First Task: Segmentaion (Regression Task)

Heart Sound Segmentation

- The first challenge is to produce a method that can locate S1 (LUB) and S2 (DUB) sounds within audio data, segmenting the Normal audio files.

In [68]:

```
from google.colab import drive
import matplotlib.pyplot as plt
import pandas as pd
import  random
import numpy as np
import os
import glob
import wave
import struct
from scipy.io import wavfile
import librosa
import librosa.display
from sklearn.model_selection import train_test_split
import keras
from sklearn.metrics import mean_squared_error
from sklearn.metrics import mean_absolute_error
from keras.callbacks import ModelCheckpoint
from keras.models import load_model
from keras.models import Sequential
from keras.layers import Dense, Dropout, Activation, Flatten,LSTM, Bidirectional
from keras.layers import Convolution2D, Conv2D, Conv1D, MaxPooling2D, MaxPool1D , GlobalAveragePooling2D, MaxPool
ing1D, GlobalAveragePooling1D, InputLayer
```

In [2]:

```
drive.mount('/gdrive', force_remount = True)
!ln -s "/gdrive/MyDrive/HeartBeats/set_a" "/content/set_a"
!ln -s "/gdrive/MyDrive/HeartBeats/set_a_timing.csv" "/content/set_a_timing.csv"
!ln -s "/gdrive/MyDrive/HeartBeats/set_a.csv" "/content/set_a.csv"
seta_a_timing_path = "/content/set_a_timing.csv"
seta_path = "/content/set_a"
```

```
Mounted at /gdrive
```

Reading "set_a_timing.csv" into a dataframe

In [3]:

```
df = pd.read_csv(seta_a_timing_path)
df
```

Out[3]:

	fname	cycle	sound	location
0	set_a/normal__201102081321.wav	1	S1	10021
1	set_a/normal__201102081321.wav	1	S2	20759
2	set_a/normal__201102081321.wav	2	S1	35075
3	set_a/normal__201102081321.wav	2	S2	47244
4	set_a/normal__201102081321.wav	3	S1	62992
...	...	...	...	...
385	set_a/normal__201108011118.wav	10	S2	284673
386	set_a/normal__201108011118.wav	11	S1	300863
387	set_a/normal__201108011118.wav	11	S2	314279
388	set_a/normal__201108011118.wav	12	S1	330980
389	set_a/normal__201108011118.wav	12	S2	343126

390 rows × 4 columns

Creating a df for the cut of each cycle

In [236]:

```
timing = pd.DataFrame(columns=['fname', 'cycle','start_loc', 'end_loc','S1','S2'])
index = 0
timing
```

Out[236]:

fname	cycle	start_loc	end_loc	S1	S2

Cutting each cycle such as it contains its LUB and DUB:

1. It will start at a random value between its LUB and the previous DUB
2. It will end at a random value between its DUB and the next LUB
3. This is to prevent feeding the model the location of the LUB and DUB ready for extraction.

In [237]:

```
end_prev = 0
for i in range(len(df)):
  cycle = df.iloc[i]['cycle']
  fname = df.iloc[i]['fname']

  if df.iloc[i]['sound'] == 'S1':
    location_S1 = df.iloc[i]['location']
    # this condition is if we are not reading the first instance in set_a_timing, so we get the previous DUB
    if i != 0 :
      # if it is not the same as the previous file, we reset the end_prev
      if fname != df.iloc[i-1]['fname']:
          end_prev = 0
      else:
        end_prev = df.iloc[i-1]['location']

    # cut the first cycle at a random number between the previous DUB and the current LUB
    if location_S1 < end_prev:
        start_cycle = random.randint(location_S1, end_prev)
    else:
        start_cycle = random.randint(end_prev, location_S1)
    # add the start of the cut and the location of S1 in the df for later use
    timing.loc[index, ['fname','cycle','start_loc','S1']] = [fname, cycle, start_cycle, location_S1]

  # end with cutting after S2
  if df.iloc[i]['sound']  == 'S2':
    location_S2 = df.iloc[i]['location']
    # this condition is if we are not reading the last instance in set_a_timing, so we get the next LUB
    if i != len(df) - 1:
        start_next = df.iloc[i+1]['location']
         # if it is not the same as the next file, we set the next LUB with a random value between the current DU
B and the maximum value
        if fname != df.iloc[i+1]['fname']:
            start_next =  random.randint(location_S2, 396900)
    else:
        # if it is the last instance, we set the next LUB with a random value between the current DUB and the max
imum value
        start_next =  random.randint(location_S2, 396900)


    # getting the value of the end of the cut which is a random value between the current DUB and the next LUB
    if location_S2 < start_next:
        end_prev = random.randint(location_S2, start_next)
    else:
        end_prev = random.randint(start_next, location_S2)

    # add the end of the cut and the location of S2 for future use
    timing.loc[index, ['end_loc','S2']] = [end_prev,location_S2]
    index = index + 1
```

In [238]:

```
timing
```

Out[238]:

	fname	cycle	start_loc	end_loc	S1	S2
0	set_a/normal__201102081321.wav	1	380	30427	10021	20759
1	set_a/normal__201102081321.wav	2	34640	49088	35075	47244
2	set_a/normal__201102081321.wav	3	58937	76921	62992	73729
3	set_a/normal__201102081321.wav	4	74934	105258	88761	101646
4	set_a/normal__201102081321.wav	5	112243	142695	115246	127415
...	...	...	...	...	...	...
190	set_a/normal__201108011118.wav	8	199619	238946	213315	226220
191	set_a/normal__201108011118.wav	9	227631	260819	241403	255826
192	set_a/normal__201108011118.wav	10	260360	292639	272527	284673
193	set_a/normal__201108011118.wav	11	288205	315809	300863	314279
194	set_a/normal__201108011118.wav	12	316728	355536	330980	343126

195 rows × 6 columns

NOTE

> We tried running the above code that creates the splits randomly multiple times to increase the size of the data as a type of data augmentation due to the randomness, but it didn't affect the MSE at all, so we figured that the 195 splits were enough for the regression task.

Splitting the audio files with the cut locations for each cyle that we obtained earlier:

In [239]:

```
# we will save the names of the new audio files in this array
cycle_files = []

for i in range(len(timing)):
    rate, data = wavfile.read(timing['fname'][i])
    # times between which to extract the wave from
    start = timing['start_loc'][i]/rate # seconds
    end = timing['end_loc'][i]/rate # seconds
    # file to extract the snippet from
    with wave.open(timing['fname'][i], "rb") as infile:
        # get file data
        nchannels = infile.getnchannels()
        sampwidth = infile.getsampwidth()
        framerate = infile.getframerate()
        # set position in wave to start of segment
        infile.setpos(timing['start_loc'][i])
        # extract data
        data = infile.readframes(timing['end_loc'][i] - timing['start_loc'][i])
    # write the extracted data to a new file
    new_file = 'file' + str(i) + '.wav'
    with wave.open(new_file, 'w') as outfile:
        outfile.setnchannels(nchannels)
        outfile.setsampwidth(sampwidth)
        outfile.setframerate(framerate)
        outfile.setnframes(int(len(data) / sampwidth))
        outfile.writeframes(data)

    cycle_files.append(new_file)

print(cycle_files)
```

```
['file0.wav', 'file1.wav', 'file2.wav', 'file3.wav', 'file4.wav', 'file5.wav', 'file6.wav', 'file7.w
av', 'file8.wav', 'file9.wav', 'file10.wav', 'file11.wav', 'file12.wav', 'file13.wav', 'file14.wav',
'file15.wav', 'file16.wav', 'file17.wav', 'file18.wav', 'file19.wav', 'file20.wav', 'file21.wav', 'f
ile22.wav', 'file23.wav', 'file24.wav', 'file25.wav', 'file26.wav', 'file27.wav', 'file28.wav', 'fil
e29.wav', 'file30.wav', 'file31.wav', 'file32.wav', 'file33.wav', 'file34.wav', 'file35.wav', 'file3
6.wav', 'file37.wav', 'file38.wav', 'file39.wav', 'file40.wav', 'file41.wav', 'file42.wav', 'file43.
wav', 'file44.wav', 'file45.wav', 'file46.wav', 'file47.wav', 'file48.wav', 'file49.wav', 'file50.wa
v', 'file51.wav', 'file52.wav', 'file53.wav', 'file54.wav', 'file55.wav', 'file56.wav', 'file57.wav'
, 'file58.wav', 'file59.wav', 'file60.wav', 'file61.wav', 'file62.wav', 'file63.wav', 'file64.wav',
'file65.wav', 'file66.wav', 'file67.wav', 'file68.wav', 'file69.wav', 'file70.wav', 'file71.wav', 'f
ile72.wav', 'file73.wav', 'file74.wav', 'file75.wav', 'file76.wav', 'file77.wav', 'file78.wav', 'fil
e79.wav', 'file80.wav', 'file81.wav', 'file82.wav', 'file83.wav', 'file84.wav', 'file85.wav', 'file8
6.wav', 'file87.wav', 'file88.wav', 'file89.wav', 'file90.wav', 'file91.wav', 'file92.wav', 'file93.
wav', 'file94.wav', 'file95.wav', 'file96.wav', 'file97.wav', 'file98.wav', 'file99.wav', 'file100.w
av', 'file101.wav', 'file102.wav', 'file103.wav', 'file104.wav', 'file105.wav', 'file106.wav', 'file
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av', 'file181.wav', 'file182.wav', 'file183.wav', 'file184.wav', 'file185.wav', 'file186.wav', 'file
187.wav', 'file188.wav', 'file189.wav', 'file190.wav', 'file191.wav', 'file192.wav', 'file193.wav',
'file194.wav']
```

Helper Functions:

Get the maximum length of the MFCC extraction to pad with later:

In [240]:

```
MAX_LEN_MFCC = []

for file in cycle_files:
    audio,sample_rate = librosa.load(file, res_type='kaiser_fast')
    mfccs = librosa.feature.mfcc(y=audio, sr=sample_rate, n_mfcc=40)
    MAX_LEN_MFCC.append(mfccs.shape[1])

print(max(MAX_LEN_MFCC))
```

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Extracting the features using MFCC:

(like we did in the classification part)

In [241]:

```
from tqdm import tqdm
def extract_features(data):
  X = []
  for i in tqdm(range(len(data))):
    filename = data[i]
    try:
      y, sr = librosa.load(filename, res_type='kaiser_fast')
      mfccs = librosa.feature.mfcc(y=y, sr=sr, n_mfcc=40)
      pad_width = max(MAX_LEN_MFCC) - mfccs.shape[1]
      mfccs = np.pad(mfccs, pad_width=((0, 0), (0, pad_width)), mode='constant')
      X.append(mfccs)
    except Exception as e:
        print("Error encountered while parsing file: ", filename)
        return None

  return X
```

Compiling and fitting: (we are using MSE as our evaluation metric)

In [200]:

```
def compile_fit(model, lossfn ='mean_squared_error', LR = 0.001, epoch_no=150):
    adam = keras.optimizers.Adam(learning_rate=LR)
    model.compile(optimizer='adam', loss=lossfn)
    filepath="/content/weights.best.hdf5"
    checkpoint = ModelCheckpoint(filepath, monitor='val_loss', verbose=1, save_best_only=True, mode='min')
    history = model.fit(x_train, y_train,
          batch_size=50,
          epochs=epoch_no,
          verbose=1,
          validation_data=(x_val, y_val),
          shuffle=True,
          callbacks = [checkpoint])
    adam = keras.optimizers.Adam(learning_rate=LR)
    model.load_weights("/content/weights.best.hdf5")
    model.compile(loss=lossfn, optimizer='adam')
    print("Created model and loaded weights from file")
    return history, model
```

Getting the MSE of the training and validation data:

In [11]:

```
def train_val_evaluation(model,results,index):
  train_mse = model.evaluate(x_train, y_train, verbose=0)
  print('Train MSE:', train_mse)
  val_mse = model.evaluate(x_val, y_val, verbose=0)
  print('Validation MSE:', val_mse)
  results.loc[index,['Train MSE','Validation MSE']] = [train_mse, val_mse]
```

Evaluating the model using testing data:

In [12]:

```
def test_evaluation(model, y_pred,results,index):
  score = model.evaluate(x_test, y_test, verbose=0)
  print('Test MSE:', score)
  rms = mean_squared_error(y_test, y_pred, squared=False)
  print('Test RMSE:', rms)
  MAE = mean_absolute_error(y_test, y_pred)
  print('Test MAE:', MAE)
  results.loc[index,['Test MSE', 'Test RMSE', 'Test MAE']] = [score, rms,MAE]
```

Plotting the predicted values of LUB and DUB locations VS the original:

In [105]:

```
def plot_LUB_DUB(y_test, y_pred):
  x_ax = range(len(y_pred))
  fig = plt.figure()
  plt.subplot(2, 1, 1)
  plt.scatter(x_ax, y_test[:,0], s=5, color="blue", label="original")
  plt.plot(x_ax, y_pred[:,0], lw=0.8, color="red", label="predicted")
  plt.legend()
  plt.title('LUB')
  plt.ylim(-1, 1)
  plt.subplot(2, 1, 2)
  plt.scatter(x_ax, y_test[:,1], s=5, color="blue", label="original")
  plt.plot(x_ax, y_pred[:,1], lw=0.8, color="red", label="predicted")
  plt.legend()
  plt.title('DUB')
  plt.ylim(0, 2)
  plt.show()
```

Feature extraction on the cutted locations we got:

In [242]:

```
features = extract_features(cycle_files)
```

```
100%|██████████| 195/195 [00:04<00:00, 44.10it/s]
```

Creating the labels for our cut audio files], which contain the location of the LUB and DUB for each cycle (each cutted file):

Normalising the locations (MIN - MAX Normalisation):

In [243]:

```
y = []
for i in range(len(timing)):
    S1 = timing['S1'][i]
    S2 = timing['S2'][i]
    cut_start = timing['start_loc'][i]
    cut_end = timing['end_loc'][i]
    diff = cut_end - cut_start
    LUB = (S1 - cut_start ) / diff
    DUB = (S2 - cut_start) / diff
    y_i = [LUB, DUB]
    y.append(y_i)

print(y)
```

[[0.3208639797650348, 0.6782374280294206], [0.03010797342192691, 0.8723698781838317], [0.22547820284
69751, 0.822508896797153], [0.45597546497823505, 0.8808864265927978], [0.09861421253119663, 0.498226
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In [221]:

```
print(len(y))
```

```
195
```

Splitting the data and labels with ratio 70:15:15 into train, test, and validation splits respectively:

In [244]:

```
# splitting to get test partition
x_train_1, x_test, y_train_1, y_test = train_test_split(features, y, test_size=0.15, random_state=42)
# splitting to get validation and training partition (0.15/0.85)
x_train, x_val, y_train, y_val = train_test_split(x_train_1, y_train_1, test_size=0.17647059 , random_state=42)
```

In [245]:

```
print(f"Training Data Size:  {len(x_train)}")
print(f"Validation Data Size:  {len(x_val)}")
print(f"Testing Data Size:  {len(x_test)}")
```

```
Training Data Size:  135
Validation Data Size:  30
Testing Data Size:  30
```

In [246]:

```
x_train = np.array(x_train)
x_test = np.array(x_test)
x_val = np.array(x_val)
y_train = np.array(y_train)
y_test = np.array(y_test)
y_val = np.array(y_val)
print("X train:", x_train.shape)
print("X test:", x_test.shape)
print("X validation:", x_val.shape)
print("Y train:", y_train.shape)
print("Y test:", y_test.shape)
print("Y validation:", y_val.shape)
```

```
X train: (135, 40, 137)
X test: (30, 40, 137)
X validation: (30, 40, 137)
Y train: (135, 2)
Y test: (30, 2)
Y validation: (30, 2)
```

In [247]:

```
x_train = x_train.reshape(x_train.shape[0], x_train.shape[1], x_train.shape[2], 1)
x_val = x_val.reshape(x_val.shape[0], x_val.shape[1], x_val.shape[2], 1)
# set aside for testing
x_test = x_test.reshape(x_test.shape[0], x_test.shape[1], x_test.shape[2], 1)
```

In [248]:

```
print("X train:", x_train.shape)
print("Y train:", y_train.shape)
print("X val:", x_val.shape)
print("Y val:", y_val.shape)
# set aside for testing
print("X test:", x_test.shape)
print("Y test:", y_test.shape)
```

```
X train: (135, 40, 137, 1)
Y train: (135, 2)
X val: (30, 40, 137, 1)
Y val: (30, 2)
X test: (30, 40, 137, 1)
Y test: (30, 2)
```

In [249]:

```
results = pd.DataFrame(columns=['Architecture', 'LR','Dropout and pooling', 'kernel size','Loss Fn', 'Train MSE',
'Validation MSE', 'Test MSE', 'Test RMSE', 'Test MAE'])
index = 0
results
```

Out[249]:

Architecture	LR	Dropout and pooling	kernel size	Loss Fn	Train MSE	Validation MSE	Test MSE	Test RMSE	Test MAE

NOTES

- In regression you are estimating the parameters. So, you can't say an estimated value completely wrong or completely right, but you can only say how far or near it is to the original value. You won't have absolute class labels to compare it with output. So, Loss (error) is the only measure to analyze the performance of regression.
- For regression it is best practice to use the Mean Squared Error as loss function.

CNN Experiment 1:

In [250]:

```
model = Sequential()
model.add(Conv2D(16,(1, 1), padding = 'same', input_shape=(x_train.shape[1],x_train.shape[2],x_train.shape[3]), a
ctivation='relu'))
model.add(Conv2D(32, (1, 1), padding = 'same',activation='relu'))
model.add(Conv2D(64, (1, 1),padding = 'same', activation='relu'))
model.add(MaxPooling2D())
model.add(Conv2D(128, (1, 1),padding = 'same', activation='relu'))
model.add(GlobalAveragePooling2D())
model.add(Dense(2, activation='linear'))
model.summary()
```

```
Model: "sequential_26"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d_68 (Conv2D)          (None, 40, 137, 16)       32

 conv2d_69 (Conv2D)          (None, 40, 137, 32)       544

 conv2d_70 (Conv2D)          (None, 40, 137, 64)       2112

 max_pooling2d_21 (MaxPoolin  (None, 20, 68, 64)       0
 g2D)

 conv2d_71 (Conv2D)          (None, 20, 68, 128)       8320

 global_average_pooling2d_24  (None, 128)              0
  (GlobalAveragePooling2D)

 dense_51 (Dense)            (None, 2)                 258

=================================================================
Total params: 11,266
Trainable params: 11,266
Non-trainable params: 0
_________________________________________________________________
```

