - 1s 513ms/step - loss: 0.4977 - accuracy:
0.7500 - val_loss: 0.6032 - val_accuracy: 0.6000
Epoch 53/300
2/2 [==============================] - 1s 224ms/step - loss: 0.3437 - accuracy:
0.9250 - val_loss: 0.5934 - val_accuracy: 0.6500
Epoch 54/300
2/2 [==============================] - 1s 494ms/step - loss: 0.5122 - accuracy:
0.7750 - val_loss: 0.6061 - val_accuracy: 0.6000
```

```
Epoch 55/300
2/2 [==============================] - 1s 496ms/step - loss: 0.2935 - accuracy:
0.8750 - val_loss: 0.6096 - val_accuracy: 0.6000
Epoch 56/300
2/2 [==============================] - 1s 545ms/step - loss: 0.3119 - accuracy:
0.9250 - val_loss: 0.6029 - val_accuracy: 0.6500
Epoch 57/300
2/2 [==============================] - 1s 239ms/step - loss: 0.3345 - accuracy:
0.9000 - val_loss: 0.5900 - val_accuracy: 0.6000
Epoch 58/300
2/2 [==============================] - 1s 497ms/step - loss: 0.3366 - accuracy:
0.8500 - val_loss: 0.5845 - val_accuracy: 0.7000
Epoch 59/300
2/2 [==============================] - 1s 234ms/step - loss: 0.3245 - accuracy:
0.9500 - val_loss: 0.7472 - val_accuracy: 0.5500
Epoch 60/300
2/2 [==============================] - 1s 500ms/step - loss: 0.4059 - accuracy:
0.8000 - val_loss: 0.5509 - val_accuracy: 0.7500
Epoch 61/300
2/2 [==============================] - 1s 220ms/step - loss: 0.3439 - accuracy:
0.8250 - val_loss: 0.6474 - val_accuracy: 0.5500
Epoch 62/300
2/2 [==============================] - 1s 526ms/step - loss: 0.3098 - accuracy:
0.9250 - val_loss: 0.6636 - val_accuracy: 0.6000
Epoch 63/300
2/2 [==============================] - 1s 268ms/step - loss: 0.3282 - accuracy:
0.9000 - val_loss: 0.6641 - val_accuracy: 0.5500
Epoch 64/300
2/2 [==============================] - 1s 240ms/step - loss: 0.3456 - accuracy:
0.9000 - val_loss: 0.6535 - val_accuracy: 0.5000
Epoch 65/300
2/2 [==============================] - 1s 589ms/step - loss: 0.3990 - accuracy:
0.8500 - val_loss: 0.6492 - val_accuracy: 0.6000
Epoch 66/300
2/2 [==============================] - 1s 578ms/step - loss: 0.2578 - accuracy:
0.9500 - val_loss: 0.6468 - val_accuracy: 0.6000
Epoch 67/300
2/2 [==============================] - 1s 580ms/step - loss: 0.2111 - accuracy:
0.8750 - val_loss: 0.6120 - val_accuracy: 0.6500
Epoch 68/300
2/2 [==============================] - 1s 252ms/step - loss: 0.2786 - accuracy:
0.8500 - val_loss: 0.6836 - val_accuracy: 0.6500
Epoch 69/300
2/2 [==============================] - 1s 247ms/step - loss: 0.3139 - accuracy:
0.9250 - val_loss: 0.6499 - val_accuracy: 0.6500
Epoch 70/300
2/2 [==============================] - 1s 230ms/step - loss: 0.2760 - accuracy:
0.8750 - val_loss: 0.6016 - val_accuracy: 0.6500
```

```
Epoch 71/300
2/2 [==============================] - 1s 219ms/step - loss: 0.2949 - accuracy:
0.9000 - val_loss: 0.6094 - val_accuracy: 0.6500
Epoch 72/300
2/2 [==============================] - 1s 217ms/step - loss: 0.2947 - accuracy:
0.9000 - val_loss: 0.5756 - val_accuracy: 0.7500
Epoch 73/300
2/2 [==============================] - 1s 529ms/step - loss: 0.2817 - accuracy:
0.9250 - val_loss: 0.6066 - val_accuracy: 0.6500
Epoch 74/300
2/2 [==============================] - 1s 213ms/step - loss: 0.3322 - accuracy:
0.8750 - val_loss: 0.6181 - val_accuracy: 0.6000
Epoch 75/300
2/2 [==============================] - 1s 528ms/step - loss: 0.3027 - accuracy:
0.9250 - val_loss: 0.6465 - val_accuracy: 0.6000
Epoch 76/300
2/2 [==============================] - 1s 513ms/step - loss: 0.2929 - accuracy:
0.9000 - val_loss: 0.7113 - val_accuracy: 0.5500
Epoch 77/300
2/2 [==============================] - 1s 510ms/step - loss: 0.3140 - accuracy:
0.9250 - val_loss: 0.6960 - val_accuracy: 0.4500
Epoch 78/300
2/2 [==============================] - 1s 492ms/step - loss: 0.2527 - accuracy:
0.9250 - val_loss: 0.6656 - val_accuracy: 0.5500
Epoch 79/300
2/2 [==============================] - 1s 507ms/step - loss: 0.4293 - accuracy:
0.8000 - val_loss: 0.6535 - val_accuracy: 0.7000
Epoch 80/300
2/2 [==============================] - 1s 219ms/step - loss: 0.2459 - accuracy:
0.9250 - val_loss: 0.6908 - val_accuracy: 0.6000
Epoch 81/300
2/2 [==============================] - 1s 225ms/step - loss: 0.2987 - accuracy:
0.8750 - val_loss: 0.6572 - val_accuracy: 0.7500
Epoch 82/300
2/2 [==============================] - 1s 233ms/step - loss: 0.3696 - accuracy:
0.8000 - val_loss: 0.7515 - val_accuracy: 0.7000
Epoch 83/300
2/2 [==============================] - 1s 550ms/step - loss: 0.3417 - accuracy:
0.9250 - val_loss: 0.6263 - val_accuracy: 0.5500
Epoch 84/300
2/2 [==============================] - 1s 216ms/step - loss: 0.2421 - accuracy:
0.9250 - val_loss: 0.6290 - val_accuracy: 0.6500
Epoch 85/300
2/2 [==============================] - 1s 269ms/step - loss: 0.2484 - accuracy:
0.9250 - val_loss: 0.6476 - val_accuracy: 0.5500
Epoch 86/300
2/2 [==============================] - 1s 506ms/step - loss: 0.2290 - accuracy:
0.9000 - val_loss: 0.6495 - val_accuracy: 0.5500
```

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Epoch 87/300
2/2 [==============================] - 1s 576ms/step - loss: 0.4118 - accuracy:
0.7500 - val_loss: 0.6536 - val_accuracy: 0.5500
Epoch 88/300
2/2 [==============================] - 1s 263ms/step - loss: 0.2342 - accuracy:
0.9250 - val_loss: 0.6523 - val_accuracy: 0.4500
Epoch 89/300
2/2 [==============================] - 1s 562ms/step - loss: 0.2925 - accuracy:
0.9250 - val_loss: 0.6442 - val_accuracy: 0.5500
Epoch 90/300
2/2 [==============================] - 1s 251ms/step - loss: 0.2471 - accuracy:
0.9500 - val_loss: 0.6360 - val_accuracy: 0.6500
Epoch 91/300
2/2 [==============================] - 1s 279ms/step - loss: 0.2001 - accuracy:
0.9000 - val_loss: 0.6103 - val_accuracy: 0.6500
Epoch 92/300
2/2 [==============================] - 1s 258ms/step - loss: 0.2304 - accuracy:
0.9000 - val_loss: 0.6150 - val_accuracy: 0.6500
Epoch 93/300
2/2 [==============================] - 1s 518ms/step - loss: 0.2517 - accuracy:
0.9250 - val_loss: 0.6327 - val_accuracy: 0.6000
Epoch 94/300
2/2 [==============================] - 1s 489ms/step - loss: 0.2308 - accuracy:
0.9500 - val_loss: 0.6136 - val_accuracy: 0.6500
Epoch 95/300
2/2 [==============================] - 1s 243ms/step - loss: 0.2140 - accuracy:
0.9750 - val_loss: 0.5981 - val_accuracy: 0.6500
Epoch 96/300
2/2 [==============================] - 1s 513ms/step - loss: 0.2989 - accuracy:
0.8500 - val_loss: 0.6565 - val_accuracy: 0.6500
Epoch 97/300
2/2 [==============================] - 1s 214ms/step - loss: 0.2244 - accuracy:
0.9250 - val_loss: 0.6013 - val_accuracy: 0.5500
Epoch 98/300
2/2 [==============================] - 1s 222ms/step - loss: 0.2369 - accuracy:
0.9250 - val_loss: 0.5994 - val_accuracy: 0.6500
Epoch 99/300
2/2 [==============================] - 1s 215ms/step - loss: 0.2079 - accuracy:
0.9750 - val_loss: 0.6090 - val_accuracy: 0.6000
Epoch 100/300
2/2 [==============================] - 1s 498ms/step - loss: 0.2344 - accuracy:
0.9500 - val_loss: 0.6403 - val_accuracy: 0.5500
Epoch 101/300
2/2 [==============================] - 1s 539ms/step - loss: 0.2061 - accuracy:
0.9750 - val_loss: 0.6273 - val_accuracy: 0.5500
Epoch 102/300
2/2 [==============================] - 1s 224ms/step - loss: 0.2187 - accuracy:
0.9500 - val_loss: 0.7103 - val_accuracy: 0.7000
```

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Epoch 103/300
2/2 [==============================] - 1s 488ms/step - loss: 0.5060 - accuracy:
0.8000 - val_loss: 0.7362 - val_accuracy: 0.5500
Epoch 104/300
2/2 [==============================] - 1s 238ms/step - loss: 0.3414 - accuracy:
0.9000 - val_loss: 0.7557 - val_accuracy: 0.5000
Epoch 105/300
2/2 [==============================] - 1s 521ms/step - loss: 0.2979 - accuracy:
0.9250 - val_loss: 0.7405 - val_accuracy: 0.6000
Epoch 106/300
2/2 [==============================] - 1s 215ms/step - loss: 0.2438 - accuracy:
0.9500 - val_loss: 0.6903 - val_accuracy: 0.6000
Epoch 107/300
2/2 [==============================] - 1s 533ms/step - loss: 0.2714 - accuracy:
0.9250 - val_loss: 0.6559 - val_accuracy: 0.6000
Epoch 108/300
2/2 [==============================] - 1s 513ms/step - loss: 0.2356 - accuracy:
0.9500 - val_loss: 0.6320 - val_accuracy: 0.6500
Epoch 109/300
2/2 [==============================] - 1s 501ms/step - loss: 0.2057 - accuracy:
0.9500 - val_loss: 0.6599 - val_accuracy: 0.6000
Epoch 110/300
2/2 [==============================] - 1s 289ms/step - loss: 0.2435 - accuracy:
0.8500 - val_loss: 0.6932 - val_accuracy: 0.6000
Epoch 111/300
2/2 [==============================] - 1s 273ms/step - loss: 0.2607 - accuracy:
0.9500 - val_loss: 0.7146 - val_accuracy: 0.6000
Epoch 112/300
2/2 [==============================] - 1s 582ms/step - loss: 0.2995 - accuracy:
0.9000 - val_loss: 0.6181 - val_accuracy: 0.5500
Epoch 113/300
2/2 [==============================] - 1s 596ms/step - loss: 0.2914 - accuracy:
0.9000 - val_loss: 0.5876 - val_accuracy: 0.6000
Epoch 114/300
2/2 [==============================] - 1s 628ms/step - loss: 0.2222 - accuracy:
0.9750 - val_loss: 0.6199 - val_accuracy: 0.6000
Epoch 115/300
2/2 [==============================] - 1s 263ms/step - loss: 0.2612 - accuracy:
0.9000 - val_loss: 0.5606 - val_accuracy: 0.6000