In [251]:

```
history, model = compile_fit(model, epoch_no=200, LR=0.0001)
```

```
Epoch 1/200
3/3 [==============================] - ETA: 0s - loss: 0.7298
Epoch 1: val_loss improved from inf to 0.23349, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 440ms/step - loss: 0.7298 - val_loss: 0.2335
Epoch 2/200
3/3 [==============================] - ETA: 0s - loss: 0.1606
Epoch 2: val_loss improved from 0.23349 to 0.07599, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 394ms/step - loss: 0.1606 - val_loss: 0.0760
Epoch 3/200
3/3 [==============================] - ETA: 0s - loss: 0.1152
Epoch 3: val_loss did not improve from 0.07599
3/3 [==============================] - 1s 391ms/step - loss: 0.1152 - val_loss: 0.1498
Epoch 4/200
3/3 [==============================] - ETA: 0s - loss: 0.1865
Epoch 4: val_loss did not improve from 0.07599
3/3 [==============================] - 1s 378ms/step - loss: 0.1865 - val_loss: 0.1345
```

```
Epoch 5/200
3/3 [==============================] - ETA: 0s - loss: 0.1464
Epoch 5: val_loss did not improve from 0.07599
3/3 [==============================] - 1s 384ms/step - loss: 0.1464 - val_loss: 0.0824
Epoch 6/200
3/3 [==============================] - ETA: 0s - loss: 0.0884
Epoch 6: val_loss improved from 0.07599 to 0.06923, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 389ms/step - loss: 0.0884 - val_loss: 0.0692
Epoch 7/200
3/3 [==============================] - ETA: 0s - loss: 0.0773
Epoch 7: val_loss did not improve from 0.06923
3/3 [==============================] - 1s 375ms/step - loss: 0.0773 - val_loss: 0.0821
Epoch 8/200
3/3 [==============================] - ETA: 0s - loss: 0.0922
Epoch 8: val_loss did not improve from 0.06923
3/3 [==============================] - 1s 382ms/step - loss: 0.0922 - val_loss: 0.0928
Epoch 9/200
3/3 [==============================] - ETA: 0s - loss: 0.0978
Epoch 9: val_loss did not improve from 0.06923
3/3 [==============================] - 1s 373ms/step - loss: 0.0978 - val_loss: 0.0855
Epoch 10/200
3/3 [==============================] - ETA: 0s - loss: 0.0876
Epoch 10: val_loss did not improve from 0.06923
3/3 [==============================] - 1s 394ms/step - loss: 0.0876 - val_loss: 0.0705
Epoch 11/200
3/3 [==============================] - ETA: 0s - loss: 0.0753
Epoch 11: val_loss improved from 0.06923 to 0.06264, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 401ms/step - loss: 0.0753 - val_loss: 0.0626
Epoch 12/200
3/3 [==============================] - ETA: 0s - loss: 0.0707
Epoch 12: val_loss improved from 0.06264 to 0.06044, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 398ms/step - loss: 0.0707 - val_loss: 0.0604
Epoch 13/200
3/3 [==============================] - ETA: 0s - loss: 0.0722
Epoch 13: val_loss improved from 0.06044 to 0.06023, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 403ms/step - loss: 0.0722 - val_loss: 0.0602
Epoch 14/200
3/3 [==============================] - ETA: 0s - loss: 0.0713
Epoch 14: val_loss improved from 0.06023 to 0.05732, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 396ms/step - loss: 0.0713 - val_loss: 0.0573
Epoch 15/200
3/3 [==============================] - ETA: 0s - loss: 0.0663
Epoch 15: val_loss improved from 0.05732 to 0.05497, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 401ms/step - loss: 0.0663 - val_loss: 0.0550
Epoch 16/200
3/3 [==============================] - ETA: 0s - loss: 0.0625
Epoch 16: val_loss improved from 0.05497 to 0.05452, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 388ms/step - loss: 0.0625 - val_loss: 0.0545
Epoch 17/200
3/3 [==============================] - ETA: 0s - loss: 0.0610
Epoch 17: val_loss improved from 0.05452 to 0.05320, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 391ms/step - loss: 0.0610 - val_loss: 0.0532
Epoch 18/200
3/3 [==============================] - ETA: 0s - loss: 0.0587
Epoch 18: val_loss improved from 0.05320 to 0.05053, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 410ms/step - loss: 0.0587 - val_loss: 0.0505
Epoch 19/200
3/3 [==============================] - ETA: 0s - loss: 0.0554
Epoch 19: val_loss improved from 0.05053 to 0.04694, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 402ms/step - loss: 0.0554 - val_loss: 0.0469
Epoch 20/200
3/3 [==============================] - ETA: 0s - loss: 0.0525
Epoch 20: val_loss improved from 0.04694 to 0.04458, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 408ms/step - loss: 0.0525 - val_loss: 0.0446
Epoch 21/200
3/3 [==============================] - ETA: 0s - loss: 0.0496
Epoch 21: val_loss improved from 0.04458 to 0.04180, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 400ms/step - loss: 0.0496 - val_loss: 0.0418
Epoch 22/200
3/3 [==============================] - ETA: 0s - loss: 0.0466
Epoch 22: val_loss improved from 0.04180 to 0.03940, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 410ms/step - loss: 0.0466 - val_loss: 0.0394
Epoch 23/200
3/3 [==============================] - ETA: 0s - loss: 0.0438
Epoch 23: val_loss improved from 0.03940 to 0.03685, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 396ms/step - loss: 0.0438 - val_loss: 0.0368
Epoch 24/200
3/3 [==============================] - ETA: 0s - loss: 0.0406
Epoch 24: val_loss improved from 0.03685 to 0.03460, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 391ms/step - loss: 0.0406 - val_loss: 0.0346
Epoch 25/200
3/3 [==============================] - ETA: 0s - loss: 0.0378
Epoch 25: val_loss improved from 0.03460 to 0.03226, saving model to /content/weights.best.hdf5
```

```
3/3 [==============================] - 1s 390ms/step - loss: 0.0378 - val_loss: 0.0323
Epoch 26/200
3/3 [==============================] - ETA: 0s - loss: 0.0350
Epoch 26: val_loss improved from 0.03226 to 0.02989, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 400ms/step - loss: 0.0350 - val_loss: 0.0299
Epoch 27/200
3/3 [==============================] - ETA: 0s - loss: 0.0323
Epoch 27: val_loss improved from 0.02989 to 0.02827, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 398ms/step - loss: 0.0323 - val_loss: 0.0283
Epoch 28/200
3/3 [==============================] - ETA: 0s - loss: 0.0301
Epoch 28: val_loss improved from 0.02827 to 0.02626, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 398ms/step - loss: 0.0301 - val_loss: 0.0263
Epoch 29/200
3/3 [==============================] - ETA: 0s - loss: 0.0282
Epoch 29: val_loss improved from 0.02626 to 0.02430, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 394ms/step - loss: 0.0282 - val_loss: 0.0243
Epoch 30/200
3/3 [==============================] - ETA: 0s - loss: 0.0262
Epoch 30: val_loss improved from 0.02430 to 0.02328, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 405ms/step - loss: 0.0262 - val_loss: 0.0233
Epoch 31/200
3/3 [==============================] - ETA: 0s - loss: 0.0246
Epoch 31: val_loss improved from 0.02328 to 0.02213, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 400ms/step - loss: 0.0246 - val_loss: 0.0221
Epoch 32/200
3/3 [==============================] - ETA: 0s - loss: 0.0235
Epoch 32: val_loss improved from 0.02213 to 0.02076, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 411ms/step - loss: 0.0235 - val_loss: 0.0208
Epoch 33/200
3/3 [==============================] - ETA: 0s - loss: 0.0226
Epoch 33: val_loss improved from 0.02076 to 0.02029, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 392ms/step - loss: 0.0226 - val_loss: 0.0203
Epoch 34/200
3/3 [==============================] - ETA: 0s - loss: 0.0219
Epoch 34: val_loss improved from 0.02029 to 0.01983, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 389ms/step - loss: 0.0219 - val_loss: 0.0198
Epoch 35/200
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 35: val_loss improved from 0.01983 to 0.01929, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 395ms/step - loss: 0.0215 - val_loss: 0.0193
Epoch 36/200
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 36: val_loss improved from 0.01929 to 0.01892, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 406ms/step - loss: 0.0213 - val_loss: 0.0189
Epoch 37/200
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 37: val_loss did not improve from 0.01892
3/3 [==============================] - 1s 377ms/step - loss: 0.0211 - val_loss: 0.0191
Epoch 38/200
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 38: val_loss did not improve from 0.01892
3/3 [==============================] - 1s 383ms/step - loss: 0.0212 - val_loss: 0.0191
Epoch 39/200
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 39: val_loss improved from 0.01892 to 0.01834, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 397ms/step - loss: 0.0212 - val_loss: 0.0183
Epoch 40/200
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 40: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 375ms/step - loss: 0.0212 - val_loss: 0.0189
Epoch 41/200
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 41: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 367ms/step - loss: 0.0209 - val_loss: 0.0188
Epoch 42/200
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 42: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 384ms/step - loss: 0.0208 - val_loss: 0.0186
Epoch 43/200
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 43: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 383ms/step - loss: 0.0208 - val_loss: 0.0186
Epoch 44/200
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 44: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 375ms/step - loss: 0.0207 - val_loss: 0.0187
Epoch 45/200
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 45: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 379ms/step - loss: 0.0209 - val_loss: 0.0188
Epoch 46/200
3/3 [==============================] - ETA: 0s - loss: 0.0207
```

```
Epoch 46: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 382ms/step - loss: 0.0207 - val_loss: 0.0186
Epoch 47/200
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 47: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 383ms/step - loss: 0.0211 - val_loss: 0.0185
Epoch 48/200
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 48: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 373ms/step - loss: 0.0206 - val_loss: 0.0193
Epoch 49/200
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 49: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 386ms/step - loss: 0.0213 - val_loss: 0.0195
Epoch 50/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 50: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 388ms/step - loss: 0.0205 - val_loss: 0.0187
Epoch 51/200
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 51: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 386ms/step - loss: 0.0212 - val_loss: 0.0186
Epoch 52/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 52: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0205 - val_loss: 0.0198
Epoch 53/200
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 53: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 392ms/step - loss: 0.0210 - val_loss: 0.0203
Epoch 54/200
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 54: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0213 - val_loss: 0.0191
Epoch 55/200
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 55: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 379ms/step - loss: 0.0206 - val_loss: 0.0194
Epoch 56/200
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 56: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 395ms/step - loss: 0.0208 - val_loss: 0.0195
Epoch 57/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 57: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 393ms/step - loss: 0.0205 - val_loss: 0.0188
Epoch 58/200
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 58: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 388ms/step - loss: 0.0206 - val_loss: 0.0191
Epoch 59/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 59: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0205 - val_loss: 0.0201
Epoch 60/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 60: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 394ms/step - loss: 0.0205 - val_loss: 0.0193
Epoch 61/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 61: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0203 - val_loss: 0.0188
Epoch 62/200
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 62: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 396ms/step - loss: 0.0207 - val_loss: 0.0189
Epoch 63/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 63: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 384ms/step - loss: 0.0205 - val_loss: 0.0202
Epoch 64/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 64: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0205 - val_loss: 0.0195
Epoch 65/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 65: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 401ms/step - loss: 0.0203 - val_loss: 0.0192
Epoch 66/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 66: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 389ms/step - loss: 0.0202 - val_loss: 0.0195
Epoch 67/200
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3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 67: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 382ms/step - loss: 0.0202 - val_loss: 0.0197
Epoch 68/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 68: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 403ms/step - loss: 0.0201 - val_loss: 0.0201
Epoch 69/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 69: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 408ms/step - loss: 0.0203 - val_loss: 0.0198
Epoch 70/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 70: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 413ms/step - loss: 0.0201 - val_loss: 0.0201
Epoch 71/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 71: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 387ms/step - loss: 0.0201 - val_loss: 0.0201
Epoch 72/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 72: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 405ms/step - loss: 0.0200 - val_loss: 0.0198
Epoch 73/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 73: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 389ms/step - loss: 0.0202 - val_loss: 0.0198
Epoch 74/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 74: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0201 - val_loss: 0.0195
Epoch 75/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 75: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 391ms/step - loss: 0.0203 - val_loss: 0.0202
Epoch 76/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 76: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 388ms/step - loss: 0.0201 - val_loss: 0.0195
Epoch 77/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 77: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 388ms/step - loss: 0.0203 - val_loss: 0.0200
Epoch 78/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 78: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 394ms/step - loss: 0.0200 - val_loss: 0.0199
Epoch 79/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 79: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 383ms/step - loss: 0.0201 - val_loss: 0.0199
Epoch 80/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 80: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 384ms/step - loss: 0.0201 - val_loss: 0.0199
Epoch 81/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 81: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0203 - val_loss: 0.0205
Epoch 82/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 82: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0201 - val_loss: 0.0202
Epoch 83/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 83: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0203 - val_loss: 0.0198
Epoch 84/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 84: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0201 - val_loss: 0.0205
Epoch 85/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 85: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 387ms/step - loss: 0.0201 - val_loss: 0.0202
Epoch 86/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 86: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 384ms/step - loss: 0.0201 - val_loss: 0.0203
Epoch 87/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 87: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 393ms/step - loss: 0.0200 - val_loss: 0.0207
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Epoch 88/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 88: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 396ms/step - loss: 0.0199 - val_loss: 0.0197
Epoch 89/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 89: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 399ms/step - loss: 0.0203 - val_loss: 0.0197
Epoch 90/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 90: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 399ms/step - loss: 0.0201 - val_loss: 0.0203
Epoch 91/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 91: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0200 - val_loss: 0.0205
Epoch 92/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 92: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0200 - val_loss: 0.0203
Epoch 93/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 93: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0199 - val_loss: 0.0198
Epoch 94/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 94: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 391ms/step - loss: 0.0200 - val_loss: 0.0202
Epoch 95/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 95: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 388ms/step - loss: 0.0200 - val_loss: 0.0201
Epoch 96/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 96: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 384ms/step - loss: 0.0203 - val_loss: 0.0208
Epoch 97/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 97: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0201 - val_loss: 0.0199
Epoch 98/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 98: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 391ms/step - loss: 0.0201 - val_loss: 0.0202
Epoch 99/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 99: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 397ms/step - loss: 0.0200 - val_loss: 0.0207
Epoch 100/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 100: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 390ms/step - loss: 0.0199 - val_loss: 0.0206
Epoch 101/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 101: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0201 - val_loss: 0.0206
Epoch 102/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 102: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 374ms/step - loss: 0.0201 - val_loss: 0.0209
Epoch 103/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 103: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 386ms/step - loss: 0.0200 - val_loss: 0.0200
Epoch 104/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 104: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0202 - val_loss: 0.0202
Epoch 105/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 105: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0201 - val_loss: 0.0212
Epoch 106/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 106: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 402ms/step - loss: 0.0199 - val_loss: 0.0203
Epoch 107/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 107: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 409ms/step - loss: 0.0202 - val_loss: 0.0199
Epoch 108/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 108: val_loss did not improve from 0.01834
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3/3 [==============================] - 1s 368ms/step - loss: 0.0199 - val_loss: 0.0208
Epoch 109/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 109: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0202 - val_loss: 0.0215
Epoch 110/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 110: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0200 - val_loss: 0.0204
Epoch 111/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 111: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 376ms/step - loss: 0.0201 - val_loss: 0.0202
Epoch 112/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 112: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 388ms/step - loss: 0.0201 - val_loss: 0.0207
Epoch 113/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 113: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 389ms/step - loss: 0.0199 - val_loss: 0.0210
Epoch 114/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 114: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 375ms/step - loss: 0.0201 - val_loss: 0.0214
Epoch 115/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 115: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 384ms/step - loss: 0.0201 - val_loss: 0.0201
Epoch 116/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 116: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 388ms/step - loss: 0.0199 - val_loss: 0.0205
Epoch 117/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 117: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 373ms/step - loss: 0.0200 - val_loss: 0.0201
Epoch 118/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 118: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 374ms/step - loss: 0.0199 - val_loss: 0.0204
Epoch 119/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 119: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0202 - val_loss: 0.0211
Epoch 120/200
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 120: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 391ms/step - loss: 0.0203 - val_loss: 0.0199
Epoch 121/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 121: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 380ms/step - loss: 0.0200 - val_loss: 0.0208
Epoch 122/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 122: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 374ms/step - loss: 0.0202 - val_loss: 0.0217
Epoch 123/200
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 123: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 394ms/step - loss: 0.0204 - val_loss: 0.0200
Epoch 124/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 124: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 387ms/step - loss: 0.0200 - val_loss: 0.0207
Epoch 125/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 125: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 375ms/step - loss: 0.0199 - val_loss: 0.0202
Epoch 126/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 126: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0198 - val_loss: 0.0202
Epoch 127/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 127: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0199 - val_loss: 0.0205
Epoch 128/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 128: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0199 - val_loss: 0.0210
Epoch 129/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
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Epoch 129: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0197 - val_loss: 0.0202
Epoch 130/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 130: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0199 - val_loss: 0.0201
Epoch 131/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 131: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0198 - val_loss: 0.0208
Epoch 132/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 132: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 394ms/step - loss: 0.0198 - val_loss: 0.0203
Epoch 133/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 133: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 383ms/step - loss: 0.0199 - val_loss: 0.0207
Epoch 134/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 134: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0201 - val_loss: 0.0205
Epoch 135/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 135: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 375ms/step - loss: 0.0199 - val_loss: 0.0207
Epoch 136/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 136: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0198 - val_loss: 0.0211
Epoch 137/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 137: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 395ms/step - loss: 0.0199 - val_loss: 0.0209
Epoch 138/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 138: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 382ms/step - loss: 0.0198 - val_loss: 0.0205
Epoch 139/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 139: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 391ms/step - loss: 0.0199 - val_loss: 0.0201
Epoch 140/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 140: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 391ms/step - loss: 0.0199 - val_loss: 0.0209
Epoch 141/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 141: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0199 - val_loss: 0.0205
Epoch 142/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 142: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 387ms/step - loss: 0.0200 - val_loss: 0.0199
Epoch 143/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 143: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 439ms/step - loss: 0.0199 - val_loss: 0.0211
Epoch 144/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 144: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 698ms/step - loss: 0.0202 - val_loss: 0.0208
Epoch 145/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 145: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 604ms/step - loss: 0.0198 - val_loss: 0.0202
Epoch 146/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 146: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 379ms/step - loss: 0.0200 - val_loss: 0.0204
Epoch 147/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 147: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0199 - val_loss: 0.0211
Epoch 148/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 148: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 395ms/step - loss: 0.0198 - val_loss: 0.0212
Epoch 149/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 149: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0201 - val_loss: 0.0205
Epoch 150/200
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3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 150: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 392ms/step - loss: 0.0199 - val_loss: 0.0207
Epoch 151/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 151: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 429ms/step - loss: 0.0198 - val_loss: 0.0201
Epoch 152/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 152: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 604ms/step - loss: 0.0198 - val_loss: 0.0210
Epoch 153/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 153: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0197 - val_loss: 0.0210
Epoch 154/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 154: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 389ms/step - loss: 0.0197 - val_loss: 0.0207
Epoch 155/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 155: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0197 - val_loss: 0.0206
Epoch 156/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 156: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 392ms/step - loss: 0.0198 - val_loss: 0.0205
Epoch 157/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 157: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 382ms/step - loss: 0.0198 - val_loss: 0.0206
Epoch 158/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 158: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 390ms/step - loss: 0.0197 - val_loss: 0.0204
Epoch 159/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 159: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 390ms/step - loss: 0.0197 - val_loss: 0.0210
Epoch 160/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 160: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 384ms/step - loss: 0.0197 - val_loss: 0.0209
Epoch 161/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 161: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 377ms/step - loss: 0.0197 - val_loss: 0.0208
Epoch 162/200
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 162: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 376ms/step - loss: 0.0196 - val_loss: 0.0210
Epoch 163/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 163: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0198 - val_loss: 0.0210
Epoch 164/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 164: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 390ms/step - loss: 0.0197 - val_loss: 0.0206
Epoch 165/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 165: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 393ms/step - loss: 0.0197 - val_loss: 0.0208
Epoch 166/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 166: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 383ms/step - loss: 0.0198 - val_loss: 0.0208
Epoch 167/200
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 167: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 387ms/step - loss: 0.0196 - val_loss: 0.0203
Epoch 168/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 168: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 376ms/step - loss: 0.0197 - val_loss: 0.0207
Epoch 169/200
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 169: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 392ms/step - loss: 0.0196 - val_loss: 0.0212
Epoch 170/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 170: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0197 - val_loss: 0.0207
```

```
Epoch 171/200
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 171: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 611ms/step - loss: 0.0196 - val_loss: 0.0207
Epoch 172/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 172: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 392ms/step - loss: 0.0197 - val_loss: 0.0207
Epoch 173/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 173: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 401ms/step - loss: 0.0197 - val_loss: 0.0205
Epoch 174/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 174: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 391ms/step - loss: 0.0198 - val_loss: 0.0210
Epoch 175/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 175: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 392ms/step - loss: 0.0197 - val_loss: 0.0205
Epoch 176/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 176: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0200 - val_loss: 0.0210
Epoch 177/200
3/3 [==============================] - ETA: 0s - loss: 0.0195
Epoch 177: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 385ms/step - loss: 0.0195 - val_loss: 0.0204
Epoch 178/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 178: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0199 - val_loss: 0.0206
Epoch 179/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 179: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 378ms/step - loss: 0.0201 - val_loss: 0.0220
Epoch 180/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 180: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 395ms/step - loss: 0.0197 - val_loss: 0.0202
Epoch 181/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 181: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 406ms/step - loss: 0.0200 - val_loss: 0.0206
Epoch 182/200
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 182: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 394ms/step - loss: 0.0196 - val_loss: 0.0208
Epoch 183/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 183: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 414ms/step - loss: 0.0197 - val_loss: 0.0210
Epoch 184/200
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 184: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 402ms/step - loss: 0.0200 - val_loss: 0.0209
Epoch 185/200
3/3 [==============================] - ETA: 0s - loss: 0.0195
Epoch 185: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 390ms/step - loss: 0.0195 - val_loss: 0.0200
Epoch 186/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 186: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 507ms/step - loss: 0.0199 - val_loss: 0.0206
Epoch 187/200
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 187: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 817ms/step - loss: 0.0201 - val_loss: 0.0214
Epoch 188/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 188: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 588ms/step - loss: 0.0197 - val_loss: 0.0202
Epoch 189/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 189: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 531ms/step - loss: 0.0198 - val_loss: 0.0204
Epoch 190/200
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 190: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 609ms/step - loss: 0.0199 - val_loss: 0.0215
Epoch 191/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 191: val_loss did not improve from 0.01834
```

```
3/3 [==============================] - 1s 382ms/step - loss: 0.0197 - val_loss: 0.0208
Epoch 192/200
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 192: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 394ms/step - loss: 0.0202 - val_loss: 0.0208
Epoch 193/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 193: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 381ms/step - loss: 0.0198 - val_loss: 0.0222
Epoch 194/200
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 194: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 405ms/step - loss: 0.0205 - val_loss: 0.0204
Epoch 195/200
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 195: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 395ms/step - loss: 0.0196 - val_loss: 0.0218
Epoch 196/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 196: val_loss did not improve from 0.01834
3/3 [==============================] - 1s 389ms/step - loss: 0.0198 - val_loss: 0.0208
Epoch 197/200
3/3 [==============================] - ETA: 0s - loss: 0.0197
Epoch 197: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 555ms/step - loss: 0.0197 - val_loss: 0.0204
Epoch 198/200
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 198: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 557ms/step - loss: 0.0196 - val_loss: 0.0214
Epoch 199/200
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 199: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 497ms/step - loss: 0.0198 - val_loss: 0.0207
Epoch 200/200
3/3 [==============================] - ETA: 0s - loss: 0.0195
Epoch 200: val_loss did not improve from 0.01834
3/3 [==============================] - 2s 487ms/step - loss: 0.0195 - val_loss: 0.0204
Created model and loaded weights from file
```

In [252]:

```
results.loc[index,['Architecture','Dropout and pooling','kernel size','Loss Fn', 'LR']] = ['CNN 2D','No Dropout L
ayers, 1 max-pooling layer', '1','Mean-Squared-Error',0.0001]
```

Train & Validation (MSE)

In [253]:

```
train_val_evaluation(model,results,index)
```

```
Train MSE: 0.02108066715300083
Validation MSE: 0.01834106259047985
```

Prediction

In [259]:

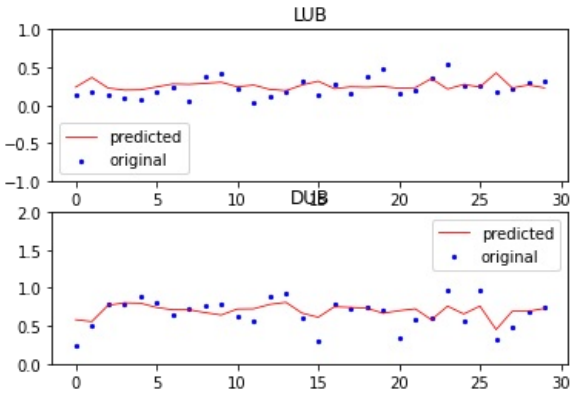
```
y_pred = model.predict(x_test)
print(y_pred)
```

```
1/1 [==============================] - 0s 60ms/step
[[0.24043328 0.57956964]
 [0.36715806 0.5554594 ]
 [0.22881249 0.7685761 ]
 [0.20147689 0.8025401 ]
 [0.20391342 0.7982108 ]
 [0.24343888 0.74127674]
 [0.28203288 0.711034  ]
 [0.2770047  0.71082526]
 [0.28977522 0.6735199 ]
 [0.30523026 0.6412763 ]
 [0.24447604 0.7208286 ]
 [0.2679377  0.72319394]
 [0.21072768 0.7811976 ]
 [0.19379094 0.8089655 ]
 [0.26857552 0.6664924 ]
 [0.3183451  0.6121762 ]
 [0.22101872 0.7505463 ]
 [0.24382125 0.7420179 ]
 [0.23870173 0.73090905]
 [0.24877693 0.6665857 ]
 [0.22581148 0.69809157]
 [0.23311587 0.72363514]
 [0.35257176 0.57872695]
 [0.21469532 0.7582124 ]
 [0.2759349  0.6554795 ]
 [0.24199612 0.7589164 ]
 [0.4278046  0.45006335]
 [0.2289663  0.691682  ]
 [0.2686008  0.69114643]
 [0.23045132 0.7291513 ]]
```

Plotting the predicted locations of LUB and DUB VS their original locations:

In [260]:

```
plot_LUB_DUB(y_test, y_pred)
```



Evaluation Metrics

Mean Squared Error (MSE), Root Mean Squared Error (RMSE), and Mean Absolute Error (MAE):

In [261]:

```
test_evaluation(model, y_pred,results,index)
```

```
Test MSE: 0.019292153418064117
Test RMSE: 0.13870513968964437
Test MAE: 0.10601457158735089
```

In [257]:

```
index = index + 1
results
```

Out[257]:

	Architecture	LR	Dropout and pooling	kernel size	Loss Fn	Train MSE	Validation MSE	Test MSE	Test RMSE	Test MAE
0	CNN 2D	0.0001	No Dropout Layers, 1 max-pooling layer	1	Mean-Squared-Error	0.021081	0.018341	0.019292	0.138705	0.106015

CNN Experiment 2:

Changing in Parameters and Architecture:

In [274]:

```
model = Sequential()
model.add(Conv2D(16,(2, 2), padding = 'same', input_shape=(x_train.shape[1],x_train.shape[2],x_train.shape[3]), a
ctivation='relu'))
model.add(MaxPooling2D())
model.add(Conv2D(32, (2, 2), padding = 'same',activation='relu'))
model.add(MaxPooling2D())
model.add(Conv2D(64, (2, 2),padding = 'same', activation='relu'))
model.add(MaxPooling2D())
model.add(Conv2D(128, (2, 2),padding = 'same', activation='relu'))
model.add(GlobalAveragePooling2D())
model.add(Dense(2, activation='linear', kernel_regularizer='l2'))
model.summary()
```

```
Model: "sequential_31"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d_88 (Conv2D)          (None, 40, 137, 16)       80

 max_pooling2d_34 (MaxPoolin  (None, 20, 68, 16)       0
 g2D)

 conv2d_89 (Conv2D)          (None, 20, 68, 32)        2080

 max_pooling2d_35 (MaxPoolin  (None, 10, 34, 32)       0
 g2D)

 conv2d_90 (Conv2D)          (None, 10, 34, 64)        8256

 max_pooling2d_36 (MaxPoolin  (None, 5, 17, 64)        0
 g2D)

 conv2d_91 (Conv2D)          (None, 5, 17, 128)        32896

 global_average_pooling2d_29  (None, 128)              0
  (GlobalAveragePooling2D)

 dense_56 (Dense)            (None, 2)                 258

=================================================================
Total params: 43,570
Trainable params: 43,570
Non-trainable params: 0
_________________________________________________________________
```