Epoch 116/300
2/2 [==============================] - 1s 249ms/step - loss: 0.2214 - accuracy:
1.0000 - val_loss: 0.6088 - val_accuracy: 0.7000
Epoch 117/300
2/2 [==============================] - 1s 500ms/step - loss: 0.2693 - accuracy:
0.8750 - val_loss: 0.6456 - val_accuracy: 0.5500
Epoch 118/300
2/2 [==============================] - 1s 492ms/step - loss: 0.3630 - accuracy:
0.8000 - val_loss: 0.7393 - val_accuracy: 0.6000
```

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Epoch 119/300
2/2 [==============================] - 1s 241ms/step - loss: 0.2558 - accuracy:
0.9000 - val_loss: 0.7498 - val_accuracy: 0.7000
Epoch 120/300
2/2 [==============================] - 1s 500ms/step - loss: 0.3219 - accuracy:
0.8750 - val_loss: 0.6406 - val_accuracy: 0.6000
Epoch 121/300
2/2 [==============================] - 1s 534ms/step - loss: 0.1807 - accuracy:
0.9750 - val_loss: 0.6084 - val_accuracy: 0.6500
Epoch 122/300
2/2 [==============================] - 1s 223ms/step - loss: 0.2303 - accuracy:
0.9000 - val_loss: 0.6286 - val_accuracy: 0.5500
Epoch 123/300
2/2 [==============================] - 1s 500ms/step - loss: 0.1597 - accuracy:
0.9750 - val_loss: 0.6903 - val_accuracy: 0.5500
Epoch 124/300
2/2 [==============================] - 1s 225ms/step - loss: 0.1903 - accuracy:
0.9500 - val_loss: 0.6890 - val_accuracy: 0.6000
Epoch 125/300
2/2 [==============================] - 1s 223ms/step - loss: 0.1986 - accuracy:
0.9750 - val_loss: 0.6646 - val_accuracy: 0.6500
Epoch 126/300
2/2 [==============================] - 1s 586ms/step - loss: 0.1599 - accuracy:
0.9500 - val_loss: 0.6860 - val_accuracy: 0.5500
Epoch 127/300
2/2 [==============================] - 1s 524ms/step - loss: 0.1629 - accuracy:
0.9750 - val_loss: 0.8165 - val_accuracy: 0.5500
Epoch 128/300
2/2 [==============================] - 1s 519ms/step - loss: 0.2091 - accuracy:
0.9250 - val_loss: 0.7988 - val_accuracy: 0.5000
Epoch 129/300
2/2 [==============================] - 1s 523ms/step - loss: 0.2585 - accuracy:
0.8750 - val_loss: 0.7234 - val_accuracy: 0.5500
Epoch 130/300
2/2 [==============================] - 1s 514ms/step - loss: 0.1700 - accuracy:
0.9250 - val_loss: 0.7438 - val_accuracy: 0.6000
Epoch 131/300
2/2 [==============================] - 1s 500ms/step - loss: 0.2668 - accuracy:
0.8750 - val_loss: 0.7341 - val_accuracy: 0.5000
Epoch 132/300
2/2 [==============================] - 1s 220ms/step - loss: 0.2377 - accuracy:
0.9500 - val_loss: 0.7869 - val_accuracy: 0.5500
Epoch 133/300
2/2 [==============================] - 1s 568ms/step - loss: 0.2248 - accuracy:
0.9250 - val_loss: 0.6902 - val_accuracy: 0.5500
Epoch 134/300
2/2 [==============================] - 1s 283ms/step - loss: 0.1615 - accuracy:
0.9750 - val_loss: 0.8937 - val_accuracy: 0.6500
```

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Epoch 135/300
2/2 [==============================] - 1s 550ms/step - loss: 0.2618 - accuracy:
0.9750 - val_loss: 0.6946 - val_accuracy: 0.5500
Epoch 136/300
2/2 [==============================] - 1s 240ms/step - loss: 0.1686 - accuracy:
0.9500 - val_loss: 0.6527 - val_accuracy: 0.5500
Epoch 137/300
2/2 [==============================] - 1s 288ms/step - loss: 0.2008 - accuracy:
0.9500 - val_loss: 0.6607 - val_accuracy: 0.6000
Epoch 138/300
2/2 [==============================] - 1s 585ms/step - loss: 0.2594 - accuracy:
0.9000 - val_loss: 0.6211 - val_accuracy: 0.6000
Epoch 139/300
2/2 [==============================] - 1s 238ms/step - loss: 0.1155 - accuracy:
1.0000 - val_loss: 0.6187 - val_accuracy: 0.6000
Epoch 140/300
2/2 [==============================] - 1s 227ms/step - loss: 0.1401 - accuracy:
0.9500 - val_loss: 0.7220 - val_accuracy: 0.6500
Epoch 141/300
2/2 [==============================] - 1s 524ms/step - loss: 0.1258 - accuracy:
0.9750 - val_loss: 0.6525 - val_accuracy: 0.6000
Epoch 142/300
2/2 [==============================] - 1s 499ms/step - loss: 0.1437 - accuracy:
0.9750 - val_loss: 0.6362 - val_accuracy: 0.6000
Epoch 143/300
2/2 [==============================] - 1s 223ms/step - loss: 0.2069 - accuracy:
0.9250 - val_loss: 0.5820 - val_accuracy: 0.7500
Epoch 144/300
2/2 [==============================] - 1s 509ms/step - loss: 0.1736 - accuracy:
0.9750 - val_loss: 0.5596 - val_accuracy: 0.7000
Epoch 145/300
2/2 [==============================] - 1s 518ms/step - loss: 0.1659 - accuracy:
1.0000 - val_loss: 0.5741 - val_accuracy: 0.6000
Epoch 146/300
2/2 [==============================] - 1s 497ms/step - loss: 0.2513 - accuracy:
0.9250 - val_loss: 0.7156 - val_accuracy: 0.7000
Epoch 147/300
2/2 [==============================] - 1s 245ms/step - loss: 0.1909 - accuracy:
0.9500 - val_loss: 0.7125 - val_accuracy: 0.5500
Epoch 148/300
2/2 [==============================] - 1s 210ms/step - loss: 0.1545 - accuracy:
1.0000 - val_loss: 0.6427 - val_accuracy: 0.6000
Epoch 149/300
2/2 [==============================] - 1s 549ms/step - loss: 0.1943 - accuracy:
0.9500 - val_loss: 0.6714 - val_accuracy: 0.5500
Epoch 150/300
2/2 [==============================] - 1s 239ms/step - loss: 0.2160 - accuracy:
0.9500 - val_loss: 0.6657 - val_accuracy: 0.5500
```

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Epoch 151/300
2/2 [==============================] - 1s 227ms/step - loss: 0.1953 - accuracy:
0.9750 - val_loss: 0.7178 - val_accuracy: 0.7500
Epoch 152/300
2/2 [==============================] - 1s 566ms/step - loss: 0.1776 - accuracy:
0.9500 - val_loss: 0.6989 - val_accuracy: 0.6000
Epoch 153/300
2/2 [==============================] - 1s 240ms/step - loss: 0.0854 - accuracy:
1.0000 - val_loss: 0.6966 - val_accuracy: 0.6000
Epoch 154/300
2/2 [==============================] - 1s 504ms/step - loss: 0.1378 - accuracy:
0.9500 - val_loss: 0.6825 - val_accuracy: 0.5500
Epoch 155/300
2/2 [==============================] - 1s 529ms/step - loss: 0.1403 - accuracy:
0.9750 - val_loss: 0.6594 - val_accuracy: 0.5500
Epoch 156/300
2/2 [==============================] - 1s 557ms/step - loss: 0.1526 - accuracy:
0.9750 - val_loss: 0.6719 - val_accuracy: 0.6500
Epoch 157/300
2/2 [==============================] - 1s 231ms/step - loss: 0.1706 - accuracy:
0.9000 - val_loss: 0.7067 - val_accuracy: 0.5500
Epoch 158/300
2/2 [==============================] - 1s 599ms/step - loss: 0.1880 - accuracy:
0.9500 - val_loss: 0.6803 - val_accuracy: 0.6000
Epoch 159/300
2/2 [==============================] - 1s 587ms/step - loss: 0.1748 - accuracy:
0.9000 - val_loss: 0.6728 - val_accuracy: 0.5500
Epoch 160/300
2/2 [==============================] - 1s 258ms/step - loss: 0.1372 - accuracy:
0.9750 - val_loss: 0.8150 - val_accuracy: 0.6500
Epoch 161/300
2/2 [==============================] - 1s 253ms/step - loss: 0.3773 - accuracy:
0.8250 - val_loss: 1.0201 - val_accuracy: 0.6500
Epoch 162/300
2/2 [==============================] - 1s 253ms/step - loss: 0.2798 - accuracy:
0.8750 - val_loss: 0.6736 - val_accuracy: 0.6500
Epoch 163/300
2/2 [==============================] - 1s 531ms/step - loss: 0.1964 - accuracy:
0.9250 - val_loss: 0.6761 - val_accuracy: 0.5500
Epoch 164/300
2/2 [==============================] - 1s 533ms/step - loss: 0.1508 - accuracy:
0.9500 - val_loss: 0.7059 - val_accuracy: 0.6500
Epoch 165/300
2/2 [==============================] - 1s 501ms/step - loss: 0.1270 - accuracy:
0.9750 - val_loss: 0.6441 - val_accuracy: 0.6500
Epoch 166/300
2/2 [==============================] - 1s 532ms/step - loss: 0.1950 - accuracy:
0.9250 - val_loss: 0.6957 - val_accuracy: 0.6000
```

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Epoch 167/300
2/2 [==============================] - 1s 280ms/step - loss: 0.1824 - accuracy:
0.9500 - val_loss: 0.6448 - val_accuracy: 0.6000
Epoch 168/300
2/2 [==============================] - 1s 584ms/step - loss: 0.1262 - accuracy:
1.0000 - val_loss: 0.6184 - val_accuracy: 0.6500
Epoch 169/300
2/2 [==============================] - 1s 243ms/step - loss: 0.1849 - accuracy:
0.9500 - val_loss: 0.5893 - val_accuracy: 0.6500
Epoch 170/300
2/2 [==============================] - 1s 272ms/step - loss: 0.1631 - accuracy:
0.9750 - val_loss: 0.5239 - val_accuracy: 0.6500
Epoch 171/300
2/2 [==============================] - 1s 535ms/step - loss: 0.1930 - accuracy:
0.9500 - val_loss: 0.6377 - val_accuracy: 0.6500
Epoch 172/300
2/2 [==============================] - 1s 562ms/step - loss: 0.2138 - accuracy:
0.9500 - val_loss: 0.6254 - val_accuracy: 0.6000
Epoch 173/300
2/2 [==============================] - 1s 247ms/step - loss: 0.1816 - accuracy:
0.9750 - val_loss: 0.6209 - val_accuracy: 0.6000
Epoch 174/300
2/2 [==============================] - 1s 544ms/step - loss: 0.1294 - accuracy:
0.9750 - val_loss: 0.6901 - val_accuracy: 0.5500
Epoch 175/300
2/2 [==============================] - 1s 548ms/step - loss: 0.1408 - accuracy:
0.9500 - val_loss: 0.6209 - val_accuracy: 0.5500
Epoch 176/300
2/2 [==============================] - 1s 513ms/step - loss: 0.1619 - accuracy:
0.9750 - val_loss: 0.6445 - val_accuracy: 0.6000
Epoch 177/300
2/2 [==============================] - 1s 264ms/step - loss: 0.1374 - accuracy:
1.0000 - val_loss: 0.6324 - val_accuracy: 0.6000
Epoch 178/300