In [275]:

```
history , model = compile_fit(model, epoch_no=300, LR=0.001)
```

```
Epoch 1/300
3/3 [==============================] - ETA: 0s - loss: 0.3065
Epoch 1: val_loss improved from inf to 0.17241, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 242ms/step - loss: 0.3065 - val_loss: 0.1724
Epoch 2/300
3/3 [==============================] - ETA: 0s - loss: 0.2063
Epoch 2: val_loss improved from 0.17241 to 0.10493, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 175ms/step - loss: 0.2063 - val_loss: 0.1049
Epoch 3/300
3/3 [==============================] - ETA: 0s - loss: 0.1256
Epoch 3: val_loss did not improve from 0.10493
3/3 [==============================] - 1s 167ms/step - loss: 0.1256 - val_loss: 0.1424
Epoch 4/300
```

```
3/3 [==============================] - ETA: 0s - loss: 0.1368
Epoch 4: val_loss did not improve from 0.10493
3/3 [==============================] - 1s 171ms/step - loss: 0.1368 - val_loss: 0.1105
Epoch 5/300
3/3 [==============================] - ETA: 0s - loss: 0.1097
Epoch 5: val_loss improved from 0.10493 to 0.09068, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 173ms/step - loss: 0.1097 - val_loss: 0.0907
Epoch 6/300
3/3 [==============================] - ETA: 0s - loss: 0.1009
Epoch 6: val_loss improved from 0.09068 to 0.08892, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 176ms/step - loss: 0.1009 - val_loss: 0.0889
Epoch 7/300
3/3 [==============================] - ETA: 0s - loss: 0.0964
Epoch 7: val_loss improved from 0.08892 to 0.08187, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 0.0964 - val_loss: 0.0819
Epoch 8/300
3/3 [==============================] - ETA: 0s - loss: 0.0813
Epoch 8: val_loss improved from 0.08187 to 0.07974, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 182ms/step - loss: 0.0813 - val_loss: 0.0797
Epoch 9/300
3/3 [==============================] - ETA: 0s - loss: 0.0776
Epoch 9: val_loss improved from 0.07974 to 0.07280, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 176ms/step - loss: 0.0776 - val_loss: 0.0728
Epoch 10/300
3/3 [==============================] - ETA: 0s - loss: 0.0684
Epoch 10: val_loss improved from 0.07280 to 0.06759, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0684 - val_loss: 0.0676
Epoch 11/300
3/3 [==============================] - ETA: 0s - loss: 0.0646
Epoch 11: val_loss improved from 0.06759 to 0.06415, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 176ms/step - loss: 0.0646 - val_loss: 0.0641
Epoch 12/300
3/3 [==============================] - ETA: 0s - loss: 0.0575
Epoch 12: val_loss improved from 0.06415 to 0.05928, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0575 - val_loss: 0.0593
Epoch 13/300
3/3 [==============================] - ETA: 0s - loss: 0.0546
Epoch 13: val_loss improved from 0.05928 to 0.05558, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0546 - val_loss: 0.0556
Epoch 14/300
3/3 [==============================] - ETA: 0s - loss: 0.0502
Epoch 14: val_loss did not improve from 0.05558
3/3 [==============================] - 0s 167ms/step - loss: 0.0502 - val_loss: 0.0568
Epoch 15/300
3/3 [==============================] - ETA: 0s - loss: 0.0512
Epoch 15: val_loss improved from 0.05558 to 0.05160, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 180ms/step - loss: 0.0512 - val_loss: 0.0516
Epoch 16/300
3/3 [==============================] - ETA: 0s - loss: 0.0490
Epoch 16: val_loss improved from 0.05160 to 0.05119, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0490 - val_loss: 0.0512
Epoch 17/300
3/3 [==============================] - ETA: 0s - loss: 0.0482
Epoch 17: val_loss improved from 0.05119 to 0.05029, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0482 - val_loss: 0.0503
Epoch 18/300
3/3 [==============================] - ETA: 0s - loss: 0.0474
Epoch 18: val_loss improved from 0.05029 to 0.04962, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 170ms/step - loss: 0.0474 - val_loss: 0.0496
Epoch 19/300
3/3 [==============================] - ETA: 0s - loss: 0.0465
Epoch 19: val_loss improved from 0.04962 to 0.04912, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 0.0465 - val_loss: 0.0491
Epoch 20/300
3/3 [==============================] - ETA: 0s - loss: 0.0459
Epoch 20: val_loss improved from 0.04912 to 0.04907, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 172ms/step - loss: 0.0459 - val_loss: 0.0491
Epoch 21/300
3/3 [==============================] - ETA: 0s - loss: 0.0458
Epoch 21: val_loss did not improve from 0.04907
3/3 [==============================] - 0s 166ms/step - loss: 0.0458 - val_loss: 0.0491
Epoch 22/300
3/3 [==============================] - ETA: 0s - loss: 0.0439
Epoch 22: val_loss improved from 0.04907 to 0.04848, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0439 - val_loss: 0.0485
Epoch 23/300
3/3 [==============================] - ETA: 0s - loss: 0.0437
Epoch 23: val_loss did not improve from 0.04848
3/3 [==============================] - 0s 160ms/step - loss: 0.0437 - val_loss: 0.0492
Epoch 24/300
3/3 [==============================] - ETA: 0s - loss: 0.0446
Epoch 24: val_loss improved from 0.04848 to 0.04757, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 171ms/step - loss: 0.0446 - val_loss: 0.0476
```

```
Epoch 25/300
3/3 [==============================] - ETA: 0s - loss: 0.0433
Epoch 25: val_loss improved from 0.04757 to 0.04727, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 180ms/step - loss: 0.0433 - val_loss: 0.0473
Epoch 26/300
3/3 [==============================] - ETA: 0s - loss: 0.0432
Epoch 26: val_loss did not improve from 0.04727
3/3 [==============================] - 1s 171ms/step - loss: 0.0432 - val_loss: 0.0477
Epoch 27/300
3/3 [==============================] - ETA: 0s - loss: 0.0419
Epoch 27: val_loss improved from 0.04727 to 0.04602, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0419 - val_loss: 0.0460
Epoch 28/300
3/3 [==============================] - ETA: 0s - loss: 0.0410
Epoch 28: val_loss did not improve from 0.04602
3/3 [==============================] - 0s 160ms/step - loss: 0.0410 - val_loss: 0.0465
Epoch 29/300
3/3 [==============================] - ETA: 0s - loss: 0.0406
Epoch 29: val_loss improved from 0.04602 to 0.04519, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 0.0406 - val_loss: 0.0452
Epoch 30/300
3/3 [==============================] - ETA: 0s - loss: 0.0396
Epoch 30: val_loss improved from 0.04519 to 0.04461, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0396 - val_loss: 0.0446
Epoch 31/300
3/3 [==============================] - ETA: 0s - loss: 0.0393
Epoch 31: val_loss improved from 0.04461 to 0.04460, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 0.0393 - val_loss: 0.0446
Epoch 32/300
3/3 [==============================] - ETA: 0s - loss: 0.0388
Epoch 32: val_loss improved from 0.04460 to 0.04428, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0388 - val_loss: 0.0443
Epoch 33/300
3/3 [==============================] - ETA: 0s - loss: 0.0383
Epoch 33: val_loss improved from 0.04428 to 0.04413, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 176ms/step - loss: 0.0383 - val_loss: 0.0441
Epoch 34/300
3/3 [==============================] - ETA: 0s - loss: 0.0381
Epoch 34: val_loss improved from 0.04413 to 0.04387, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 182ms/step - loss: 0.0381 - val_loss: 0.0439
Epoch 35/300
3/3 [==============================] - ETA: 0s - loss: 0.0377
Epoch 35: val_loss improved from 0.04387 to 0.04372, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0377 - val_loss: 0.0437
Epoch 36/300
3/3 [==============================] - ETA: 0s - loss: 0.0379
Epoch 36: val_loss improved from 0.04372 to 0.04272, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 0.0379 - val_loss: 0.0427
Epoch 37/300
3/3 [==============================] - ETA: 0s - loss: 0.0365
Epoch 37: val_loss did not improve from 0.04272
3/3 [==============================] - 1s 170ms/step - loss: 0.0365 - val_loss: 0.0435
Epoch 38/300
3/3 [==============================] - ETA: 0s - loss: 0.0378
Epoch 38: val_loss improved from 0.04272 to 0.04205, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0378 - val_loss: 0.0420
Epoch 39/300
3/3 [==============================] - ETA: 0s - loss: 0.0361
Epoch 39: val_loss did not improve from 0.04205
3/3 [==============================] - 0s 163ms/step - loss: 0.0361 - val_loss: 0.0424
Epoch 40/300
3/3 [==============================] - ETA: 0s - loss: 0.0362
Epoch 40: val_loss improved from 0.04205 to 0.04160, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 175ms/step - loss: 0.0362 - val_loss: 0.0416
Epoch 41/300
3/3 [==============================] - ETA: 0s - loss: 0.0356
Epoch 41: val_loss did not improve from 0.04160
3/3 [==============================] - 0s 165ms/step - loss: 0.0356 - val_loss: 0.0417
Epoch 42/300
3/3 [==============================] - ETA: 0s - loss: 0.0348
Epoch 42: val_loss improved from 0.04160 to 0.04118, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 172ms/step - loss: 0.0348 - val_loss: 0.0412
Epoch 43/300
3/3 [==============================] - ETA: 0s - loss: 0.0349
Epoch 43: val_loss did not improve from 0.04118
3/3 [==============================] - 0s 164ms/step - loss: 0.0349 - val_loss: 0.0417
Epoch 44/300
3/3 [==============================] - ETA: 0s - loss: 0.0349
Epoch 44: val_loss improved from 0.04118 to 0.04067, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0349 - val_loss: 0.0407
Epoch 45/300
3/3 [==============================] - ETA: 0s - loss: 0.0338
Epoch 45: val_loss improved from 0.04067 to 0.04051, saving model to /content/weights.best.hdf5
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3/3 [==============================] - 1s 178ms/step - loss: 0.0338 - val_loss: 0.0405
Epoch 46/300
3/3 [==============================] - ETA: 0s - loss: 0.0335
Epoch 46: val_loss did not improve from 0.04051
3/3 [==============================] - 1s 165ms/step - loss: 0.0335 - val_loss: 0.0421
Epoch 47/300
3/3 [==============================] - ETA: 0s - loss: 0.0340
Epoch 47: val_loss improved from 0.04051 to 0.04026, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 171ms/step - loss: 0.0340 - val_loss: 0.0403
Epoch 48/300
3/3 [==============================] - ETA: 0s - loss: 0.0330
Epoch 48: val_loss improved from 0.04026 to 0.04023, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 0.0330 - val_loss: 0.0402
Epoch 49/300
3/3 [==============================] - ETA: 0s - loss: 0.0329
Epoch 49: val_loss improved from 0.04023 to 0.03977, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 171ms/step - loss: 0.0329 - val_loss: 0.0398
Epoch 50/300
3/3 [==============================] - ETA: 0s - loss: 0.0323
Epoch 50: val_loss improved from 0.03977 to 0.03897, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 175ms/step - loss: 0.0323 - val_loss: 0.0390
Epoch 51/300
3/3 [==============================] - ETA: 0s - loss: 0.0317
Epoch 51: val_loss improved from 0.03897 to 0.03880, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 179ms/step - loss: 0.0317 - val_loss: 0.0388
Epoch 52/300
3/3 [==============================] - ETA: 0s - loss: 0.0316
Epoch 52: val_loss did not improve from 0.03880
3/3 [==============================] - 1s 166ms/step - loss: 0.0316 - val_loss: 0.0399
Epoch 53/300
3/3 [==============================] - ETA: 0s - loss: 0.0330
Epoch 53: val_loss did not improve from 0.03880
3/3 [==============================] - 0s 164ms/step - loss: 0.0330 - val_loss: 0.0388
Epoch 54/300
3/3 [==============================] - ETA: 0s - loss: 0.0327
Epoch 54: val_loss improved from 0.03880 to 0.03861, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 175ms/step - loss: 0.0327 - val_loss: 0.0386
Epoch 55/300
3/3 [==============================] - ETA: 0s - loss: 0.0324
Epoch 55: val_loss did not improve from 0.03861
3/3 [==============================] - 0s 164ms/step - loss: 0.0324 - val_loss: 0.0397
Epoch 56/300
3/3 [==============================] - ETA: 0s - loss: 0.0303
Epoch 56: val_loss did not improve from 0.03861
3/3 [==============================] - 0s 167ms/step - loss: 0.0303 - val_loss: 0.0387
Epoch 57/300
3/3 [==============================] - ETA: 0s - loss: 0.0312
Epoch 57: val_loss improved from 0.03861 to 0.03828, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 184ms/step - loss: 0.0312 - val_loss: 0.0383
Epoch 58/300
3/3 [==============================] - ETA: 0s - loss: 0.0301
Epoch 58: val_loss improved from 0.03828 to 0.03804, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0301 - val_loss: 0.0380
Epoch 59/300
3/3 [==============================] - ETA: 0s - loss: 0.0302
Epoch 59: val_loss did not improve from 0.03804
3/3 [==============================] - 0s 165ms/step - loss: 0.0302 - val_loss: 0.0386
Epoch 60/300
3/3 [==============================] - ETA: 0s - loss: 0.0299
Epoch 60: val_loss improved from 0.03804 to 0.03758, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 183ms/step - loss: 0.0299 - val_loss: 0.0376
Epoch 61/300
3/3 [==============================] - ETA: 0s - loss: 0.0305
Epoch 61: val_loss improved from 0.03758 to 0.03728, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0305 - val_loss: 0.0373
Epoch 62/300
3/3 [==============================] - ETA: 0s - loss: 0.0288
Epoch 62: val_loss did not improve from 0.03728
3/3 [==============================] - 1s 177ms/step - loss: 0.0288 - val_loss: 0.0378
Epoch 63/300
3/3 [==============================] - ETA: 0s - loss: 0.0285
Epoch 63: val_loss improved from 0.03728 to 0.03685, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 0.0285 - val_loss: 0.0369
Epoch 64/300
3/3 [==============================] - ETA: 0s - loss: 0.0302
Epoch 64: val_loss did not improve from 0.03685
3/3 [==============================] - 0s 168ms/step - loss: 0.0302 - val_loss: 0.0375
Epoch 65/300
3/3 [==============================] - ETA: 0s - loss: 0.0305
Epoch 65: val_loss improved from 0.03685 to 0.03665, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 180ms/step - loss: 0.0305 - val_loss: 0.0367
Epoch 66/300
3/3 [==============================] - ETA: 0s - loss: 0.0302
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Epoch 66: val_loss improved from 0.03665 to 0.03658, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 0.0302 - val_loss: 0.0366
Epoch 67/300
3/3 [==============================] - ETA: 0s - loss: 0.0277
Epoch 67: val_loss did not improve from 0.03658
3/3 [==============================] - 0s 164ms/step - loss: 0.0277 - val_loss: 0.0404
Epoch 68/300
3/3 [==============================] - ETA: 0s - loss: 0.0291
Epoch 68: val_loss did not improve from 0.03658
3/3 [==============================] - 1s 167ms/step - loss: 0.0291 - val_loss: 0.0371
Epoch 69/300
3/3 [==============================] - ETA: 0s - loss: 0.0296
Epoch 69: val_loss improved from 0.03658 to 0.03635, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 182ms/step - loss: 0.0296 - val_loss: 0.0364
Epoch 70/300
3/3 [==============================] - ETA: 0s - loss: 0.0292
Epoch 70: val_loss did not improve from 0.03635
3/3 [==============================] - 1s 169ms/step - loss: 0.0292 - val_loss: 0.0368
Epoch 71/300
3/3 [==============================] - ETA: 0s - loss: 0.0287
Epoch 71: val_loss did not improve from 0.03635
3/3 [==============================] - 1s 169ms/step - loss: 0.0287 - val_loss: 0.0366
Epoch 72/300
3/3 [==============================] - ETA: 0s - loss: 0.0281
Epoch 72: val_loss did not improve from 0.03635
3/3 [==============================] - 1s 167ms/step - loss: 0.0281 - val_loss: 0.0382
Epoch 73/300
3/3 [==============================] - ETA: 0s - loss: 0.0280
Epoch 73: val_loss improved from 0.03635 to 0.03570, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 175ms/step - loss: 0.0280 - val_loss: 0.0357
Epoch 74/300
3/3 [==============================] - ETA: 0s - loss: 0.0277
Epoch 74: val_loss did not improve from 0.03570
3/3 [==============================] - 0s 162ms/step - loss: 0.0277 - val_loss: 0.0357
Epoch 75/300
3/3 [==============================] - ETA: 0s - loss: 0.0268
Epoch 75: val_loss did not improve from 0.03570
3/3 [==============================] - 0s 169ms/step - loss: 0.0268 - val_loss: 0.0359
Epoch 76/300
3/3 [==============================] - ETA: 0s - loss: 0.0261
Epoch 76: val_loss improved from 0.03570 to 0.03529, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0261 - val_loss: 0.0353
Epoch 77/300
3/3 [==============================] - ETA: 0s - loss: 0.0262
Epoch 77: val_loss did not improve from 0.03529
3/3 [==============================] - 0s 160ms/step - loss: 0.0262 - val_loss: 0.0364
Epoch 78/300
3/3 [==============================] - ETA: 0s - loss: 0.0262
Epoch 78: val_loss improved from 0.03529 to 0.03457, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 172ms/step - loss: 0.0262 - val_loss: 0.0346
Epoch 79/300
3/3 [==============================] - ETA: 0s - loss: 0.0262
Epoch 79: val_loss improved from 0.03457 to 0.03429, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 175ms/step - loss: 0.0262 - val_loss: 0.0343
Epoch 80/300
3/3 [==============================] - ETA: 0s - loss: 0.0253
Epoch 80: val_loss did not improve from 0.03429
3/3 [==============================] - 1s 165ms/step - loss: 0.0253 - val_loss: 0.0354
Epoch 81/300
3/3 [==============================] - ETA: 0s - loss: 0.0253
Epoch 81: val_loss improved from 0.03429 to 0.03427, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 170ms/step - loss: 0.0253 - val_loss: 0.0343
Epoch 82/300
3/3 [==============================] - ETA: 0s - loss: 0.0254
Epoch 82: val_loss did not improve from 0.03427
3/3 [==============================] - 0s 164ms/step - loss: 0.0254 - val_loss: 0.0348
Epoch 83/300
3/3 [==============================] - ETA: 0s - loss: 0.0250
Epoch 83: val_loss did not improve from 0.03427
3/3 [==============================] - 0s 172ms/step - loss: 0.0250 - val_loss: 0.0343
Epoch 84/300
3/3 [==============================] - ETA: 0s - loss: 0.0254
Epoch 84: val_loss did not improve from 0.03427
3/3 [==============================] - 0s 161ms/step - loss: 0.0254 - val_loss: 0.0343
Epoch 85/300
3/3 [==============================] - ETA: 0s - loss: 0.0249
Epoch 85: val_loss did not improve from 0.03427
3/3 [==============================] - 0s 160ms/step - loss: 0.0249 - val_loss: 0.0349
Epoch 86/300
3/3 [==============================] - ETA: 0s - loss: 0.0246
Epoch 86: val_loss improved from 0.03427 to 0.03393, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 185ms/step - loss: 0.0246 - val_loss: 0.0339
Epoch 87/300
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3/3 [==============================] - ETA: 0s - loss: 0.0245
Epoch 87: val_loss did not improve from 0.03393
3/3 [==============================] - 0s 163ms/step - loss: 0.0245 - val_loss: 0.0343
Epoch 88/300
3/3 [==============================] - ETA: 0s - loss: 0.0237
Epoch 88: val_loss did not improve from 0.03393
3/3 [==============================] - 0s 162ms/step - loss: 0.0237 - val_loss: 0.0339
Epoch 89/300
3/3 [==============================] - ETA: 0s - loss: 0.0237
Epoch 89: val_loss improved from 0.03393 to 0.03387, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 180ms/step - loss: 0.0237 - val_loss: 0.0339
Epoch 90/300
3/3 [==============================] - ETA: 0s - loss: 0.0236
Epoch 90: val_loss improved from 0.03387 to 0.03355, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 173ms/step - loss: 0.0236 - val_loss: 0.0336
Epoch 91/300
3/3 [==============================] - ETA: 0s - loss: 0.0233
Epoch 91: val_loss did not improve from 0.03355
3/3 [==============================] - 0s 159ms/step - loss: 0.0233 - val_loss: 0.0336
Epoch 92/300
3/3 [==============================] - ETA: 0s - loss: 0.0232
Epoch 92: val_loss improved from 0.03355 to 0.03331, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 182ms/step - loss: 0.0232 - val_loss: 0.0333
Epoch 93/300
3/3 [==============================] - ETA: 0s - loss: 0.0235
Epoch 93: val_loss did not improve from 0.03331
3/3 [==============================] - 0s 165ms/step - loss: 0.0235 - val_loss: 0.0337
Epoch 94/300
3/3 [==============================] - ETA: 0s - loss: 0.0241
Epoch 94: val_loss improved from 0.03331 to 0.03312, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 0.0241 - val_loss: 0.0331
Epoch 95/300
3/3 [==============================] - ETA: 0s - loss: 0.0228
Epoch 95: val_loss did not improve from 0.03312
3/3 [==============================] - 0s 165ms/step - loss: 0.0228 - val_loss: 0.0332
Epoch 96/300
3/3 [==============================] - ETA: 0s - loss: 0.0225
Epoch 96: val_loss did not improve from 0.03312
3/3 [==============================] - 0s 163ms/step - loss: 0.0225 - val_loss: 0.0340
Epoch 97/300
3/3 [==============================] - ETA: 0s - loss: 0.0228
Epoch 97: val_loss improved from 0.03312 to 0.03259, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 176ms/step - loss: 0.0228 - val_loss: 0.0326
Epoch 98/300
3/3 [==============================] - ETA: 0s - loss: 0.0223
Epoch 98: val_loss improved from 0.03259 to 0.03244, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 180ms/step - loss: 0.0223 - val_loss: 0.0324
Epoch 99/300
3/3 [==============================] - ETA: 0s - loss: 0.0222
Epoch 99: val_loss did not improve from 0.03244
3/3 [==============================] - 0s 164ms/step - loss: 0.0222 - val_loss: 0.0326
Epoch 100/300
3/3 [==============================] - ETA: 0s - loss: 0.0216
Epoch 100: val_loss did not improve from 0.03244
3/3 [==============================] - 1s 164ms/step - loss: 0.0216 - val_loss: 0.0328
Epoch 101/300
3/3 [==============================] - ETA: 0s - loss: 0.0214
Epoch 101: val_loss did not improve from 0.03244
3/3 [==============================] - 0s 164ms/step - loss: 0.0214 - val_loss: 0.0326
Epoch 102/300
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 102: val_loss did not improve from 0.03244
3/3 [==============================] - 1s 163ms/step - loss: 0.0215 - val_loss: 0.0328
Epoch 103/300
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 103: val_loss improved from 0.03244 to 0.03182, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 176ms/step - loss: 0.0213 - val_loss: 0.0318
Epoch 104/300
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 104: val_loss did not improve from 0.03182
3/3 [==============================] - 1s 165ms/step - loss: 0.0211 - val_loss: 0.0328
Epoch 105/300
3/3 [==============================] - ETA: 0s - loss: 0.0214
Epoch 105: val_loss did not improve from 0.03182
3/3 [==============================] - 0s 165ms/step - loss: 0.0214 - val_loss: 0.0321
Epoch 106/300
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 106: val_loss did not improve from 0.03182
3/3 [==============================] - 1s 165ms/step - loss: 0.0207 - val_loss: 0.0326
Epoch 107/300
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 107: val_loss did not improve from 0.03182
3/3 [==============================] - 0s 166ms/step - loss: 0.0204 - val_loss: 0.0320
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Epoch 108/300
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 108: val_loss did not improve from 0.03182
3/3 [==============================] - 1s 172ms/step - loss: 0.0205 - val_loss: 0.0335
Epoch 109/300
3/3 [==============================] - ETA: 0s - loss: 0.0218
Epoch 109: val_loss did not improve from 0.03182
3/3 [==============================] - 0s 165ms/step - loss: 0.0218 - val_loss: 0.0325
Epoch 110/300
3/3 [==============================] - ETA: 0s - loss: 0.0223
Epoch 110: val_loss did not improve from 0.03182
3/3 [==============================] - 1s 164ms/step - loss: 0.0223 - val_loss: 0.0319
Epoch 111/300
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 111: val_loss improved from 0.03182 to 0.03123, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0208 - val_loss: 0.0312
Epoch 112/300
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 112: val_loss did not improve from 0.03123
3/3 [==============================] - 1s 164ms/step - loss: 0.0201 - val_loss: 0.0312
Epoch 113/300
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 113: val_loss improved from 0.03123 to 0.03074, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 195ms/step - loss: 0.0199 - val_loss: 0.0307
Epoch 114/300
3/3 [==============================] - ETA: 0s - loss: 0.0195
Epoch 114: val_loss did not improve from 0.03074
3/3 [==============================] - 1s 167ms/step - loss: 0.0195 - val_loss: 0.0328
Epoch 115/300
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 115: val_loss did not improve from 0.03074
3/3 [==============================] - 0s 164ms/step - loss: 0.0201 - val_loss: 0.0316
Epoch 116/300
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 116: val_loss did not improve from 0.03074
3/3 [==============================] - 1s 168ms/step - loss: 0.0198 - val_loss: 0.0322
Epoch 117/300
3/3 [==============================] - ETA: 0s - loss: 0.0191
Epoch 117: val_loss did not improve from 0.03074
3/3 [==============================] - 1s 172ms/step - loss: 0.0191 - val_loss: 0.0313
Epoch 118/300
3/3 [==============================] - ETA: 0s - loss: 0.0191
Epoch 118: val_loss did not improve from 0.03074
3/3 [==============================] - 1s 166ms/step - loss: 0.0191 - val_loss: 0.0313
Epoch 119/300
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 119: val_loss did not improve from 0.03074
3/3 [==============================] - 1s 174ms/step - loss: 0.0196 - val_loss: 0.0309
Epoch 120/300
3/3 [==============================] - ETA: 0s - loss: 0.0196
Epoch 120: val_loss did not improve from 0.03074
3/3 [==============================] - 1s 164ms/step - loss: 0.0196 - val_loss: 0.0331
Epoch 121/300
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 121: val_loss improved from 0.03074 to 0.03059, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 182ms/step - loss: 0.0201 - val_loss: 0.0306
Epoch 122/300
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 122: val_loss improved from 0.03059 to 0.03042, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 184ms/step - loss: 0.0200 - val_loss: 0.0304
Epoch 123/300
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 123: val_loss did not improve from 0.03042
3/3 [==============================] - 1s 174ms/step - loss: 0.0201 - val_loss: 0.0306
Epoch 124/300
3/3 [==============================] - ETA: 0s - loss: 0.0188
Epoch 124: val_loss improved from 0.03042 to 0.03011, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0188 - val_loss: 0.0301
Epoch 125/300
3/3 [==============================] - ETA: 0s - loss: 0.0182
Epoch 125: val_loss did not improve from 0.03011
3/3 [==============================] - 0s 167ms/step - loss: 0.0182 - val_loss: 0.0303
Epoch 126/300
3/3 [==============================] - ETA: 0s - loss: 0.0178
Epoch 126: val_loss improved from 0.03011 to 0.03007, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 0.0178 - val_loss: 0.0301
Epoch 127/300
3/3 [==============================] - ETA: 0s - loss: 0.0175
Epoch 127: val_loss improved from 0.03007 to 0.02966, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 196ms/step - loss: 0.0175 - val_loss: 0.0297
Epoch 128/300
3/3 [==============================] - ETA: 0s - loss: 0.0177
Epoch 128: val_loss did not improve from 0.02966
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3/3 [==============================] - 1s 180ms/step - loss: 0.0177 - val_loss: 0.0299
Epoch 129/300
3/3 [==============================] - ETA: 0s - loss: 0.0172
Epoch 129: val_loss improved from 0.02966 to 0.02946, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 200ms/step - loss: 0.0172 - val_loss: 0.0295
Epoch 130/300
3/3 [==============================] - ETA: 0s - loss: 0.0170
Epoch 130: val_loss did not improve from 0.02946
3/3 [==============================] - 0s 164ms/step - loss: 0.0170 - val_loss: 0.0307
Epoch 131/300
3/3 [==============================] - ETA: 0s - loss: 0.0171
Epoch 131: val_loss did not improve from 0.02946
3/3 [==============================] - 1s 168ms/step - loss: 0.0171 - val_loss: 0.0298
Epoch 132/300
3/3 [==============================] - ETA: 0s - loss: 0.0171
Epoch 132: val_loss did not improve from 0.02946
3/3 [==============================] - 0s 163ms/step - loss: 0.0171 - val_loss: 0.0313
Epoch 133/300
3/3 [==============================] - ETA: 0s - loss: 0.0170
Epoch 133: val_loss improved from 0.02946 to 0.02943, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 185ms/step - loss: 0.0170 - val_loss: 0.0294
Epoch 134/300
3/3 [==============================] - ETA: 0s - loss: 0.0175
Epoch 134: val_loss did not improve from 0.02943
3/3 [==============================] - 1s 174ms/step - loss: 0.0175 - val_loss: 0.0297
Epoch 135/300
3/3 [==============================] - ETA: 0s - loss: 0.0170
Epoch 135: val_loss improved from 0.02943 to 0.02906, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 179ms/step - loss: 0.0170 - val_loss: 0.0291
Epoch 136/300
3/3 [==============================] - ETA: 0s - loss: 0.0167
Epoch 136: val_loss improved from 0.02906 to 0.02880, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 0.0167 - val_loss: 0.0288
Epoch 137/300
3/3 [==============================] - ETA: 0s - loss: 0.0162
Epoch 137: val_loss did not improve from 0.02880
3/3 [==============================] - 1s 169ms/step - loss: 0.0162 - val_loss: 0.0296
Epoch 138/300
3/3 [==============================] - ETA: 0s - loss: 0.0160
Epoch 138: val_loss did not improve from 0.02880
3/3 [==============================] - 0s 161ms/step - loss: 0.0160 - val_loss: 0.0291
Epoch 139/300
3/3 [==============================] - ETA: 0s - loss: 0.0162
Epoch 139: val_loss did not improve from 0.02880
3/3 [==============================] - 1s 169ms/step - loss: 0.0162 - val_loss: 0.0291
Epoch 140/300
3/3 [==============================] - ETA: 0s - loss: 0.0160
Epoch 140: val_loss did not improve from 0.02880
3/3 [==============================] - 0s 164ms/step - loss: 0.0160 - val_loss: 0.0289
Epoch 141/300
3/3 [==============================] - ETA: 0s - loss: 0.0154
Epoch 141: val_loss improved from 0.02880 to 0.02842, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 187ms/step - loss: 0.0154 - val_loss: 0.0284
Epoch 142/300
3/3 [==============================] - ETA: 0s - loss: 0.0158
Epoch 142: val_loss did not improve from 0.02842
3/3 [==============================] - 0s 162ms/step - loss: 0.0158 - val_loss: 0.0302
Epoch 143/300
3/3 [==============================] - ETA: 0s - loss: 0.0159
Epoch 143: val_loss did not improve from 0.02842
3/3 [==============================] - 1s 169ms/step - loss: 0.0159 - val_loss: 0.0292
Epoch 144/300
3/3 [==============================] - ETA: 0s - loss: 0.0159
Epoch 144: val_loss did not improve from 0.02842
3/3 [==============================] - 0s 169ms/step - loss: 0.0159 - val_loss: 0.0292
Epoch 145/300
3/3 [==============================] - ETA: 0s - loss: 0.0157
Epoch 145: val_loss did not improve from 0.02842
3/3 [==============================] - 1s 174ms/step - loss: 0.0157 - val_loss: 0.0297
Epoch 146/300