2/2 [==============================] - 1s 567ms/step - loss: 0.1247 - accuracy:
0.9500 - val_loss: 0.6597 - val_accuracy: 0.6500
Epoch 179/300
2/2 [==============================] - 1s 621ms/step - loss: 0.1329 - accuracy:
0.9750 - val_loss: 0.6829 - val_accuracy: 0.5500
Epoch 180/300
2/2 [==============================] - 1s 578ms/step - loss: 0.1043 - accuracy:
0.9750 - val_loss: 0.5899 - val_accuracy: 0.6000
Epoch 181/300
2/2 [==============================] - 1s 582ms/step - loss: 0.1445 - accuracy:
0.9750 - val_loss: 0.6473 - val_accuracy: 0.6000
Epoch 182/300
2/2 [==============================] - 1s 272ms/step - loss: 0.1258 - accuracy:
1.0000 - val_loss: 0.6743 - val_accuracy: 0.6000
```

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Epoch 183/300
2/2 [==============================] - 1s 273ms/step - loss: 0.1136 - accuracy:
0.9750 - val_loss: 0.6964 - val_accuracy: 0.7000
Epoch 184/300
2/2 [==============================] - 1s 278ms/step - loss: 0.1282 - accuracy:
0.9500 - val_loss: 0.7166 - val_accuracy: 0.6000
Epoch 185/300
2/2 [==============================] - 1s 622ms/step - loss: 0.1209 - accuracy:
0.9750 - val_loss: 0.7418 - val_accuracy: 0.5500
Epoch 186/300
2/2 [==============================] - 1s 229ms/step - loss: 0.1197 - accuracy:
0.9750 - val_loss: 0.6917 - val_accuracy: 0.5500
Epoch 187/300
2/2 [==============================] - 1s 500ms/step - loss: 0.1069 - accuracy:
0.9500 - val_loss: 0.7397 - val_accuracy: 0.6000
Epoch 188/300
2/2 [==============================] - 1s 535ms/step - loss: 0.2082 - accuracy:
0.8750 - val_loss: 0.6107 - val_accuracy: 0.6000
Epoch 189/300
2/2 [==============================] - 1s 566ms/step - loss: 0.1543 - accuracy:
0.9750 - val_loss: 0.6835 - val_accuracy: 0.6000
Epoch 190/300
2/2 [==============================] - 1s 498ms/step - loss: 0.1063 - accuracy:
0.9750 - val_loss: 0.6716 - val_accuracy: 0.6000
Epoch 191/300
2/2 [==============================] - 1s 568ms/step - loss: 0.0959 - accuracy:
0.9750 - val_loss: 0.6889 - val_accuracy: 0.6500
Epoch 192/300
2/2 [==============================] - 1s 240ms/step - loss: 0.0976 - accuracy:
1.0000 - val_loss: 0.7398 - val_accuracy: 0.6000
Epoch 193/300
2/2 [==============================] - 1s 526ms/step - loss: 0.1555 - accuracy:
0.9750 - val_loss: 0.7506 - val_accuracy: 0.6500
Epoch 194/300
2/2 [==============================] - 1s 517ms/step - loss: 0.1538 - accuracy:
0.9500 - val_loss: 0.6989 - val_accuracy: 0.6000
Epoch 195/300
2/2 [==============================] - 1s 520ms/step - loss: 0.1062 - accuracy:
0.9750 - val_loss: 0.7480 - val_accuracy: 0.6000
Epoch 196/300
2/2 [==============================] - 1s 548ms/step - loss: 0.1406 - accuracy:
0.9500 - val_loss: 0.7066 - val_accuracy: 0.6000
Epoch 197/300
2/2 [==============================] - 1s 544ms/step - loss: 0.0990 - accuracy:
1.0000 - val_loss: 0.7501 - val_accuracy: 0.6000
Epoch 198/300
2/2 [==============================] - 1s 264ms/step - loss: 0.1098 - accuracy:
0.9750 - val_loss: 0.8197 - val_accuracy: 0.6500
```

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Epoch 199/300
2/2 [==============================] - 1s 223ms/step - loss: 0.0688 - accuracy:
1.0000 - val_loss: 0.7843 - val_accuracy: 0.6000
Epoch 200/300
2/2 [==============================] - 1s 504ms/step - loss: 0.1330 - accuracy:
0.9750 - val_loss: 0.7309 - val_accuracy: 0.6000
Epoch 201/300
2/2 [==============================] - 1s 270ms/step - loss: 0.1267 - accuracy:
1.0000 - val_loss: 0.6873 - val_accuracy: 0.6000
Epoch 202/300
2/2 [==============================] - 1s 609ms/step - loss: 0.1518 - accuracy:
0.9500 - val_loss: 0.7106 - val_accuracy: 0.6000
Epoch 203/300
2/2 [==============================] - 1s 583ms/step - loss: 0.0741 - accuracy:
0.9750 - val_loss: 0.7050 - val_accuracy: 0.6000
Epoch 204/300
2/2 [==============================] - 1s 255ms/step - loss: 0.0983 - accuracy:
0.9750 - val_loss: 0.7400 - val_accuracy: 0.7000
Epoch 205/300
2/2 [==============================] - 1s 287ms/step - loss: 0.0700 - accuracy:
1.0000 - val_loss: 0.7188 - val_accuracy: 0.6500
Epoch 206/300
2/2 [==============================] - 1s 904ms/step - loss: 0.0899 - accuracy:
1.0000 - val_loss: 0.6832 - val_accuracy: 0.6000
Epoch 207/300
2/2 [==============================] - 1s 302ms/step - loss: 0.0761 - accuracy:
0.9750 - val_loss: 0.7684 - val_accuracy: 0.6500
Epoch 208/300
2/2 [==============================] - 1s 221ms/step - loss: 0.1346 - accuracy:
0.9500 - val_loss: 0.7076 - val_accuracy: 0.6500
Epoch 209/300
2/2 [==============================] - 1s 232ms/step - loss: 0.1156 - accuracy:
0.9500 - val_loss: 0.8155 - val_accuracy: 0.6000
Epoch 210/300
2/2 [==============================] - 1s 499ms/step - loss: 0.0862 - accuracy:
0.9750 - val_loss: 0.7026 - val_accuracy: 0.7000
Epoch 211/300
2/2 [==============================] - 1s 530ms/step - loss: 0.0702 - accuracy:
1.0000 - val_loss: 0.7107 - val_accuracy: 0.6500
Epoch 212/300
2/2 [==============================] - 1s 251ms/step - loss: 0.0816 - accuracy:
0.9750 - val_loss: 0.6767 - val_accuracy: 0.6500
Epoch 213/300
2/2 [==============================] - 1s 549ms/step - loss: 0.0997 - accuracy:
1.0000 - val_loss: 0.7269 - val_accuracy: 0.6000
Epoch 214/300
2/2 [==============================] - 1s 532ms/step - loss: 0.0860 - accuracy:
0.9750 - val_loss: 0.7374 - val_accuracy: 0.6000
```

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Epoch 215/300
2/2 [==============================] - 1s 253ms/step - loss: 0.1160 - accuracy:
0.9750 - val_loss: 0.7030 - val_accuracy: 0.7000
Epoch 216/300
2/2 [==============================] - 1s 220ms/step - loss: 0.0541 - accuracy:
1.0000 - val_loss: 0.7120 - val_accuracy: 0.6000
Epoch 217/300
2/2 [==============================] - 1s 251ms/step - loss: 0.1168 - accuracy:
0.9500 - val_loss: 0.6838 - val_accuracy: 0.7000
Epoch 218/300
2/2 [==============================] - 1s 247ms/step - loss: 0.1020 - accuracy:
1.0000 - val_loss: 0.7299 - val_accuracy: 0.7000
Epoch 219/300
2/2 [==============================] - 1s 532ms/step - loss: 0.0961 - accuracy:
0.9750 - val_loss: 0.7444 - val_accuracy: 0.6000
Epoch 220/300
2/2 [==============================] - 1s 230ms/step - loss: 0.0659 - accuracy:
1.0000 - val_loss: 0.7806 - val_accuracy: 0.6500
Epoch 221/300
2/2 [==============================] - 1s 259ms/step - loss: 0.1334 - accuracy:
0.9500 - val_loss: 0.7569 - val_accuracy: 0.6000
Epoch 222/300
2/2 [==============================] - 1s 536ms/step - loss: 0.0967 - accuracy:
0.9500 - val_loss: 0.8046 - val_accuracy: 0.5500
Epoch 223/300
2/2 [==============================] - 1s 567ms/step - loss: 0.1077 - accuracy:
0.9750 - val_loss: 0.7712 - val_accuracy: 0.5500
Epoch 224/300
2/2 [==============================] - 1s 614ms/step - loss: 0.0769 - accuracy:
1.0000 - val_loss: 0.8377 - val_accuracy: 0.6000
Epoch 225/300
2/2 [==============================] - 1s 258ms/step - loss: 0.0710 - accuracy:
1.0000 - val_loss: 0.9241 - val_accuracy: 0.6000
Epoch 226/300
2/2 [==============================] - 1s 257ms/step - loss: 0.1404 - accuracy:
0.9500 - val_loss: 0.8193 - val_accuracy: 0.6000
Epoch 227/300
2/2 [==============================] - 1s 264ms/step - loss: 0.1154 - accuracy:
0.9750 - val_loss: 0.7602 - val_accuracy: 0.6500
Epoch 228/300
2/2 [==============================] - 1s 670ms/step - loss: 0.1072 - accuracy:
1.0000 - val_loss: 0.7647 - val_accuracy: 0.6000
Epoch 229/300
2/2 [==============================] - 1s 532ms/step - loss: 0.2087 - accuracy:
0.9250 - val_loss: 0.7095 - val_accuracy: 0.5500
Epoch 230/300
2/2 [==============================] - 1s 516ms/step - loss: 0.1477 - accuracy:
0.9750 - val_loss: 0.7484 - val_accuracy: 0.6000
```

```
Epoch 231/300
2/2 [==============================] - 1s 225ms/step - loss: 0.1031 - accuracy:
0.9750 - val_loss: 0.7514 - val_accuracy: 0.6000
Epoch 232/300
2/2 [==============================] - 1s 239ms/step - loss: 0.0685 - accuracy:
1.0000 - val_loss: 0.7830 - val_accuracy: 0.5500
Epoch 233/300
2/2 [==============================] - 1s 220ms/step - loss: 0.1031 - accuracy:
1.0000 - val_loss: 0.9119 - val_accuracy: 0.6000
Epoch 234/300
2/2 [==============================] - 1s 498ms/step - loss: 0.1200 - accuracy:
0.9500 - val_loss: 0.8204 - val_accuracy: 0.6000
Epoch 235/300
2/2 [==============================] - 1s 514ms/step - loss: 0.1087 - accuracy:
0.9500 - val_loss: 0.8084 - val_accuracy: 0.6500
Epoch 236/300
2/2 [==============================] - 1s 237ms/step - loss: 0.1114 - accuracy:
0.9500 - val_loss: 1.1481 - val_accuracy: 0.6500
Epoch 237/300
2/2 [==============================] - 1s 227ms/step - loss: 0.2395 - accuracy:
0.9500 - val_loss: 0.7278 - val_accuracy: 0.7500
Epoch 238/300
2/2 [==============================] - 1s 517ms/step - loss: 0.1109 - accuracy:
0.9750 - val_loss: 0.6916 - val_accuracy: 0.7000
Epoch 239/300
2/2 [==============================] - 1s 483ms/step - loss: 0.2080 - accuracy:
0.9250 - val_loss: 0.8258 - val_accuracy: 0.6500
Epoch 240/300
2/2 [==============================] - 1s 230ms/step - loss: 0.1136 - accuracy:
1.0000 - val_loss: 0.7605 - val_accuracy: 0.6000
Epoch 241/300