3/3 [==============================] - ETA: 0s - loss: 0.0154
Epoch 146: val_loss did not improve from 0.02842
3/3 [==============================] - 1s 172ms/step - loss: 0.0154 - val_loss: 0.0287
Epoch 147/300
3/3 [==============================] - ETA: 0s - loss: 0.0157
Epoch 147: val_loss did not improve from 0.02842
3/3 [==============================] - 1s 167ms/step - loss: 0.0157 - val_loss: 0.0302
Epoch 148/300
3/3 [==============================] - ETA: 0s - loss: 0.0158
Epoch 148: val_loss improved from 0.02842 to 0.02807, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 181ms/step - loss: 0.0158 - val_loss: 0.0281
Epoch 149/300
3/3 [==============================] - ETA: 0s - loss: 0.0150
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Epoch 149: val_loss improved from 0.02807 to 0.02792, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 185ms/step - loss: 0.0150 - val_loss: 0.0279
Epoch 150/300
3/3 [==============================] - ETA: 0s - loss: 0.0145
Epoch 150: val_loss did not improve from 0.02792
3/3 [==============================] - 1s 166ms/step - loss: 0.0145 - val_loss: 0.0282
Epoch 151/300
3/3 [==============================] - ETA: 0s - loss: 0.0144
Epoch 151: val_loss did not improve from 0.02792
3/3 [==============================] - 1s 176ms/step - loss: 0.0144 - val_loss: 0.0280
Epoch 152/300
3/3 [==============================] - ETA: 0s - loss: 0.0141
Epoch 152: val_loss did not improve from 0.02792
3/3 [==============================] - 0s 170ms/step - loss: 0.0141 - val_loss: 0.0307
Epoch 153/300
3/3 [==============================] - ETA: 0s - loss: 0.0144
Epoch 153: val_loss did not improve from 0.02792
3/3 [==============================] - 1s 171ms/step - loss: 0.0144 - val_loss: 0.0291
Epoch 154/300
3/3 [==============================] - ETA: 0s - loss: 0.0149
Epoch 154: val_loss did not improve from 0.02792
3/3 [==============================] - 1s 172ms/step - loss: 0.0149 - val_loss: 0.0322
Epoch 155/300
3/3 [==============================] - ETA: 0s - loss: 0.0169
Epoch 155: val_loss improved from 0.02792 to 0.02752, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 184ms/step - loss: 0.0169 - val_loss: 0.0275
Epoch 156/300
3/3 [==============================] - ETA: 0s - loss: 0.0151
Epoch 156: val_loss did not improve from 0.02752
3/3 [==============================] - 0s 164ms/step - loss: 0.0151 - val_loss: 0.0281
Epoch 157/300
3/3 [==============================] - ETA: 0s - loss: 0.0163
Epoch 157: val_loss did not improve from 0.02752
3/3 [==============================] - 1s 174ms/step - loss: 0.0163 - val_loss: 0.0349
Epoch 158/300
3/3 [==============================] - ETA: 0s - loss: 0.0176
Epoch 158: val_loss did not improve from 0.02752
3/3 [==============================] - 0s 167ms/step - loss: 0.0176 - val_loss: 0.0289
Epoch 159/300
3/3 [==============================] - ETA: 0s - loss: 0.0151
Epoch 159: val_loss did not improve from 0.02752
3/3 [==============================] - 1s 171ms/step - loss: 0.0151 - val_loss: 0.0294
Epoch 160/300
3/3 [==============================] - ETA: 0s - loss: 0.0148
Epoch 160: val_loss did not improve from 0.02752
3/3 [==============================] - 0s 169ms/step - loss: 0.0148 - val_loss: 0.0279
Epoch 161/300
3/3 [==============================] - ETA: 0s - loss: 0.0144
Epoch 161: val_loss improved from 0.02752 to 0.02670, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 182ms/step - loss: 0.0144 - val_loss: 0.0267
Epoch 162/300
3/3 [==============================] - ETA: 0s - loss: 0.0138
Epoch 162: val_loss improved from 0.02670 to 0.02611, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 175ms/step - loss: 0.0138 - val_loss: 0.0261
Epoch 163/300
3/3 [==============================] - ETA: 0s - loss: 0.0134
Epoch 163: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 172ms/step - loss: 0.0134 - val_loss: 0.0267
Epoch 164/300
3/3 [==============================] - ETA: 0s - loss: 0.0134
Epoch 164: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 173ms/step - loss: 0.0134 - val_loss: 0.0281
Epoch 165/300
3/3 [==============================] - ETA: 0s - loss: 0.0134
Epoch 165: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 171ms/step - loss: 0.0134 - val_loss: 0.0281
Epoch 166/300
3/3 [==============================] - ETA: 0s - loss: 0.0139
Epoch 166: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 168ms/step - loss: 0.0139 - val_loss: 0.0306
Epoch 167/300
3/3 [==============================] - ETA: 0s - loss: 0.0135
Epoch 167: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 173ms/step - loss: 0.0135 - val_loss: 0.0277
Epoch 168/300
3/3 [==============================] - ETA: 0s - loss: 0.0141
Epoch 168: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 174ms/step - loss: 0.0141 - val_loss: 0.0273
Epoch 169/300
3/3 [==============================] - ETA: 0s - loss: 0.0135
Epoch 169: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 172ms/step - loss: 0.0135 - val_loss: 0.0268
Epoch 170/300
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3/3 [==============================] - ETA: 0s - loss: 0.0134
Epoch 170: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 178ms/step - loss: 0.0134 - val_loss: 0.0270
Epoch 171/300
3/3 [==============================] - ETA: 0s - loss: 0.0133
Epoch 171: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 174ms/step - loss: 0.0133 - val_loss: 0.0283
Epoch 172/300
3/3 [==============================] - ETA: 0s - loss: 0.0130
Epoch 172: val_loss did not improve from 0.02611
3/3 [==============================] - 0s 169ms/step - loss: 0.0130 - val_loss: 0.0273
Epoch 173/300
3/3 [==============================] - ETA: 0s - loss: 0.0125
Epoch 173: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 177ms/step - loss: 0.0125 - val_loss: 0.0273
Epoch 174/300
3/3 [==============================] - ETA: 0s - loss: 0.0125
Epoch 174: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 173ms/step - loss: 0.0125 - val_loss: 0.0275
Epoch 175/300
3/3 [==============================] - ETA: 0s - loss: 0.0127
Epoch 175: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 170ms/step - loss: 0.0127 - val_loss: 0.0270
Epoch 176/300
3/3 [==============================] - ETA: 0s - loss: 0.0122
Epoch 176: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 184ms/step - loss: 0.0122 - val_loss: 0.0267
Epoch 177/300
3/3 [==============================] - ETA: 0s - loss: 0.0123
Epoch 177: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 170ms/step - loss: 0.0123 - val_loss: 0.0279
Epoch 178/300
3/3 [==============================] - ETA: 0s - loss: 0.0119
Epoch 178: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 174ms/step - loss: 0.0119 - val_loss: 0.0269
Epoch 179/300
3/3 [==============================] - ETA: 0s - loss: 0.0130
Epoch 179: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 178ms/step - loss: 0.0130 - val_loss: 0.0270
Epoch 180/300
3/3 [==============================] - ETA: 0s - loss: 0.0124
Epoch 180: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 168ms/step - loss: 0.0124 - val_loss: 0.0275
Epoch 181/300
3/3 [==============================] - ETA: 0s - loss: 0.0132
Epoch 181: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 172ms/step - loss: 0.0132 - val_loss: 0.0269
Epoch 182/300
3/3 [==============================] - ETA: 0s - loss: 0.0119
Epoch 182: val_loss did not improve from 0.02611
3/3 [==============================] - 1s 172ms/step - loss: 0.0119 - val_loss: 0.0279
Epoch 183/300
3/3 [==============================] - ETA: 0s - loss: 0.0127
Epoch 183: val_loss improved from 0.02611 to 0.02591, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 189ms/step - loss: 0.0127 - val_loss: 0.0259
Epoch 184/300
3/3 [==============================] - ETA: 0s - loss: 0.0121
Epoch 184: val_loss did not improve from 0.02591
3/3 [==============================] - 0s 169ms/step - loss: 0.0121 - val_loss: 0.0261
Epoch 185/300
3/3 [==============================] - ETA: 0s - loss: 0.0119
Epoch 185: val_loss did not improve from 0.02591
3/3 [==============================] - 1s 177ms/step - loss: 0.0119 - val_loss: 0.0280
Epoch 186/300
3/3 [==============================] - ETA: 0s - loss: 0.0118
Epoch 186: val_loss did not improve from 0.02591
3/3 [==============================] - 1s 180ms/step - loss: 0.0118 - val_loss: 0.0263
Epoch 187/300
3/3 [==============================] - ETA: 0s - loss: 0.0115
Epoch 187: val_loss did not improve from 0.02591
3/3 [==============================] - 1s 175ms/step - loss: 0.0115 - val_loss: 0.0274
Epoch 188/300
3/3 [==============================] - ETA: 0s - loss: 0.0117
Epoch 188: val_loss did not improve from 0.02591
3/3 [==============================] - 0s 164ms/step - loss: 0.0117 - val_loss: 0.0269
Epoch 189/300
3/3 [==============================] - ETA: 0s - loss: 0.0115
Epoch 189: val_loss did not improve from 0.02591
3/3 [==============================] - 1s 175ms/step - loss: 0.0115 - val_loss: 0.0260
Epoch 190/300
3/3 [==============================] - ETA: 0s - loss: 0.0114
Epoch 190: val_loss did not improve from 0.02591
3/3 [==============================] - 0s 163ms/step - loss: 0.0114 - val_loss: 0.0268
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Epoch 191/300
3/3 [==============================] - ETA: 0s - loss: 0.0113
Epoch 191: val_loss did not improve from 0.02591
3/3 [==============================] - 1s 176ms/step - loss: 0.0113 - val_loss: 0.0260
Epoch 192/300
3/3 [==============================] - ETA: 0s - loss: 0.0108
Epoch 192: val_loss improved from 0.02591 to 0.02591, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 0.0108 - val_loss: 0.0259
Epoch 193/300
3/3 [==============================] - ETA: 0s - loss: 0.0115
Epoch 193: val_loss did not improve from 0.02591
3/3 [==============================] - 1s 174ms/step - loss: 0.0115 - val_loss: 0.0291
Epoch 194/300
3/3 [==============================] - ETA: 0s - loss: 0.0127
Epoch 194: val_loss improved from 0.02591 to 0.02576, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 184ms/step - loss: 0.0127 - val_loss: 0.0258
Epoch 195/300
3/3 [==============================] - ETA: 0s - loss: 0.0117
Epoch 195: val_loss did not improve from 0.02576
3/3 [==============================] - 1s 177ms/step - loss: 0.0117 - val_loss: 0.0268
Epoch 196/300
3/3 [==============================] - ETA: 0s - loss: 0.0134
Epoch 196: val_loss did not improve from 0.02576
3/3 [==============================] - 1s 169ms/step - loss: 0.0134 - val_loss: 0.0299
Epoch 197/300
3/3 [==============================] - ETA: 0s - loss: 0.0130
Epoch 197: val_loss improved from 0.02576 to 0.02553, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 188ms/step - loss: 0.0130 - val_loss: 0.0255
Epoch 198/300
3/3 [==============================] - ETA: 0s - loss: 0.0116
Epoch 198: val_loss improved from 0.02553 to 0.02490, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0116 - val_loss: 0.0249
Epoch 199/300
3/3 [==============================] - ETA: 0s - loss: 0.0117
Epoch 199: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 179ms/step - loss: 0.0117 - val_loss: 0.0270
Epoch 200/300
3/3 [==============================] - ETA: 0s - loss: 0.0106
Epoch 200: val_loss did not improve from 0.02490
3/3 [==============================] - 0s 159ms/step - loss: 0.0106 - val_loss: 0.0256
Epoch 201/300
3/3 [==============================] - ETA: 0s - loss: 0.0105
Epoch 201: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 174ms/step - loss: 0.0105 - val_loss: 0.0265
Epoch 202/300
3/3 [==============================] - ETA: 0s - loss: 0.0103
Epoch 202: val_loss did not improve from 0.02490
3/3 [==============================] - 0s 169ms/step - loss: 0.0103 - val_loss: 0.0259
Epoch 203/300
3/3 [==============================] - ETA: 0s - loss: 0.0105
Epoch 203: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 181ms/step - loss: 0.0105 - val_loss: 0.0254
Epoch 204/300
3/3 [==============================] - ETA: 0s - loss: 0.0103
Epoch 204: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 171ms/step - loss: 0.0103 - val_loss: 0.0255
Epoch 205/300
3/3 [==============================] - ETA: 0s - loss: 0.0102
Epoch 205: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 281ms/step - loss: 0.0102 - val_loss: 0.0249
Epoch 206/300
3/3 [==============================] - ETA: 0s - loss: 0.0103
Epoch 206: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 305ms/step - loss: 0.0103 - val_loss: 0.0251
Epoch 207/300
3/3 [==============================] - ETA: 0s - loss: 0.0098
Epoch 207: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 320ms/step - loss: 0.0098 - val_loss: 0.0256
Epoch 208/300
3/3 [==============================] - ETA: 0s - loss: 0.0098
Epoch 208: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 310ms/step - loss: 0.0098 - val_loss: 0.0251
Epoch 209/300
3/3 [==============================] - ETA: 0s - loss: 0.0099
Epoch 209: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 317ms/step - loss: 0.0099 - val_loss: 0.0253
Epoch 210/300
3/3 [==============================] - ETA: 0s - loss: 0.0098
Epoch 210: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 171ms/step - loss: 0.0098 - val_loss: 0.0263
Epoch 211/300
3/3 [==============================] - ETA: 0s - loss: 0.0096
Epoch 211: val_loss did not improve from 0.02490
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3/3 [==============================] - 1s 172ms/step - loss: 0.0096 - val_loss: 0.0250
Epoch 212/300
3/3 [==============================] - ETA: 0s - loss: 0.0095
Epoch 212: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 179ms/step - loss: 0.0095 - val_loss: 0.0251
Epoch 213/300
3/3 [==============================] - ETA: 0s - loss: 0.0093
Epoch 213: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 181ms/step - loss: 0.0093 - val_loss: 0.0260
Epoch 214/300
3/3 [==============================] - ETA: 0s - loss: 0.0091
Epoch 214: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 167ms/step - loss: 0.0091 - val_loss: 0.0250
Epoch 215/300
3/3 [==============================] - ETA: 0s - loss: 0.0091
Epoch 215: val_loss did not improve from 0.02490
3/3 [==============================] - 1s 181ms/step - loss: 0.0091 - val_loss: 0.0258
Epoch 216/300
3/3 [==============================] - ETA: 0s - loss: 0.0090
Epoch 216: val_loss improved from 0.02490 to 0.02477, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 185ms/step - loss: 0.0090 - val_loss: 0.0248
Epoch 217/300
3/3 [==============================] - ETA: 0s - loss: 0.0090
Epoch 217: val_loss did not improve from 0.02477
3/3 [==============================] - 1s 173ms/step - loss: 0.0090 - val_loss: 0.0253
Epoch 218/300
3/3 [==============================] - ETA: 0s - loss: 0.0087
Epoch 218: val_loss did not improve from 0.02477
3/3 [==============================] - 0s 164ms/step - loss: 0.0087 - val_loss: 0.0252
Epoch 219/300
3/3 [==============================] - ETA: 0s - loss: 0.0094
Epoch 219: val_loss did not improve from 0.02477
3/3 [==============================] - 1s 180ms/step - loss: 0.0094 - val_loss: 0.0263
Epoch 220/300
3/3 [==============================] - ETA: 0s - loss: 0.0092
Epoch 220: val_loss improved from 0.02477 to 0.02466, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 185ms/step - loss: 0.0092 - val_loss: 0.0247
Epoch 221/300
3/3 [==============================] - ETA: 0s - loss: 0.0088
Epoch 221: val_loss improved from 0.02466 to 0.02441, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 192ms/step - loss: 0.0088 - val_loss: 0.0244
Epoch 222/300
3/3 [==============================] - ETA: 0s - loss: 0.0092
Epoch 222: val_loss did not improve from 0.02441
3/3 [==============================] - 1s 178ms/step - loss: 0.0092 - val_loss: 0.0247
Epoch 223/300
3/3 [==============================] - ETA: 0s - loss: 0.0089
Epoch 223: val_loss did not improve from 0.02441
3/3 [==============================] - 1s 176ms/step - loss: 0.0089 - val_loss: 0.0248
Epoch 224/300
3/3 [==============================] - ETA: 0s - loss: 0.0084
Epoch 224: val_loss did not improve from 0.02441
3/3 [==============================] - 0s 167ms/step - loss: 0.0084 - val_loss: 0.0248
Epoch 225/300
3/3 [==============================] - ETA: 0s - loss: 0.0084
Epoch 225: val_loss did not improve from 0.02441
3/3 [==============================] - 1s 180ms/step - loss: 0.0084 - val_loss: 0.0245
Epoch 226/300
3/3 [==============================] - ETA: 0s - loss: 0.0083
Epoch 226: val_loss did not improve from 0.02441
3/3 [==============================] - 1s 167ms/step - loss: 0.0083 - val_loss: 0.0248
Epoch 227/300
3/3 [==============================] - ETA: 0s - loss: 0.0084
Epoch 227: val_loss did not improve from 0.02441
3/3 [==============================] - 1s 174ms/step - loss: 0.0084 - val_loss: 0.0254
Epoch 228/300
3/3 [==============================] - ETA: 0s - loss: 0.0083
Epoch 228: val_loss did not improve from 0.02441
3/3 [==============================] - 0s 167ms/step - loss: 0.0083 - val_loss: 0.0245
Epoch 229/300
3/3 [==============================] - ETA: 0s - loss: 0.0084
Epoch 229: val_loss improved from 0.02441 to 0.02429, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 190ms/step - loss: 0.0084 - val_loss: 0.0243
Epoch 230/300
3/3 [==============================] - ETA: 0s - loss: 0.0083
Epoch 230: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 170ms/step - loss: 0.0083 - val_loss: 0.0257
Epoch 231/300
3/3 [==============================] - ETA: 0s - loss: 0.0087
Epoch 231: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 173ms/step - loss: 0.0087 - val_loss: 0.0251
Epoch 232/300
3/3 [==============================] - ETA: 0s - loss: 0.0084
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Epoch 232: val_loss did not improve from 0.02429
3/3 [==============================] - 0s 164ms/step - loss: 0.0084 - val_loss: 0.0254
Epoch 233/300
3/3 [==============================] - ETA: 0s - loss: 0.0095
Epoch 233: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 177ms/step - loss: 0.0095 - val_loss: 0.0253
Epoch 234/300
3/3 [==============================] - ETA: 0s - loss: 0.0084
Epoch 234: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 168ms/step - loss: 0.0084 - val_loss: 0.0250
Epoch 235/300
3/3 [==============================] - ETA: 0s - loss: 0.0082
Epoch 235: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 187ms/step - loss: 0.0082 - val_loss: 0.0249
Epoch 236/300
3/3 [==============================] - ETA: 0s - loss: 0.0093
Epoch 236: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 171ms/step - loss: 0.0093 - val_loss: 0.0253
Epoch 237/300
3/3 [==============================] - ETA: 0s - loss: 0.0087
Epoch 237: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 174ms/step - loss: 0.0087 - val_loss: 0.0262
Epoch 238/300
3/3 [==============================] - ETA: 0s - loss: 0.0082
Epoch 238: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 171ms/step - loss: 0.0082 - val_loss: 0.0254
Epoch 239/300
3/3 [==============================] - ETA: 0s - loss: 0.0082
Epoch 239: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 176ms/step - loss: 0.0082 - val_loss: 0.0248
Epoch 240/300
3/3 [==============================] - ETA: 0s - loss: 0.0082
Epoch 240: val_loss did not improve from 0.02429
3/3 [==============================] - 1s 168ms/step - loss: 0.0082 - val_loss: 0.0254
Epoch 241/300
3/3 [==============================] - ETA: 0s - loss: 0.0081
Epoch 241: val_loss improved from 0.02429 to 0.02387, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 185ms/step - loss: 0.0081 - val_loss: 0.0239
Epoch 242/300
3/3 [==============================] - ETA: 0s - loss: 0.0084
Epoch 242: val_loss did not improve from 0.02387
3/3 [==============================] - 1s 170ms/step - loss: 0.0084 - val_loss: 0.0239
Epoch 243/300
3/3 [==============================] - ETA: 0s - loss: 0.0077
Epoch 243: val_loss did not improve from 0.02387
3/3 [==============================] - 1s 163ms/step - loss: 0.0077 - val_loss: 0.0245
Epoch 244/300
3/3 [==============================] - ETA: 0s - loss: 0.0076
Epoch 244: val_loss did not improve from 0.02387
3/3 [==============================] - 1s 170ms/step - loss: 0.0076 - val_loss: 0.0254
Epoch 245/300
3/3 [==============================] - ETA: 0s - loss: 0.0077
Epoch 245: val_loss did not improve from 0.02387
3/3 [==============================] - 1s 176ms/step - loss: 0.0077 - val_loss: 0.0258
Epoch 246/300
3/3 [==============================] - ETA: 0s - loss: 0.0077
Epoch 246: val_loss improved from 0.02387 to 0.02376, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 0.0077 - val_loss: 0.0238
Epoch 247/300
3/3 [==============================] - ETA: 0s - loss: 0.0077
Epoch 247: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 164ms/step - loss: 0.0077 - val_loss: 0.0241
Epoch 248/300
3/3 [==============================] - ETA: 0s - loss: 0.0091
Epoch 248: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 168ms/step - loss: 0.0091 - val_loss: 0.0284
Epoch 249/300
3/3 [==============================] - ETA: 0s - loss: 0.0102
Epoch 249: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 170ms/step - loss: 0.0102 - val_loss: 0.0260
Epoch 250/300
3/3 [==============================] - ETA: 0s - loss: 0.0094
Epoch 250: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 169ms/step - loss: 0.0094 - val_loss: 0.0261
Epoch 251/300
3/3 [==============================] - ETA: 0s - loss: 0.0096
Epoch 251: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 170ms/step - loss: 0.0096 - val_loss: 0.0250
Epoch 252/300
3/3 [==============================] - ETA: 0s - loss: 0.0085
Epoch 252: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 169ms/step - loss: 0.0085 - val_loss: 0.0265
Epoch 253/300
```

```
3/3 [==============================] - ETA: 0s - loss: 0.0087
Epoch 253: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 168ms/step - loss: 0.0087 - val_loss: 0.0269
Epoch 254/300
3/3 [==============================] - ETA: 0s - loss: 0.0110
Epoch 254: val_loss did not improve from 0.02376
3/3 [==============================] - 0s 164ms/step - loss: 0.0110 - val_loss: 0.0253
Epoch 255/300
3/3 [==============================] - ETA: 0s - loss: 0.0090
Epoch 255: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 174ms/step - loss: 0.0090 - val_loss: 0.0309
Epoch 256/300
3/3 [==============================] - ETA: 0s - loss: 0.0095
Epoch 256: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 170ms/step - loss: 0.0095 - val_loss: 0.0267
Epoch 257/300
3/3 [==============================] - ETA: 0s - loss: 0.0113
Epoch 257: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 166ms/step - loss: 0.0113 - val_loss: 0.0260
Epoch 258/300
3/3 [==============================] - ETA: 0s - loss: 0.0088
Epoch 258: val_loss did not improve from 0.02376
3/3 [==============================] - 1s 187ms/step - loss: 0.0088 - val_loss: 0.0244
Epoch 259/300
3/3 [==============================] - ETA: 0s - loss: 0.0098
Epoch 259: val_loss improved from 0.02376 to 0.02348, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 190ms/step - loss: 0.0098 - val_loss: 0.0235
Epoch 260/300
3/3 [==============================] - ETA: 0s - loss: 0.0080
Epoch 260: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 181ms/step - loss: 0.0080 - val_loss: 0.0258
Epoch 261/300
3/3 [==============================] - ETA: 0s - loss: 0.0079
Epoch 261: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 177ms/step - loss: 0.0079 - val_loss: 0.0243
Epoch 262/300
3/3 [==============================] - ETA: 0s - loss: 0.0072
Epoch 262: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 179ms/step - loss: 0.0072 - val_loss: 0.0267
Epoch 263/300
3/3 [==============================] - ETA: 0s - loss: 0.0075
Epoch 263: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 167ms/step - loss: 0.0075 - val_loss: 0.0244
Epoch 264/300
3/3 [==============================] - ETA: 0s - loss: 0.0073
Epoch 264: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 174ms/step - loss: 0.0073 - val_loss: 0.0248
Epoch 265/300
3/3 [==============================] - ETA: 0s - loss: 0.0072
Epoch 265: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 174ms/step - loss: 0.0072 - val_loss: 0.0242
Epoch 266/300
3/3 [==============================] - ETA: 0s - loss: 0.0070
Epoch 266: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 181ms/step - loss: 0.0070 - val_loss: 0.0236
Epoch 267/300
3/3 [==============================] - ETA: 0s - loss: 0.0072
Epoch 267: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 169ms/step - loss: 0.0072 - val_loss: 0.0259
Epoch 268/300
3/3 [==============================] - ETA: 0s - loss: 0.0077
Epoch 268: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 179ms/step - loss: 0.0077 - val_loss: 0.0237
Epoch 269/300
3/3 [==============================] - ETA: 0s - loss: 0.0069
Epoch 269: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 177ms/step - loss: 0.0069 - val_loss: 0.0238
Epoch 270/300
3/3 [==============================] - ETA: 0s - loss: 0.0072
Epoch 270: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 177ms/step - loss: 0.0072 - val_loss: 0.0251
Epoch 271/300
3/3 [==============================] - ETA: 0s - loss: 0.0072
Epoch 271: val_loss did not improve from 0.02348
3/3 [==============================] - 1s 169ms/step - loss: 0.0072 - val_loss: 0.0238
Epoch 272/300
3/3 [==============================] - ETA: 0s - loss: 0.0067
Epoch 272: val_loss improved from 0.02348 to 0.02333, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 186ms/step - loss: 0.0067 - val_loss: 0.0233
Epoch 273/300
3/3 [==============================] - ETA: 0s - loss: 0.0066
Epoch 273: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 171ms/step - loss: 0.0066 - val_loss: 0.0255
```

```
Epoch 274/300
3/3 [==============================] - ETA: 0s - loss: 0.0069
Epoch 274: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 182ms/step - loss: 0.0069 - val_loss: 0.0236
Epoch 275/300
3/3 [==============================] - ETA: 0s - loss: 0.0068
Epoch 275: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 167ms/step - loss: 0.0068 - val_loss: 0.0235
Epoch 276/300
3/3 [==============================] - ETA: 0s - loss: 0.0067
Epoch 276: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 173ms/step - loss: 0.0067 - val_loss: 0.0254
Epoch 277/300
3/3 [==============================] - ETA: 0s - loss: 0.0075
Epoch 277: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 170ms/step - loss: 0.0075 - val_loss: 0.0235
Epoch 278/300
3/3 [==============================] - ETA: 0s - loss: 0.0075
Epoch 278: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 178ms/step - loss: 0.0075 - val_loss: 0.0235
Epoch 279/300
3/3 [==============================] - ETA: 0s - loss: 0.0069
Epoch 279: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 171ms/step - loss: 0.0069 - val_loss: 0.0258
Epoch 280/300
3/3 [==============================] - ETA: 0s - loss: 0.0071
Epoch 280: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 190ms/step - loss: 0.0071 - val_loss: 0.0236
Epoch 281/300
3/3 [==============================] - ETA: 0s - loss: 0.0066
Epoch 281: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 170ms/step - loss: 0.0066 - val_loss: 0.0236
Epoch 282/300
3/3 [==============================] - ETA: 0s - loss: 0.0063
Epoch 282: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 174ms/step - loss: 0.0063 - val_loss: 0.0249
Epoch 283/300
3/3 [==============================] - ETA: 0s - loss: 0.0064
Epoch 283: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 172ms/step - loss: 0.0064 - val_loss: 0.0240
Epoch 284/300
3/3 [==============================] - ETA: 0s - loss: 0.0063
Epoch 284: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 183ms/step - loss: 0.0063 - val_loss: 0.0242
Epoch 285/300
3/3 [==============================] - ETA: 0s - loss: 0.0062
Epoch 285: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 171ms/step - loss: 0.0062 - val_loss: 0.0244
Epoch 286/300
3/3 [==============================] - ETA: 0s - loss: 0.0064
Epoch 286: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 174ms/step - loss: 0.0064 - val_loss: 0.0234
Epoch 287/300
3/3 [==============================] - ETA: 0s - loss: 0.0063
Epoch 287: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 184ms/step - loss: 0.0063 - val_loss: 0.0234
Epoch 288/300
3/3 [==============================] - ETA: 0s - loss: 0.0069
Epoch 288: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 183ms/step - loss: 0.0069 - val_loss: 0.0265
Epoch 289/300
3/3 [==============================] - ETA: 0s - loss: 0.0081
Epoch 289: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 172ms/step - loss: 0.0081 - val_loss: 0.0237
Epoch 290/300
3/3 [==============================] - ETA: 0s - loss: 0.0072
Epoch 290: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 177ms/step - loss: 0.0072 - val_loss: 0.0241
Epoch 291/300
3/3 [==============================] - ETA: 0s - loss: 0.0074
Epoch 291: val_loss did not improve from 0.02333
3/3 [==============================] - 1s 172ms/step - loss: 0.0074 - val_loss: 0.0260
Epoch 292/300
3/3 [==============================] - ETA: 0s - loss: 0.0075
Epoch 292: val_loss improved from 0.02333 to 0.02304, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 186ms/step - loss: 0.0075 - val_loss: 0.0230
Epoch 293/300
3/3 [==============================] - ETA: 0s - loss: 0.0068
Epoch 293: val_loss improved from 0.02304 to 0.02295, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 188ms/step - loss: 0.0068 - val_loss: 0.0230
Epoch 294/300
3/3 [==============================] - ETA: 0s - loss: 0.0067
Epoch 294: val_loss did not improve from 0.02295
```

```
3/3 [==============================] - 1s 170ms/step - loss: 0.0067 - val_loss: 0.0254
Epoch 295/300
3/3 [==============================] - ETA: 0s - loss: 0.0068
Epoch 295: val_loss did not improve from 0.02295
3/3 [==============================] - 1s 184ms/step - loss: 0.0068 - val_loss: 0.0235
Epoch 296/300
3/3 [==============================] - ETA: 0s - loss: 0.0066
Epoch 296: val_loss did not improve from 0.02295
3/3 [==============================] - 1s 169ms/step - loss: 0.0066 - val_loss: 0.0233
Epoch 297/300
3/3 [==============================] - ETA: 0s - loss: 0.0063
Epoch 297: val_loss did not improve from 0.02295
3/3 [==============================] - 1s 177ms/step - loss: 0.0063 - val_loss: 0.0254
Epoch 298/300
3/3 [==============================] - ETA: 0s - loss: 0.0065
Epoch 298: val_loss did not improve from 0.02295
3/3 [==============================] - 1s 174ms/step - loss: 0.0065 - val_loss: 0.0240
Epoch 299/300
3/3 [==============================] - ETA: 0s - loss: 0.0074
Epoch 299: val_loss did not improve from 0.02295
3/3 [==============================] - 1s 175ms/step - loss: 0.0074 - val_loss: 0.0240
Epoch 300/300
3/3 [==============================] - ETA: 0s - loss: 0.0068
Epoch 300: val_loss did not improve from 0.02295
3/3 [==============================] - 1s 173ms/step - loss: 0.0068 - val_loss: 0.0240
Created model and loaded weights from file
```

In [278]:

```
results.loc[index,['Architecture','Dropout and pooling','kernel size','Loss Fn', 'LR']] = ['CNN 2D','No Dropout Layers, 3 max-pooling layers', 2, 'Mean-Squared-Error', 0.0001]
```

Train & Validation (MSE)

In [279]:

```
train_val_evaluation(model,results,index)
```

```
Train MSE: 0.006355891469866037
Validation MSE: 0.02295304648578167
```

Prediction

In [276]:

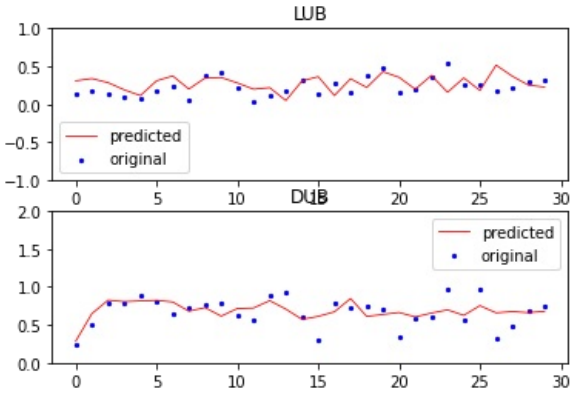
```
y_pred = model.predict(x_test)
print(y_pred)
```

```
1/1 [==============================] - 0s 93ms/step
[[0.31032667 0.28322095]
 [0.33963287 0.64571655]
 [0.2864222  0.82364225]
 [0.19179119 0.8041955 ]
 [0.1162512  0.8136891 ]
 [0.30992642 0.8208827 ]
 [0.37431777 0.8005483 ]
 [0.20197259 0.6782805 ]
 [0.34682342 0.7257631 ]
 [0.3540831  0.61406744]
 [0.2823682  0.7141821 ]
 [0.19975479 0.72082984]
 [0.21944126 0.8177727 ]
 [0.05056515 0.705973  ]
 [0.3092994  0.5709652 ]
 [0.36490273 0.61080337]
 [0.11614383 0.6703699 ]
 [0.33772257 0.8458569 ]
 [0.22237131 0.6096601 ]
 [0.4303692  0.6362823 ]
 [0.35624743 0.661567  ]
 [0.19967681 0.6034355 ]
 [0.3803001  0.65420425]
 [0.15955134 0.69636244]
 [0.3486653  0.6244632 ]
 [0.1831757  0.751526  ]
 [0.51632273 0.6570137 ]
 [0.3714193  0.6742134 ]
 [0.2535278  0.6595578 ]
 [0.22824517 0.6778088 ]]
```

Plotting the predicted locations of LUB and DUB VS their original locations:

In [277]:

```
plot_LUB_DUB(y_test, y_pred)
```



Evaluation Metrics

Mean Squared Error (MSE), Root Mean Squared Error (RMSE), and Mean Absolute Error (MAE):

In [280]:

```
test_evaluation(model, y_pred,results,index)
```

```
Test MSE: 0.027629105374217033
Test RMSE: 0.15296251439532638
Test MAE: 0.1232626470469733
```

COMMENTS

> Overfitting was observed.

In [281]:

```
index = index + 1
results
```

Out[281]:

	Architecture	LR	Dropout and pooling	kernel size	Loss Fn	Train MSE	Validation MSE	Test MSE	Test RMSE	Test MAE
0	CNN 2D	0.0001	No Dropout Layers, 1 max-pooling layer	1	Mean-Squared-Error	0.021081	0.018341	0.019292	0.138705	0.106015
1	CNN 2D	0.0001	No Dropout Layers, 3 max-pooling layers	2	Mean-Squared-Error	0.006356	0.022953	0.027629	0.152963	0.123263

ANN Experiment 1:

In [282]:

```
from keras.layers import BatchNormalization
model = Sequential()


model.add(Dense(64, input_shape=(x_train[1].shape)))
model.add(BatchNormalization())
model.add(Activation('relu'))

model.add(Dense(32))
model.add(BatchNormalization())
model.add(Activation('relu'))

model.add(Dense(16))
model.add(Activation('relu'))
model.add(Dropout(0.1))

model.add(GlobalAveragePooling2D())
model.add(Dense(2, activation='linear'))
model.summary()
```

```
Model: "sequential_32"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 dense_57 (Dense)            (None, 40, 137, 64)       128

 batch_normalization_16 (Bat  (None, 40, 137, 64)      256
 chNormalization)

 activation_29 (Activation)  (None, 40, 137, 64)       0

 dense_58 (Dense)            (None, 40, 137, 32)       2080

 batch_normalization_17 (Bat  (None, 40, 137, 32)      128
 chNormalization)

 activation_30 (Activation)  (None, 40, 137, 32)       0

 dense_59 (Dense)            (None, 40, 137, 16)       528

 activation_31 (Activation)  (None, 40, 137, 16)       0

 dropout_17 (Dropout)        (None, 40, 137, 16)       0

 global_average_pooling2d_30  (None, 16)               0
  (GlobalAveragePooling2D)

 dense_60 (Dense)            (None, 2)                 34

=================================================================
Total params: 3,154
Trainable params: 2,962
Non-trainable params: 192
_________________________________________________________________
```