2/2 [==============================] - 1s 533ms/step - loss: 0.0788 - accuracy:
1.0000 - val_loss: 0.7345 - val_accuracy: 0.7000
Epoch 242/300
2/2 [==============================] - 1s 224ms/step - loss: 0.0649 - accuracy:
1.0000 - val_loss: 0.7158 - val_accuracy: 0.6000
Epoch 243/300
2/2 [==============================] - 1s 501ms/step - loss: 0.0797 - accuracy:
1.0000 - val_loss: 0.6616 - val_accuracy: 0.6500
Epoch 244/300
2/2 [==============================] - 1s 251ms/step - loss: 0.0716 - accuracy:
1.0000 - val_loss: 0.7060 - val_accuracy: 0.6500
Epoch 245/300
2/2 [==============================] - 1s 536ms/step - loss: 0.0674 - accuracy:
0.9750 - val_loss: 0.6986 - val_accuracy: 0.6500
Epoch 246/300
2/2 [==============================] - 1s 572ms/step - loss: 0.0980 - accuracy:
0.9500 - val_loss: 0.7339 - val_accuracy: 0.6500
```

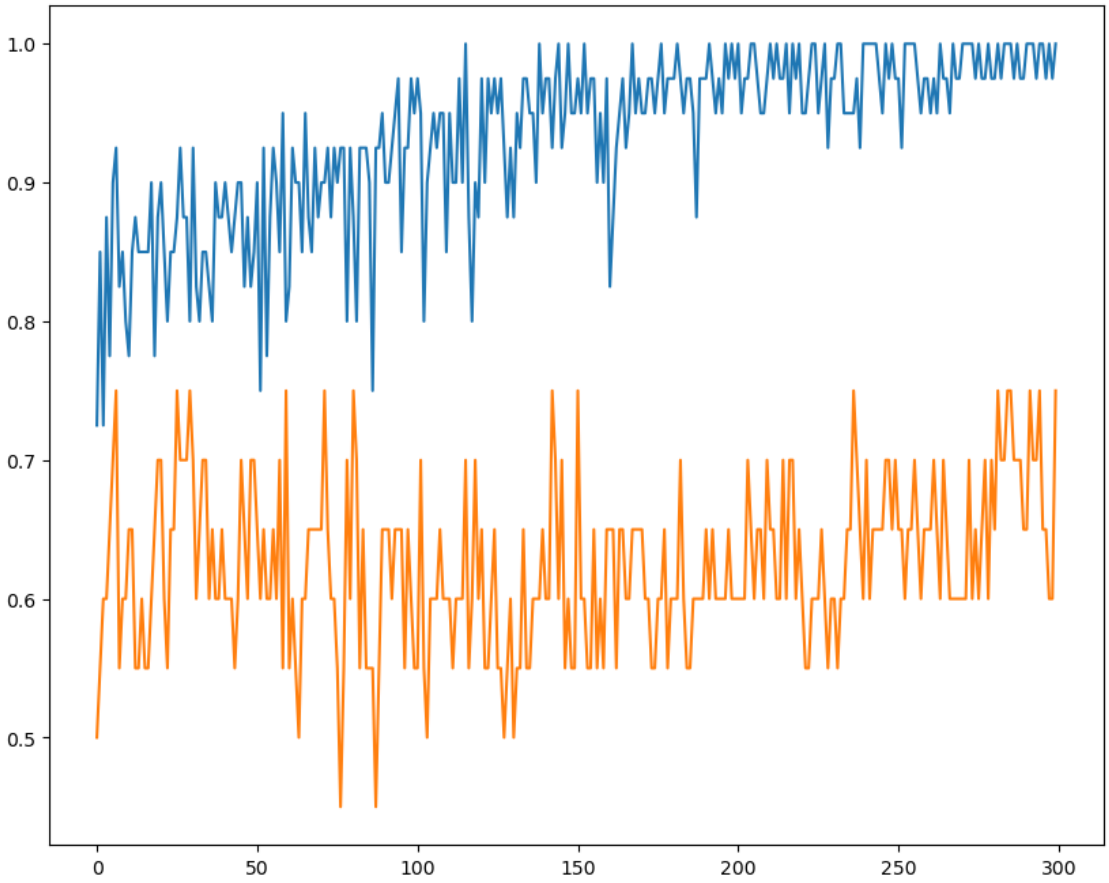
```
Epoch 247/300
2/2 [==============================] - 1s 246ms/step - loss: 0.0960 - accuracy:
1.0000 - val_loss: 0.7694 - val_accuracy: 0.7000
Epoch 248/300
2/2 [==============================] - 1s 271ms/step - loss: 0.0769 - accuracy:
0.9750 - val_loss: 0.6914 - val_accuracy: 0.7000
Epoch 249/300
2/2 [==============================] - 1s 292ms/step - loss: 0.0626 - accuracy:
1.0000 - val_loss: 0.7276 - val_accuracy: 0.6500
Epoch 250/300
2/2 [==============================] - 1s 568ms/step - loss: 0.0523 - accuracy:
0.9750 - val_loss: 0.7203 - val_accuracy: 0.7000
Epoch 251/300
2/2 [==============================] - 1s 261ms/step - loss: 0.0546 - accuracy:
0.9750 - val_loss: 0.7983 - val_accuracy: 0.6500
Epoch 252/300
2/2 [==============================] - 1s 249ms/step - loss: 0.1150 - accuracy:
0.9250 - val_loss: 0.7487 - val_accuracy: 0.6500
Epoch 253/300
2/2 [==============================] - 1s 499ms/step - loss: 0.0688 - accuracy:
1.0000 - val_loss: 0.7204 - val_accuracy: 0.6000
Epoch 254/300
2/2 [==============================] - 1s 516ms/step - loss: 0.0848 - accuracy:
1.0000 - val_loss: 0.6979 - val_accuracy: 0.6500
Epoch 255/300
2/2 [==============================] - 1s 234ms/step - loss: 0.0815 - accuracy:
1.0000 - val_loss: 0.7190 - val_accuracy: 0.6500
Epoch 256/300
2/2 [==============================] - 1s 233ms/step - loss: 0.0399 - accuracy:
1.0000 - val_loss: 0.7283 - val_accuracy: 0.7000
Epoch 257/300
2/2 [==============================] - 1s 241ms/step - loss: 0.0817 - accuracy:
0.9750 - val_loss: 0.8951 - val_accuracy: 0.6500
Epoch 258/300
2/2 [==============================] - 1s 535ms/step - loss: 0.1156 - accuracy:
0.9500 - val_loss: 0.7866 - val_accuracy: 0.6000
Epoch 259/300
2/2 [==============================] - 1s 230ms/step - loss: 0.1067 - accuracy:
0.9750 - val_loss: 0.7185 - val_accuracy: 0.6500
Epoch 260/300
2/2 [==============================] - 1s 514ms/step - loss: 0.1026 - accuracy:
0.9750 - val_loss: 0.7231 - val_accuracy: 0.6500
Epoch 261/300
2/2 [==============================] - 1s 256ms/step - loss: 0.1027 - accuracy:
0.9500 - val_loss: 0.7504 - val_accuracy: 0.6500
Epoch 262/300
2/2 [==============================] - 1s 517ms/step - loss: 0.0740 - accuracy:
0.9750 - val_loss: 0.7041 - val_accuracy: 0.7000
```

```
Epoch 263/300
2/2 [==============================] - 1s 218ms/step - loss: 0.1222 - accuracy:
0.9500 - val_loss: 0.7177 - val_accuracy: 0.6500
Epoch 264/300
2/2 [==============================] - 1s 234ms/step - loss: 0.0796 - accuracy:
1.0000 - val_loss: 0.7751 - val_accuracy: 0.6000
Epoch 265/300
2/2 [==============================] - 1s 518ms/step - loss: 0.1419 - accuracy:
0.9750 - val_loss: 0.7293 - val_accuracy: 0.7000
Epoch 266/300
2/2 [==============================] - 1s 217ms/step - loss: 0.0777 - accuracy:
0.9750 - val_loss: 0.7751 - val_accuracy: 0.6500
Epoch 267/300
2/2 [==============================] - 1s 248ms/step - loss: 0.1652 - accuracy:
0.9500 - val_loss: 0.8101 - val_accuracy: 0.6000
Epoch 268/300
2/2 [==============================] - 1s 568ms/step - loss: 0.0639 - accuracy:
1.0000 - val_loss: 0.7764 - val_accuracy: 0.6000
Epoch 269/300
2/2 [==============================] - 1s 581ms/step - loss: 0.0869 - accuracy:
0.9750 - val_loss: 0.7616 - val_accuracy: 0.6000
Epoch 270/300
2/2 [==============================] - 1s 273ms/step - loss: 0.0641 - accuracy:
0.9750 - val_loss: 0.7633 - val_accuracy: 0.6000
Epoch 271/300
2/2 [==============================] - 1s 281ms/step - loss: 0.0411 - accuracy:
1.0000 - val_loss: 0.7938 - val_accuracy: 0.6000
Epoch 272/300
2/2 [==============================] - 1s 598ms/step - loss: 0.0458 - accuracy:
1.0000 - val_loss: 0.7906 - val_accuracy: 0.6000
Epoch 273/300
2/2 [==============================] - 1s 270ms/step - loss: 0.0478 - accuracy:
1.0000 - val_loss: 0.7889 - val_accuracy: 0.7000
Epoch 274/300
2/2 [==============================] - 1s 580ms/step - loss: 0.0580 - accuracy:
1.0000 - val_loss: 0.7475 - val_accuracy: 0.6000
Epoch 275/300
2/2 [==============================] - 1s 516ms/step - loss: 0.0984 - accuracy:
0.9750 - val_loss: 0.7650 - val_accuracy: 0.6500
Epoch 276/300
2/2 [==============================] - 1s 536ms/step - loss: 0.0562 - accuracy:
1.0000 - val_loss: 0.7814 - val_accuracy: 0.6000
Epoch 277/300
2/2 [==============================] - 1s 514ms/step - loss: 0.0964 - accuracy:
0.9750 - val_loss: 0.6954 - val_accuracy: 0.6500
Epoch 278/300
2/2 [==============================] - 1s 500ms/step - loss: 0.1078 - accuracy:
0.9750 - val_loss: 0.7404 - val_accuracy: 0.7000
```

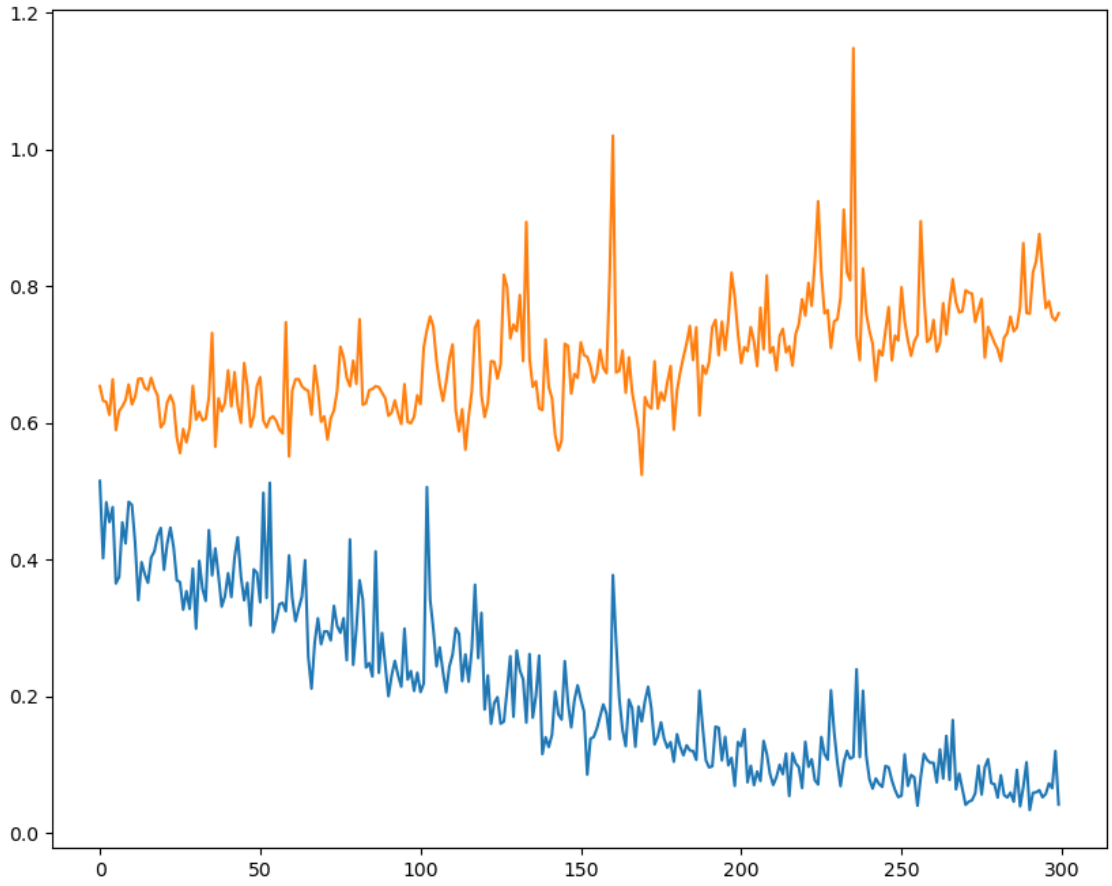
```
Epoch 279/300
2/2 [==============================] - 1s 239ms/step - loss: 0.0730 - accuracy:
1.0000 - val_loss: 0.7287 - val_accuracy: 0.6000
Epoch 280/300
2/2 [==============================] - 1s 515ms/step - loss: 0.0713 - accuracy:
0.9750 - val_loss: 0.7171 - val_accuracy: 0.7000
Epoch 281/300
2/2 [==============================] - 1s 532ms/step - loss: 0.0516 - accuracy:
0.9750 - val_loss: 0.7075 - val_accuracy: 0.6500
Epoch 282/300
2/2 [==============================] - 1s 255ms/step - loss: 0.0844 - accuracy:
1.0000 - val_loss: 0.6904 - val_accuracy: 0.7500
Epoch 283/300
2/2 [==============================] - 1s 235ms/step - loss: 0.0554 - accuracy:
0.9750 - val_loss: 0.7243 - val_accuracy: 0.7000
Epoch 284/300
2/2 [==============================] - 1s 230ms/step - loss: 0.0518 - accuracy:
1.0000 - val_loss: 0.7315 - val_accuracy: 0.7000
Epoch 285/300
2/2 [==============================] - 1s 241ms/step - loss: 0.0590 - accuracy:
1.0000 - val_loss: 0.7552 - val_accuracy: 0.7500
Epoch 286/300
2/2 [==============================] - 1s 237ms/step - loss: 0.0458 - accuracy:
1.0000 - val_loss: 0.7339 - val_accuracy: 0.7500
Epoch 287/300
2/2 [==============================] - 1s 224ms/step - loss: 0.0923 - accuracy:
0.9750 - val_loss: 0.7396 - val_accuracy: 0.7000
Epoch 288/300
2/2 [==============================] - 1s 535ms/step - loss: 0.0389 - accuracy:
1.0000 - val_loss: 0.7697 - val_accuracy: 0.7000
Epoch 289/300
2/2 [==============================] - 1s 242ms/step - loss: 0.0674 - accuracy:
0.9750 - val_loss: 0.8630 - val_accuracy: 0.7000
Epoch 290/300
2/2 [==============================] - 1s 231ms/step - loss: 0.1033 - accuracy:
0.9750 - val_loss: 0.7608 - val_accuracy: 0.6500
Epoch 291/300
2/2 [==============================] - 1s 268ms/step - loss: 0.0335 - accuracy:
1.0000 - val_loss: 0.7596 - val_accuracy: 0.6500
Epoch 292/300
2/2 [==============================] - 1s 582ms/step - loss: 0.0586 - accuracy:
1.0000 - val_loss: 0.8199 - val_accuracy: 0.7500
Epoch 293/300
2/2 [==============================] - 1s 583ms/step - loss: 0.0595 - accuracy:
1.0000 - val_loss: 0.8367 - val_accuracy: 0.7000
Epoch 294/300
2/2 [==============================] - 1s 597ms/step - loss: 0.0626 - accuracy:
0.9750 - val_loss: 0.8762 - val_accuracy: 0.7000
```

```
Epoch 295/300
2/2 [==============================] - 1s 296ms/step - loss: 0.0522 - accuracy:
1.0000 - val_loss: 0.8198 - val_accuracy: 0.7500
Epoch 296/300
2/2 [==============================] - 1s 629ms/step - loss: 0.0571 - accuracy:
1.0000 - val_loss: 0.7677 - val_accuracy: 0.6500
Epoch 297/300
2/2 [==============================] - 1s 599ms/step - loss: 0.0724 - accuracy:
0.9750 - val_loss: 0.7779 - val_accuracy: 0.6500
Epoch 298/300
2/2 [==============================] - 1s 594ms/step - loss: 0.0656 - accuracy:
1.0000 - val_loss: 0.7549 - val_accuracy: 0.6000
Epoch 299/300
2/2 [==============================] - 1s 496ms/step - loss: 0.1197 - accuracy:
0.9750 - val_loss: 0.7497 - val_accuracy: 0.6000
Epoch 300/300
2/2 [==============================] - 1s 230ms/step - loss: 0.0417 - accuracy:
1.0000 - val_loss: 0.7601 - val_accuracy: 0.7500
```

[28]:
```
#Plotting accuracy graph
plt.figure(figsize=(10,8))
plt.plot(result2.history['accuracy'])
plt.plot(result2.history['val_accuracy'])
plt.show()
```



[29]:
```
#Plotting loss graph
plt.figure(figsize=(10,8))
plt.plot(result2.history['loss'])
plt.plot(result2.history['val_loss'])
plt.show()
```



[36]:
```
model.evaluate(test_set)
```

```
1/1 [==============================] - 0s 153ms/step - loss: 0.7601 - accuracy:
0.7500
```

[36]: [0.7601005434989929, 0.75]