In [283]:

```
history , model = compile_fit(model, epoch_no=350)
```

```
Epoch 1/350
3/3 [==============================] - ETA: 0s - loss: 0.2766
Epoch 1: val_loss improved from inf to 0.33637, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 613ms/step - loss: 0.2766 - val_loss: 0.3364
Epoch 2/350
3/3 [==============================] - ETA: 0s - loss: 0.2044
Epoch 2: val_loss improved from 0.33637 to 0.31337, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 531ms/step - loss: 0.2044 - val_loss: 0.3134
Epoch 3/350
3/3 [==============================] - ETA: 0s - loss: 0.1613
Epoch 3: val_loss improved from 0.31337 to 0.30053, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 529ms/step - loss: 0.1613 - val_loss: 0.3005
Epoch 4/350
3/3 [==============================] - ETA: 0s - loss: 0.1334
Epoch 4: val_loss improved from 0.30053 to 0.28379, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 533ms/step - loss: 0.1334 - val_loss: 0.2838
Epoch 5/350
3/3 [==============================] - ETA: 0s - loss: 0.1109
Epoch 5: val_loss improved from 0.28379 to 0.26369, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 541ms/step - loss: 0.1109 - val_loss: 0.2637
Epoch 6/350
3/3 [==============================] - ETA: 0s - loss: 0.0912
```

```
Epoch 6: val_loss improved from 0.26369 to 0.24191, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 519ms/step - loss: 0.0912 - val_loss: 0.2419
Epoch 7/350
3/3 [==============================] - ETA: 0s - loss: 0.0727
Epoch 7: val_loss improved from 0.24191 to 0.22159, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 503ms/step - loss: 0.0727 - val_loss: 0.2216
Epoch 8/350
3/3 [==============================] - ETA: 0s - loss: 0.0572
Epoch 8: val_loss improved from 0.22159 to 0.20189, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 508ms/step - loss: 0.0572 - val_loss: 0.2019
Epoch 9/350
3/3 [==============================] - ETA: 0s - loss: 0.0453
Epoch 9: val_loss improved from 0.20189 to 0.18177, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 517ms/step - loss: 0.0453 - val_loss: 0.1818
Epoch 10/350
3/3 [==============================] - ETA: 0s - loss: 0.0361
Epoch 10: val_loss improved from 0.18177 to 0.16346, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 503ms/step - loss: 0.0361 - val_loss: 0.1635
Epoch 11/350
3/3 [==============================] - ETA: 0s - loss: 0.0302
Epoch 11: val_loss improved from 0.16346 to 0.14831, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 507ms/step - loss: 0.0302 - val_loss: 0.1483
Epoch 12/350
3/3 [==============================] - ETA: 0s - loss: 0.0270
Epoch 12: val_loss improved from 0.14831 to 0.13479, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 510ms/step - loss: 0.0270 - val_loss: 0.1348
Epoch 13/350
3/3 [==============================] - ETA: 0s - loss: 0.0246
Epoch 13: val_loss improved from 0.13479 to 0.12359, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 500ms/step - loss: 0.0246 - val_loss: 0.1236
Epoch 14/350
3/3 [==============================] - ETA: 0s - loss: 0.0241
Epoch 14: val_loss improved from 0.12359 to 0.11466, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0241 - val_loss: 0.1147
Epoch 15/350
3/3 [==============================] - ETA: 0s - loss: 0.0240
Epoch 15: val_loss improved from 0.11466 to 0.10771, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 519ms/step - loss: 0.0240 - val_loss: 0.1077
Epoch 16/350
3/3 [==============================] - ETA: 0s - loss: 0.0240
Epoch 16: val_loss improved from 0.10771 to 0.10243, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 512ms/step - loss: 0.0240 - val_loss: 0.1024
Epoch 17/350
3/3 [==============================] - ETA: 0s - loss: 0.0238
Epoch 17: val_loss improved from 0.10243 to 0.09866, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 514ms/step - loss: 0.0238 - val_loss: 0.0987
Epoch 18/350
3/3 [==============================] - ETA: 0s - loss: 0.0236
Epoch 18: val_loss improved from 0.09866 to 0.09588, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 510ms/step - loss: 0.0236 - val_loss: 0.0959
Epoch 19/350
3/3 [==============================] - ETA: 0s - loss: 0.0234
Epoch 19: val_loss improved from 0.09588 to 0.09346, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 512ms/step - loss: 0.0234 - val_loss: 0.0935
Epoch 20/350
3/3 [==============================] - ETA: 0s - loss: 0.0226
Epoch 20: val_loss improved from 0.09346 to 0.09216, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 505ms/step - loss: 0.0226 - val_loss: 0.0922
Epoch 21/350
3/3 [==============================] - ETA: 0s - loss: 0.0226
Epoch 21: val_loss improved from 0.09216 to 0.09055, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 530ms/step - loss: 0.0226 - val_loss: 0.0906
Epoch 22/350
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 22: val_loss improved from 0.09055 to 0.08927, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 521ms/step - loss: 0.0217 - val_loss: 0.0893
Epoch 23/350
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 23: val_loss improved from 0.08927 to 0.08762, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 510ms/step - loss: 0.0217 - val_loss: 0.0876
Epoch 24/350
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 24: val_loss improved from 0.08762 to 0.08516, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0217 - val_loss: 0.0852
Epoch 25/350
3/3 [==============================] - ETA: 0s - loss: 0.0221
Epoch 25: val_loss improved from 0.08516 to 0.08225, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 517ms/step - loss: 0.0221 - val_loss: 0.0823
Epoch 26/350
3/3 [==============================] - ETA: 0s - loss: 0.0218
Epoch 26: val_loss improved from 0.08225 to 0.07877, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 528ms/step - loss: 0.0218 - val_loss: 0.0788
Epoch 27/350
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3/3 [==============================] - ETA: 0s - loss: 0.0214
Epoch 27: val_loss improved from 0.07877 to 0.07514, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 518ms/step - loss: 0.0214 - val_loss: 0.0751
Epoch 28/350
3/3 [==============================] - ETA: 0s - loss: 0.0222
Epoch 28: val_loss improved from 0.07514 to 0.07184, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 515ms/step - loss: 0.0222 - val_loss: 0.0718
Epoch 29/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 29: val_loss improved from 0.07184 to 0.06948, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 516ms/step - loss: 0.0213 - val_loss: 0.0695
Epoch 30/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 30: val_loss improved from 0.06948 to 0.06755, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 525ms/step - loss: 0.0213 - val_loss: 0.0676
Epoch 31/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 31: val_loss improved from 0.06755 to 0.06585, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 517ms/step - loss: 0.0211 - val_loss: 0.0659
Epoch 32/350
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 32: val_loss improved from 0.06585 to 0.06369, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 508ms/step - loss: 0.0212 - val_loss: 0.0637
Epoch 33/350
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 33: val_loss improved from 0.06369 to 0.06125, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 521ms/step - loss: 0.0212 - val_loss: 0.0612
Epoch 34/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 34: val_loss improved from 0.06125 to 0.05953, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0210 - val_loss: 0.0595
Epoch 35/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 35: val_loss improved from 0.05953 to 0.05799, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0209 - val_loss: 0.0580
Epoch 36/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 36: val_loss improved from 0.05799 to 0.05657, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0211 - val_loss: 0.0566
Epoch 37/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 37: val_loss improved from 0.05657 to 0.05526, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 526ms/step - loss: 0.0208 - val_loss: 0.0553
Epoch 38/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 38: val_loss improved from 0.05526 to 0.05388, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0209 - val_loss: 0.0539
Epoch 39/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 39: val_loss improved from 0.05388 to 0.05230, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0211 - val_loss: 0.0523
Epoch 40/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 40: val_loss improved from 0.05230 to 0.05116, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 533ms/step - loss: 0.0211 - val_loss: 0.0512
Epoch 41/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 41: val_loss improved from 0.05116 to 0.05010, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 511ms/step - loss: 0.0210 - val_loss: 0.0501
Epoch 42/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 42: val_loss improved from 0.05010 to 0.04861, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 521ms/step - loss: 0.0209 - val_loss: 0.0486
Epoch 43/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 43: val_loss improved from 0.04861 to 0.04742, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 521ms/step - loss: 0.0209 - val_loss: 0.0474
Epoch 44/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 44: val_loss improved from 0.04742 to 0.04672, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 516ms/step - loss: 0.0211 - val_loss: 0.0467
Epoch 45/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 45: val_loss improved from 0.04672 to 0.04616, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 516ms/step - loss: 0.0209 - val_loss: 0.0462
Epoch 46/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 46: val_loss improved from 0.04616 to 0.04515, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 512ms/step - loss: 0.0209 - val_loss: 0.0452
Epoch 47/350
3/3 [==============================] - ETA: 0s - loss: 0.0216
Epoch 47: val_loss improved from 0.04515 to 0.04370, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0216 - val_loss: 0.0437
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Epoch 48/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 48: val_loss improved from 0.04370 to 0.04300, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 509ms/step - loss: 0.0213 - val_loss: 0.0430
Epoch 49/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 49: val_loss improved from 0.04300 to 0.04192, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 501ms/step - loss: 0.0210 - val_loss: 0.0419
Epoch 50/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 50: val_loss improved from 0.04192 to 0.04125, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 500ms/step - loss: 0.0208 - val_loss: 0.0412
Epoch 51/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 51: val_loss improved from 0.04125 to 0.04032, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 504ms/step - loss: 0.0209 - val_loss: 0.0403
Epoch 52/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 52: val_loss improved from 0.04032 to 0.03861, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0211 - val_loss: 0.0386
Epoch 53/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 53: val_loss improved from 0.03861 to 0.03746, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0206 - val_loss: 0.0375
Epoch 54/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 54: val_loss improved from 0.03746 to 0.03654, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 502ms/step - loss: 0.0209 - val_loss: 0.0365
Epoch 55/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 55: val_loss improved from 0.03654 to 0.03580, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 511ms/step - loss: 0.0208 - val_loss: 0.0358
Epoch 56/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 56: val_loss improved from 0.03580 to 0.03539, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 517ms/step - loss: 0.0204 - val_loss: 0.0354
Epoch 57/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 57: val_loss improved from 0.03539 to 0.03468, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 509ms/step - loss: 0.0210 - val_loss: 0.0347
Epoch 58/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 58: val_loss improved from 0.03468 to 0.03377, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0206 - val_loss: 0.0338
Epoch 59/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 59: val_loss improved from 0.03377 to 0.03298, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 518ms/step - loss: 0.0211 - val_loss: 0.0330
Epoch 60/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 60: val_loss improved from 0.03298 to 0.03257, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 509ms/step - loss: 0.0211 - val_loss: 0.0326
Epoch 61/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 61: val_loss improved from 0.03257 to 0.03177, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 505ms/step - loss: 0.0211 - val_loss: 0.0318
Epoch 62/350
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 62: val_loss improved from 0.03177 to 0.03116, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 526ms/step - loss: 0.0212 - val_loss: 0.0312
Epoch 63/350
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 63: val_loss improved from 0.03116 to 0.03092, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 522ms/step - loss: 0.0212 - val_loss: 0.0309
Epoch 64/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 64: val_loss improved from 0.03092 to 0.02999, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 508ms/step - loss: 0.0209 - val_loss: 0.0300
Epoch 65/350
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 65: val_loss improved from 0.02999 to 0.02903, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 518ms/step - loss: 0.0212 - val_loss: 0.0290
Epoch 66/350
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 66: val_loss improved from 0.02903 to 0.02837, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 524ms/step - loss: 0.0217 - val_loss: 0.0284
Epoch 67/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 67: val_loss improved from 0.02837 to 0.02821, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 506ms/step - loss: 0.0207 - val_loss: 0.0282
Epoch 68/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 68: val_loss improved from 0.02821 to 0.02777, saving model to /content/weights.best.hdf5
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3/3 [==============================] - 2s 512ms/step - loss: 0.0207 - val_loss: 0.0278
Epoch 69/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 69: val_loss improved from 0.02777 to 0.02772, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0211 - val_loss: 0.0277
Epoch 70/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 70: val_loss improved from 0.02772 to 0.02725, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 515ms/step - loss: 0.0208 - val_loss: 0.0273
Epoch 71/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 71: val_loss improved from 0.02725 to 0.02723, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0205 - val_loss: 0.0272
Epoch 72/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 72: val_loss improved from 0.02723 to 0.02698, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 525ms/step - loss: 0.0210 - val_loss: 0.0270
Epoch 73/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 73: val_loss improved from 0.02698 to 0.02685, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 510ms/step - loss: 0.0206 - val_loss: 0.0268
Epoch 74/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 74: val_loss improved from 0.02685 to 0.02650, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 508ms/step - loss: 0.0207 - val_loss: 0.0265
Epoch 75/350
3/3 [==============================] - ETA: 0s - loss: 0.0218
Epoch 75: val_loss improved from 0.02650 to 0.02574, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 516ms/step - loss: 0.0218 - val_loss: 0.0257
Epoch 76/350
3/3 [==============================] - ETA: 0s - loss: 0.0226
Epoch 76: val_loss did not improve from 0.02574
3/3 [==============================] - 2s 513ms/step - loss: 0.0226 - val_loss: 0.0260
Epoch 77/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 77: val_loss improved from 0.02574 to 0.02528, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0206 - val_loss: 0.0253
Epoch 78/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 78: val_loss improved from 0.02528 to 0.02440, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 521ms/step - loss: 0.0207 - val_loss: 0.0244
Epoch 79/350
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 79: val_loss improved from 0.02440 to 0.02363, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0215 - val_loss: 0.0236
Epoch 80/350
3/3 [==============================] - ETA: 0s - loss: 0.0214
Epoch 80: val_loss improved from 0.02363 to 0.02331, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 514ms/step - loss: 0.0214 - val_loss: 0.0233
Epoch 81/350
3/3 [==============================] - ETA: 0s - loss: 0.0216
Epoch 81: val_loss did not improve from 0.02331
3/3 [==============================] - 2s 509ms/step - loss: 0.0216 - val_loss: 0.0235
Epoch 82/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 82: val_loss improved from 0.02331 to 0.02298, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 518ms/step - loss: 0.0206 - val_loss: 0.0230
Epoch 83/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 83: val_loss improved from 0.02298 to 0.02208, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 524ms/step - loss: 0.0209 - val_loss: 0.0221
Epoch 84/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 84: val_loss improved from 0.02208 to 0.02161, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 528ms/step - loss: 0.0203 - val_loss: 0.0216
Epoch 85/350
3/3 [==============================] - ETA: 0s - loss: 0.0223
Epoch 85: val_loss improved from 0.02161 to 0.02132, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 513ms/step - loss: 0.0223 - val_loss: 0.0213
Epoch 86/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 86: val_loss improved from 0.02132 to 0.02131, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 525ms/step - loss: 0.0204 - val_loss: 0.0213
Epoch 87/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 87: val_loss improved from 0.02131 to 0.02131, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 516ms/step - loss: 0.0205 - val_loss: 0.0213
Epoch 88/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 88: val_loss improved from 0.02131 to 0.02118, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 510ms/step - loss: 0.0205 - val_loss: 0.0212
Epoch 89/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
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Epoch 89: val_loss improved from 0.02118 to 0.02084, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 519ms/step - loss: 0.0205 - val_loss: 0.0208
Epoch 90/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 90: val_loss improved from 0.02084 to 0.02048, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 511ms/step - loss: 0.0213 - val_loss: 0.0205
Epoch 91/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 91: val_loss improved from 0.02048 to 0.02013, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 524ms/step - loss: 0.0205 - val_loss: 0.0201
Epoch 92/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 92: val_loss improved from 0.02013 to 0.02000, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0206 - val_loss: 0.0200
Epoch 93/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 93: val_loss did not improve from 0.02000
3/3 [==============================] - 2s 501ms/step - loss: 0.0204 - val_loss: 0.0201
Epoch 94/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 94: val_loss did not improve from 0.02000
3/3 [==============================] - 2s 503ms/step - loss: 0.0205 - val_loss: 0.0203
Epoch 95/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 95: val_loss did not improve from 0.02000
3/3 [==============================] - 2s 513ms/step - loss: 0.0208 - val_loss: 0.0203
Epoch 96/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 96: val_loss did not improve from 0.02000
3/3 [==============================] - 2s 497ms/step - loss: 0.0205 - val_loss: 0.0202
Epoch 97/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 97: val_loss improved from 0.02000 to 0.01994, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 520ms/step - loss: 0.0205 - val_loss: 0.0199
Epoch 98/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 98: val_loss improved from 0.01994 to 0.01975, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 516ms/step - loss: 0.0208 - val_loss: 0.0198
Epoch 99/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 99: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 505ms/step - loss: 0.0204 - val_loss: 0.0198
Epoch 100/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 100: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 522ms/step - loss: 0.0208 - val_loss: 0.0199
Epoch 101/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 101: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 518ms/step - loss: 0.0206 - val_loss: 0.0198
Epoch 102/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 102: val_loss improved from 0.01975 to 0.01970, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 532ms/step - loss: 0.0206 - val_loss: 0.0197
Epoch 103/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 103: val_loss improved from 0.01970 to 0.01957, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 731ms/step - loss: 0.0205 - val_loss: 0.0196
Epoch 104/350
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 104: val_loss improved from 0.01957 to 0.01945, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 894ms/step - loss: 0.0217 - val_loss: 0.0194
Epoch 105/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 105: val_loss improved from 0.01945 to 0.01942, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 530ms/step - loss: 0.0203 - val_loss: 0.0194
Epoch 106/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 106: val_loss did not improve from 0.01942
3/3 [==============================] - 2s 500ms/step - loss: 0.0206 - val_loss: 0.0194
Epoch 107/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 107: val_loss did not improve from 0.01942
3/3 [==============================] - 2s 500ms/step - loss: 0.0205 - val_loss: 0.0195
Epoch 108/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 108: val_loss did not improve from 0.01942
3/3 [==============================] - 2s 489ms/step - loss: 0.0204 - val_loss: 0.0194
Epoch 109/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 109: val_loss improved from 0.01942 to 0.01927, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 518ms/step - loss: 0.0204 - val_loss: 0.0193
Epoch 110/350
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3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 110: val_loss improved from 0.01927 to 0.01912, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 510ms/step - loss: 0.0208 - val_loss: 0.0191
Epoch 111/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 111: val_loss did not improve from 0.01912
3/3 [==============================] - 2s 497ms/step - loss: 0.0208 - val_loss: 0.0192
Epoch 112/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 112: val_loss did not improve from 0.01912
3/3 [==============================] - 2s 512ms/step - loss: 0.0205 - val_loss: 0.0193
Epoch 113/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 113: val_loss did not improve from 0.01912
3/3 [==============================] - 2s 495ms/step - loss: 0.0206 - val_loss: 0.0193
Epoch 114/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 114: val_loss improved from 0.01912 to 0.01912, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 509ms/step - loss: 0.0209 - val_loss: 0.0191
Epoch 115/350
3/3 [==============================] - ETA: 0s - loss: 0.0218
Epoch 115: val_loss improved from 0.01912 to 0.01906, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 525ms/step - loss: 0.0218 - val_loss: 0.0191
Epoch 116/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 116: val_loss improved from 0.01906 to 0.01899, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 521ms/step - loss: 0.0204 - val_loss: 0.0190
Epoch 117/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 117: val_loss improved from 0.01899 to 0.01898, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 509ms/step - loss: 0.0207 - val_loss: 0.0190
Epoch 118/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 118: val_loss improved from 0.01898 to 0.01896, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 515ms/step - loss: 0.0205 - val_loss: 0.0190
Epoch 119/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 119: val_loss improved from 0.01896 to 0.01895, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 519ms/step - loss: 0.0204 - val_loss: 0.0189
Epoch 120/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 120: val_loss improved from 0.01895 to 0.01891, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 539ms/step - loss: 0.0203 - val_loss: 0.0189
Epoch 121/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 121: val_loss did not improve from 0.01891
3/3 [==============================] - 2s 501ms/step - loss: 0.0213 - val_loss: 0.0189
Epoch 122/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 122: val_loss did not improve from 0.01891
3/3 [==============================] - 2s 503ms/step - loss: 0.0204 - val_loss: 0.0190
Epoch 123/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 123: val_loss did not improve from 0.01891
3/3 [==============================] - 2s 502ms/step - loss: 0.0204 - val_loss: 0.0190
Epoch 124/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 124: val_loss did not improve from 0.01891
3/3 [==============================] - 2s 505ms/step - loss: 0.0210 - val_loss: 0.0189
Epoch 125/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 125: val_loss did not improve from 0.01891
3/3 [==============================] - 2s 498ms/step - loss: 0.0205 - val_loss: 0.0189
Epoch 126/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 126: val_loss improved from 0.01891 to 0.01890, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 519ms/step - loss: 0.0208 - val_loss: 0.0189
Epoch 127/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 127: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0207 - val_loss: 0.0189
Epoch 128/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 128: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0201 - val_loss: 0.0189
Epoch 129/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 129: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0202 - val_loss: 0.0189
Epoch 130/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 130: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0205 - val_loss: 0.0190
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Epoch 131/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 131: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 493ms/step - loss: 0.0207 - val_loss: 0.0191
Epoch 132/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 132: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 491ms/step - loss: 0.0213 - val_loss: 0.0191
Epoch 133/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 133: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0206 - val_loss: 0.0191
Epoch 134/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 134: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0205 - val_loss: 0.0191
Epoch 135/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 135: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0207 - val_loss: 0.0190
Epoch 136/350
3/3 [==============================] - ETA: 0s - loss: 0.0199
Epoch 136: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0199 - val_loss: 0.0191
Epoch 137/350
3/3 [==============================] - ETA: 0s - loss: 0.0221
Epoch 137: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0221 - val_loss: 0.0191
Epoch 138/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 138: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0210 - val_loss: 0.0194
Epoch 139/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 139: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0204 - val_loss: 0.0194
Epoch 140/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 140: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 499ms/step - loss: 0.0205 - val_loss: 0.0194
Epoch 141/350
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 141: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0212 - val_loss: 0.0194
Epoch 142/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 142: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 495ms/step - loss: 0.0207 - val_loss: 0.0194
Epoch 143/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 143: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0206 - val_loss: 0.0194
Epoch 144/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 144: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 499ms/step - loss: 0.0207 - val_loss: 0.0193
Epoch 145/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 145: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0206 - val_loss: 0.0194
Epoch 146/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 146: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0210 - val_loss: 0.0195
Epoch 147/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 147: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0203 - val_loss: 0.0195
Epoch 148/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 148: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0209 - val_loss: 0.0193
Epoch 149/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 149: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0205 - val_loss: 0.0193
Epoch 150/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 150: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0209 - val_loss: 0.0194
Epoch 151/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 151: val_loss did not improve from 0.01890
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3/3 [==============================] - 2s 502ms/step - loss: 0.0203 - val_loss: 0.0193
Epoch 152/350
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 152: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0200 - val_loss: 0.0193
Epoch 153/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 153: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0204 - val_loss: 0.0193
Epoch 154/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 154: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 515ms/step - loss: 0.0206 - val_loss: 0.0193
Epoch 155/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 155: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0204 - val_loss: 0.0193
Epoch 156/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 156: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 512ms/step - loss: 0.0205 - val_loss: 0.0195
Epoch 157/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 157: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 523ms/step - loss: 0.0206 - val_loss: 0.0196
Epoch 158/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 158: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0204 - val_loss: 0.0195
Epoch 159/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 159: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0204 - val_loss: 0.0195
Epoch 160/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 160: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0204 - val_loss: 0.0196
Epoch 161/350
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 161: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0200 - val_loss: 0.0195
Epoch 162/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 162: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0204 - val_loss: 0.0195
Epoch 163/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 163: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0205 - val_loss: 0.0195
Epoch 164/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 164: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 517ms/step - loss: 0.0203 - val_loss: 0.0195
Epoch 165/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 165: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0208 - val_loss: 0.0196
Epoch 166/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 166: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 499ms/step - loss: 0.0202 - val_loss: 0.0197
Epoch 167/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 167: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0205 - val_loss: 0.0198
Epoch 168/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 168: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0203 - val_loss: 0.0198
Epoch 169/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 169: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 496ms/step - loss: 0.0209 - val_loss: 0.0197
Epoch 170/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 170: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0202 - val_loss: 0.0197
Epoch 171/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 171: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 491ms/step - loss: 0.0209 - val_loss: 0.0198
Epoch 172/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
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Epoch 172: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 524ms/step - loss: 0.0205 - val_loss: 0.0197
Epoch 173/350
3/3 [==============================] - ETA: 0s - loss: 0.0219
Epoch 173: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0219 - val_loss: 0.0196
Epoch 174/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 174: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0203 - val_loss: 0.0200
Epoch 175/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 175: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0210 - val_loss: 0.0204
Epoch 176/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 176: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 521ms/step - loss: 0.0204 - val_loss: 0.0205
Epoch 177/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 177: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0204 - val_loss: 0.0204
Epoch 178/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 178: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0205 - val_loss: 0.0202
Epoch 179/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 179: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 516ms/step - loss: 0.0205 - val_loss: 0.0201
Epoch 180/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 180: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0202 - val_loss: 0.0203
Epoch 181/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 181: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0207 - val_loss: 0.0203
Epoch 182/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 182: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0205 - val_loss: 0.0206
Epoch 183/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 183: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0206 - val_loss: 0.0205
Epoch 184/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 184: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0202 - val_loss: 0.0205
Epoch 185/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 185: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0208 - val_loss: 0.0203
Epoch 186/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 186: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 518ms/step - loss: 0.0208 - val_loss: 0.0202
Epoch 187/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 187: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0210 - val_loss: 0.0206
Epoch 188/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 188: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 495ms/step - loss: 0.0208 - val_loss: 0.0204
Epoch 189/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 189: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0208 - val_loss: 0.0207
Epoch 190/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 190: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 516ms/step - loss: 0.0213 - val_loss: 0.0208
Epoch 191/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 191: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0209 - val_loss: 0.0205
Epoch 192/350
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 192: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0215 - val_loss: 0.0201
Epoch 193/350
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3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 193: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0206 - val_loss: 0.0203
Epoch 194/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 194: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 542ms/step - loss: 0.0208 - val_loss: 0.0205
Epoch 195/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 195: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0203 - val_loss: 0.0207
Epoch 196/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 196: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0203 - val_loss: 0.0206
Epoch 197/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 197: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 495ms/step - loss: 0.0203 - val_loss: 0.0208
Epoch 198/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 198: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0203 - val_loss: 0.0208
Epoch 199/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 199: val_loss did not improve from 0.01890
3/3 [==============================] - 1s 485ms/step - loss: 0.0202 - val_loss: 0.0206
Epoch 200/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 200: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0203 - val_loss: 0.0205
Epoch 201/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 201: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 517ms/step - loss: 0.0203 - val_loss: 0.0202
Epoch 202/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 202: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 491ms/step - loss: 0.0205 - val_loss: 0.0203
Epoch 203/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 203: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0203 - val_loss: 0.0202
Epoch 204/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 204: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0204 - val_loss: 0.0200
Epoch 205/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 205: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0206 - val_loss: 0.0199
Epoch 206/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 206: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0209 - val_loss: 0.0199
Epoch 207/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 207: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 496ms/step - loss: 0.0201 - val_loss: 0.0200
Epoch 208/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 208: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0211 - val_loss: 0.0200
Epoch 209/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 209: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0203 - val_loss: 0.0203
Epoch 210/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 210: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0205 - val_loss: 0.0204
Epoch 211/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 211: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0201 - val_loss: 0.0202
Epoch 212/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 212: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0203 - val_loss: 0.0201
Epoch 213/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 213: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 512ms/step - loss: 0.0209 - val_loss: 0.0201
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Epoch 214/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 214: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 863ms/step - loss: 0.0205 - val_loss: 0.0206
Epoch 215/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 215: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 705ms/step - loss: 0.0204 - val_loss: 0.0209
Epoch 216/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 216: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 512ms/step - loss: 0.0203 - val_loss: 0.0209
Epoch 217/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 217: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0205 - val_loss: 0.0209
Epoch 218/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 218: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 492ms/step - loss: 0.0203 - val_loss: 0.0204
Epoch 219/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 219: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0209 - val_loss: 0.0203
Epoch 220/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 220: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 499ms/step - loss: 0.0210 - val_loss: 0.0200
Epoch 221/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 221: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0203 - val_loss: 0.0199
Epoch 222/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 222: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0203 - val_loss: 0.0199
Epoch 223/350
3/3 [==============================] - ETA: 0s - loss: 0.0221
Epoch 223: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0221 - val_loss: 0.0203
Epoch 224/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 224: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0205 - val_loss: 0.0204
Epoch 225/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 225: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 493ms/step - loss: 0.0205 - val_loss: 0.0208
Epoch 226/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 226: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 496ms/step - loss: 0.0203 - val_loss: 0.0207
Epoch 227/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 227: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 491ms/step - loss: 0.0203 - val_loss: 0.0208
Epoch 228/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 228: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0202 - val_loss: 0.0210
Epoch 229/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 229: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0205 - val_loss: 0.0214
Epoch 230/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 230: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 496ms/step - loss: 0.0204 - val_loss: 0.0215
Epoch 231/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 231: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 496ms/step - loss: 0.0203 - val_loss: 0.0211
Epoch 232/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 232: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0204 - val_loss: 0.0209
Epoch 233/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 233: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0204 - val_loss: 0.0210
Epoch 234/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 234: val_loss did not improve from 0.01890
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3/3 [==============================] - 2s 506ms/step - loss: 0.0203 - val_loss: 0.0210
Epoch 235/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 235: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0203 - val_loss: 0.0213
Epoch 236/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 236: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 515ms/step - loss: 0.0201 - val_loss: 0.0215
Epoch 237/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 237: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0203 - val_loss: 0.0214
Epoch 238/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 238: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 512ms/step - loss: 0.0204 - val_loss: 0.0213
Epoch 239/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 239: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0204 - val_loss: 0.0210
Epoch 240/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 240: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0205 - val_loss: 0.0207
Epoch 241/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 241: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0201 - val_loss: 0.0205
Epoch 242/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 242: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0208 - val_loss: 0.0205
Epoch 243/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 243: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 496ms/step - loss: 0.0203 - val_loss: 0.0205
Epoch 244/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 244: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0201 - val_loss: 0.0203
Epoch 245/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 245: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0205 - val_loss: 0.0202
Epoch 246/350
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 246: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 515ms/step - loss: 0.0200 - val_loss: 0.0200
Epoch 247/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 247: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0211 - val_loss: 0.0197
Epoch 248/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 248: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0204 - val_loss: 0.0196
Epoch 249/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 249: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0203 - val_loss: 0.0196
Epoch 250/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 250: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0205 - val_loss: 0.0196
Epoch 251/350
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 251: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 499ms/step - loss: 0.0200 - val_loss: 0.0194
Epoch 252/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 252: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 522ms/step - loss: 0.0207 - val_loss: 0.0194
Epoch 253/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 253: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0201 - val_loss: 0.0193
Epoch 254/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 254: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0206 - val_loss: 0.0193
Epoch 255/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
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Epoch 255: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0210 - val_loss: 0.0192
Epoch 256/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 256: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0203 - val_loss: 0.0192
Epoch 257/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 257: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0211 - val_loss: 0.0192
Epoch 258/350
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 258: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0200 - val_loss: 0.0193
Epoch 259/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 259: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0201 - val_loss: 0.0194
Epoch 260/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 260: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0202 - val_loss: 0.0192
Epoch 261/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 261: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0205 - val_loss: 0.0191
Epoch 262/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 262: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0203 - val_loss: 0.0191
Epoch 263/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 263: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 499ms/step - loss: 0.0210 - val_loss: 0.0191
Epoch 264/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 264: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0201 - val_loss: 0.0191
Epoch 265/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 265: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0207 - val_loss: 0.0191
Epoch 266/350
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 266: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0215 - val_loss: 0.0191
Epoch 267/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 267: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 504ms/step - loss: 0.0204 - val_loss: 0.0192
Epoch 268/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 268: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 530ms/step - loss: 0.0202 - val_loss: 0.0193
Epoch 269/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 269: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0204 - val_loss: 0.0193
Epoch 270/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 270: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0201 - val_loss: 0.0193
Epoch 271/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 271: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 520ms/step - loss: 0.0202 - val_loss: 0.0193
Epoch 272/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 272: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0205 - val_loss: 0.0193
Epoch 273/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 273: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 519ms/step - loss: 0.0206 - val_loss: 0.0194
Epoch 274/350
3/3 [==============================] - ETA: 0s - loss: 0.0214
Epoch 274: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0214 - val_loss: 0.0194
Epoch 275/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 275: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 496ms/step - loss: 0.0203 - val_loss: 0.0195
Epoch 276/350
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3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 276: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0213 - val_loss: 0.0195
Epoch 277/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 277: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0207 - val_loss: 0.0195
Epoch 278/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 278: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 514ms/step - loss: 0.0206 - val_loss: 0.0195
Epoch 279/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 279: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0213 - val_loss: 0.0193
Epoch 280/350
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 280: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0215 - val_loss: 0.0192
Epoch 281/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 281: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 514ms/step - loss: 0.0204 - val_loss: 0.0192
Epoch 282/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 282: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0204 - val_loss: 0.0192
Epoch 283/350
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 283: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0213 - val_loss: 0.0192
Epoch 284/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 284: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0205 - val_loss: 0.0191
Epoch 285/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 285: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0209 - val_loss: 0.0191
Epoch 286/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 286: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0207 - val_loss: 0.0191
Epoch 287/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 287: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0207 - val_loss: 0.0192
Epoch 288/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 288: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0203 - val_loss: 0.0193
Epoch 289/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 289: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 520ms/step - loss: 0.0201 - val_loss: 0.0193
Epoch 290/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 290: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 512ms/step - loss: 0.0202 - val_loss: 0.0193
Epoch 291/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 291: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 521ms/step - loss: 0.0201 - val_loss: 0.0193
Epoch 292/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 292: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 804ms/step - loss: 0.0208 - val_loss: 0.0192
Epoch 293/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 293: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0202 - val_loss: 0.0193
Epoch 294/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 294: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0201 - val_loss: 0.0193
Epoch 295/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 295: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0209 - val_loss: 0.0193
Epoch 296/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 296: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 500ms/step - loss: 0.0201 - val_loss: 0.0193
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Epoch 297/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 297: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0202 - val_loss: 0.0195
Epoch 298/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 298: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0203 - val_loss: 0.0197
Epoch 299/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 299: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 519ms/step - loss: 0.0207 - val_loss: 0.0197
Epoch 300/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 300: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0203 - val_loss: 0.0198
Epoch 301/350
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 301: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 502ms/step - loss: 0.0207 - val_loss: 0.0197
Epoch 302/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 302: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 498ms/step - loss: 0.0204 - val_loss: 0.0193
Epoch 303/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 303: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0203 - val_loss: 0.0193
Epoch 304/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 304: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0206 - val_loss: 0.0192
Epoch 305/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 305: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 514ms/step - loss: 0.0204 - val_loss: 0.0194
Epoch 306/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 306: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0202 - val_loss: 0.0194
Epoch 307/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 307: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0203 - val_loss: 0.0194
Epoch 308/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 308: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0204 - val_loss: 0.0193
Epoch 309/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 309: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 527ms/step - loss: 0.0202 - val_loss: 0.0192
Epoch 310/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 310: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0202 - val_loss: 0.0191
Epoch 311/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 311: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 515ms/step - loss: 0.0201 - val_loss: 0.0192
Epoch 312/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 312: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 508ms/step - loss: 0.0204 - val_loss: 0.0191
Epoch 313/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 313: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0203 - val_loss: 0.0191
Epoch 314/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 314: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 509ms/step - loss: 0.0204 - val_loss: 0.0191
Epoch 315/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 315: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0204 - val_loss: 0.0191
Epoch 316/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 316: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 493ms/step - loss: 0.0201 - val_loss: 0.0191
Epoch 317/350
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 317: val_loss did not improve from 0.01890
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3/3 [==============================] - 2s 508ms/step - loss: 0.0211 - val_loss: 0.0191
Epoch 318/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 318: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0204 - val_loss: 0.0191
Epoch 319/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 319: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 519ms/step - loss: 0.0208 - val_loss: 0.0191
Epoch 320/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 320: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 507ms/step - loss: 0.0203 - val_loss: 0.0192
Epoch 321/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 321: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 503ms/step - loss: 0.0202 - val_loss: 0.0192
Epoch 322/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 322: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0203 - val_loss: 0.0192
Epoch 323/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 323: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 497ms/step - loss: 0.0203 - val_loss: 0.0192
Epoch 324/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 324: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 517ms/step - loss: 0.0210 - val_loss: 0.0192
Epoch 325/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 325: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 548ms/step - loss: 0.0204 - val_loss: 0.0192
Epoch 326/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 326: val_loss did not improve from 0.01890
3/3 [==============================] - 3s 882ms/step - loss: 0.0201 - val_loss: 0.0192
Epoch 327/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 327: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 530ms/step - loss: 0.0209 - val_loss: 0.0193
Epoch 328/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 328: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 528ms/step - loss: 0.0202 - val_loss: 0.0192
Epoch 329/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 329: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 530ms/step - loss: 0.0201 - val_loss: 0.0193
Epoch 330/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 330: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 528ms/step - loss: 0.0201 - val_loss: 0.0195
Epoch 331/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 331: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 514ms/step - loss: 0.0206 - val_loss: 0.0195
Epoch 332/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 332: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0204 - val_loss: 0.0195
Epoch 333/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 333: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0209 - val_loss: 0.0197
Epoch 334/350
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 334: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 512ms/step - loss: 0.0210 - val_loss: 0.0198
Epoch 335/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 335: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 518ms/step - loss: 0.0202 - val_loss: 0.0197
Epoch 336/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 336: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 520ms/step - loss: 0.0203 - val_loss: 0.0196
Epoch 337/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 337: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 521ms/step - loss: 0.0208 - val_loss: 0.0198
Epoch 338/350
3/3 [==============================] - ETA: 0s - loss: 0.0205
```

```
Epoch 338: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 505ms/step - loss: 0.0205 - val_loss: 0.0199
Epoch 339/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 339: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 506ms/step - loss: 0.0206 - val_loss: 0.0200
Epoch 340/350
3/3 [==============================] - ETA: 0s - loss: 0.0202
Epoch 340: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 516ms/step - loss: 0.0202 - val_loss: 0.0200
Epoch 341/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 341: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 501ms/step - loss: 0.0203 - val_loss: 0.0201
Epoch 342/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 342: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 520ms/step - loss: 0.0201 - val_loss: 0.0202
Epoch 343/350
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 343: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 519ms/step - loss: 0.0209 - val_loss: 0.0205
Epoch 344/350
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 344: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0206 - val_loss: 0.0202
Epoch 345/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 345: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 527ms/step - loss: 0.0204 - val_loss: 0.0201
Epoch 346/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 346: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 525ms/step - loss: 0.0201 - val_loss: 0.0200
Epoch 347/350
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 347: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 536ms/step - loss: 0.0203 - val_loss: 0.0199
Epoch 348/350
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 348: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 511ms/step - loss: 0.0208 - val_loss: 0.0200
Epoch 349/350
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 349: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 513ms/step - loss: 0.0204 - val_loss: 0.0200
Epoch 350/350
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 350: val_loss did not improve from 0.01890
3/3 [==============================] - 2s 510ms/step - loss: 0.0201 - val_loss: 0.0201
Created model and loaded weights from file
```

In [284]:

```
results.loc[index,['Architecture','Dropout and pooling','kernel size','Loss Fn', 'LR']] = ['ANN','1 Dropout','-',
'Mean-Squared-Error',0.001]
```

Train & Validation (MSE):

In [285]:

```
train_val_evaluation(model,results,index)
```

```
Train MSE: 0.02047724835574627
Validation MSE: 0.018904920667409897
```

Prediction:

In [286]:

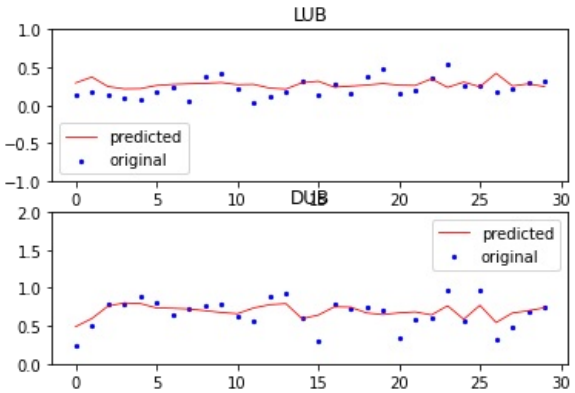
```
y_pred = model.predict(x_test)
print(y_pred)
```

```
1/1 [==============================] - 0s 196ms/step
[[0.29583746 0.48856193]
 [0.3730145  0.5952381 ]
 [0.24772766 0.75889057]
 [0.21755834 0.80101806]
 [0.2204832  0.79228556]
 [0.26260203 0.73489666]
 [0.27672786 0.73002213]
 [0.2843376  0.7212192 ]
 [0.28988606 0.6987757 ]
 [0.30064964 0.6754122 ]
 [0.27312085 0.6589951 ]
 [0.27706957 0.7338234 ]
 [0.22735491 0.7776133 ]
 [0.21491729 0.79126173]
 [0.29872084 0.59360486]
 [0.31803113 0.64036274]
 [0.23935586 0.7497056 ]
 [0.2533268  0.74484795]
 [0.26767647 0.66876906]
 [0.28747535 0.6469855 ]
 [0.2662441  0.6699539 ]
 [0.26259607 0.68251413]
 [0.34924787 0.6424787 ]
 [0.23687625 0.76269937]
 [0.30624622 0.5853674 ]
 [0.244952   0.7701974 ]
 [0.42216945 0.54274476]
 [0.25597084 0.66767174]
 [0.2833143  0.6980539 ]
 [0.24744555 0.737696  ]]
```

Plotting the predicted locations of LUB and DUB VS their original locations:

In [287]:

```
plot_LUB_DUB(y_test, y_pred)
```



Evaluation Metrics

Mean Squared Error (MSE), Root Mean Squared Error (RMSE), and Mean Absolute Error (MAE):

In [288]:

```
test_evaluation(model, y_pred,results,index)
```

```
Test MSE: 0.01861623115837574
Test RMSE: 0.13640088687170343
Test MAE: 0.10659443330928323
```

In [289]:

```
index = index + 1
results
```

Out[289]:

	Architecture	LR	Dropout and pooling	kernel size	Loss Fn	Train MSE	Validation MSE	Test MSE	Test RMSE	Test MAE
0	CNN 2D	0.0001	No Dropout Layers, 1 max-pooling layer	1	Mean-Squared-Error	0.021081	0.018341	0.019292	0.138705	0.106015
1	CNN 2D	0.0001	No Dropout Layers, 3 max-pooling layers	2	Mean-Squared-Error	0.006356	0.022953	0.027629	0.152963	0.123263
2	ANN	0.001	1 Dropout	-	Mean-Squared-Error	0.020477	0.018905	0.018616	0.136401	0.106594

ANN Experiment 2:

Changing in parameters and Architecture:

In [290]:

```
model = Sequential()

model.add(Dense(64, input_shape=(x_train[1].shape)))
model.add(BatchNormalization())
model.add(Activation('relu'))
model.add(Dropout(0.1))

model.add(Dense(32))
model.add(BatchNormalization())
model.add(Activation('relu'))
model.add(Dropout(0.1))

model.add(Dense(16))
model.add(Activation('relu'))
model.add(Dropout(0.1))


model.add(GlobalAveragePooling2D())

model.add(Dense(2, activation='linear'))
model.summary()
```

```
Model: "sequential_33"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 dense_61 (Dense)            (None, 40, 137, 64)       128

 batch_normalization_18 (Bat  (None, 40, 137, 64)      256
 chNormalization)

 activation_32 (Activation)  (None, 40, 137, 64)       0

 dropout_18 (Dropout)        (None, 40, 137, 64)       0

 dense_62 (Dense)            (None, 40, 137, 32)       2080

 batch_normalization_19 (Bat  (None, 40, 137, 32)      128
 chNormalization)

 activation_33 (Activation)  (None, 40, 137, 32)       0

 dropout_19 (Dropout)        (None, 40, 137, 32)       0

 dense_63 (Dense)            (None, 40, 137, 16)       528

 activation_34 (Activation)  (None, 40, 137, 16)       0

 dropout_20 (Dropout)        (None, 40, 137, 16)       0

 global_average_pooling2d_31  (None, 16)               0
  (GlobalAveragePooling2D)

 dense_64 (Dense)            (None, 2)                 34

=================================================================
Total params: 3,154
Trainable params: 2,962
Non-trainable params: 192
_________________________________________________________________
```

In [291]:

```
history , model = compile_fit(model)
```

```
Epoch 1/150
3/3 [==============================] - ETA: 0s - loss: 0.2243
Epoch 1: val_loss improved from inf to 0.40077, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 854ms/step - loss: 0.2243 - val_loss: 0.4008
Epoch 2/150
3/3 [==============================] - ETA: 0s - loss: 0.1661
Epoch 2: val_loss improved from 0.40077 to 0.31173, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 746ms/step - loss: 0.1661 - val_loss: 0.3117
Epoch 3/150
3/3 [==============================] - ETA: 0s - loss: 0.1200
Epoch 3: val_loss improved from 0.31173 to 0.25612, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 751ms/step - loss: 0.1200 - val_loss: 0.2561
Epoch 4/150
3/3 [==============================] - ETA: 0s - loss: 0.0840
Epoch 4: val_loss improved from 0.25612 to 0.21416, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 764ms/step - loss: 0.0840 - val_loss: 0.2142
Epoch 5/150
3/3 [==============================] - ETA: 0s - loss: 0.0607
Epoch 5: val_loss improved from 0.21416 to 0.18141, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 756ms/step - loss: 0.0607 - val_loss: 0.1814
Epoch 6/150
3/3 [==============================] - ETA: 0s - loss: 0.0472
Epoch 6: val_loss improved from 0.18141 to 0.15504, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 750ms/step - loss: 0.0472 - val_loss: 0.1550
Epoch 7/150
3/3 [==============================] - ETA: 0s - loss: 0.0376
Epoch 7: val_loss improved from 0.15504 to 0.13563, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 759ms/step - loss: 0.0376 - val_loss: 0.1356
Epoch 8/150
3/3 [==============================] - ETA: 0s - loss: 0.0316
Epoch 8: val_loss improved from 0.13563 to 0.12181, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 746ms/step - loss: 0.0316 - val_loss: 0.1218
Epoch 9/150
3/3 [==============================] - ETA: 0s - loss: 0.0289
Epoch 9: val_loss improved from 0.12181 to 0.11185, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 769ms/step - loss: 0.0289 - val_loss: 0.1118
Epoch 10/150
3/3 [==============================] - ETA: 0s - loss: 0.0271
Epoch 10: val_loss improved from 0.11185 to 0.10534, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 755ms/step - loss: 0.0271 - val_loss: 0.1053
```

```
Epoch 11/150
3/3 [==============================] - ETA: 0s - loss: 0.0266
Epoch 11: val_loss improved from 0.10534 to 0.10076, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 750ms/step - loss: 0.0266 - val_loss: 0.1008
Epoch 12/150
3/3 [==============================] - ETA: 0s - loss: 0.0260
Epoch 12: val_loss improved from 0.10076 to 0.09784, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0260 - val_loss: 0.0978
Epoch 13/150
3/3 [==============================] - ETA: 0s - loss: 0.0263
Epoch 13: val_loss improved from 0.09784 to 0.09556, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 945ms/step - loss: 0.0263 - val_loss: 0.0956
Epoch 14/150
3/3 [==============================] - ETA: 0s - loss: 0.0264
Epoch 14: val_loss improved from 0.09556 to 0.09395, saving model to /content/weights.best.hdf5
3/3 [==============================] - 4s 1s/step - loss: 0.0264 - val_loss: 0.0940
Epoch 15/150
3/3 [==============================] - ETA: 0s - loss: 0.0252
Epoch 15: val_loss improved from 0.09395 to 0.09226, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 896ms/step - loss: 0.0252 - val_loss: 0.0923
Epoch 16/150
3/3 [==============================] - ETA: 0s - loss: 0.0251
Epoch 16: val_loss improved from 0.09226 to 0.09079, saving model to /content/weights.best.hdf5
3/3 [==============================] - 6s 1s/step - loss: 0.0251 - val_loss: 0.0908
Epoch 17/150
3/3 [==============================] - ETA: 0s - loss: 0.0244
Epoch 17: val_loss improved from 0.09079 to 0.08900, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 929ms/step - loss: 0.0244 - val_loss: 0.0890
Epoch 18/150
3/3 [==============================] - ETA: 0s - loss: 0.0248
Epoch 18: val_loss improved from 0.08900 to 0.08668, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0248 - val_loss: 0.0867
Epoch 19/150
3/3 [==============================] - ETA: 0s - loss: 0.0238
Epoch 19: val_loss improved from 0.08668 to 0.08502, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0238 - val_loss: 0.0850
Epoch 20/150
3/3 [==============================] - ETA: 0s - loss: 0.0234
Epoch 20: val_loss improved from 0.08502 to 0.08321, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0234 - val_loss: 0.0832
Epoch 21/150
3/3 [==============================] - ETA: 0s - loss: 0.0233
Epoch 21: val_loss improved from 0.08321 to 0.08062, saving model to /content/weights.best.hdf5
3/3 [==============================] - 4s 1s/step - loss: 0.0233 - val_loss: 0.0806
Epoch 22/150
3/3 [==============================] - ETA: 0s - loss: 0.0233
Epoch 22: val_loss improved from 0.08062 to 0.07794, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 850ms/step - loss: 0.0233 - val_loss: 0.0779
Epoch 23/150
3/3 [==============================] - ETA: 0s - loss: 0.0234
Epoch 23: val_loss improved from 0.07794 to 0.07573, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0234 - val_loss: 0.0757
Epoch 24/150
3/3 [==============================] - ETA: 0s - loss: 0.0232
Epoch 24: val_loss improved from 0.07573 to 0.07269, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0232 - val_loss: 0.0727
Epoch 25/150
3/3 [==============================] - ETA: 0s - loss: 0.0228
Epoch 25: val_loss improved from 0.07269 to 0.06969, saving model to /content/weights.best.hdf5
3/3 [==============================] - 4s 1s/step - loss: 0.0228 - val_loss: 0.0697
Epoch 26/150
3/3 [==============================] - ETA: 0s - loss: 0.0227
Epoch 26: val_loss improved from 0.06969 to 0.06710, saving model to /content/weights.best.hdf5
3/3 [==============================] - 4s 1s/step - loss: 0.0227 - val_loss: 0.0671
Epoch 27/150
3/3 [==============================] - ETA: 0s - loss: 0.0226
Epoch 27: val_loss improved from 0.06710 to 0.06417, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0226 - val_loss: 0.0642
Epoch 28/150
3/3 [==============================] - ETA: 0s - loss: 0.0225
Epoch 28: val_loss improved from 0.06417 to 0.06147, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0225 - val_loss: 0.0615
Epoch 29/150
3/3 [==============================] - ETA: 0s - loss: 0.0224
Epoch 29: val_loss improved from 0.06147 to 0.05943, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0224 - val_loss: 0.0594
Epoch 30/150
3/3 [==============================] - ETA: 0s - loss: 0.0224
Epoch 30: val_loss improved from 0.05943 to 0.05755, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0224 - val_loss: 0.0575
Epoch 31/150
3/3 [==============================] - ETA: 0s - loss: 0.0220
Epoch 31: val_loss improved from 0.05755 to 0.05557, saving model to /content/weights.best.hdf5
```

```
3/3 [==============================] - 3s 850ms/step - loss: 0.0220 - val_loss: 0.0556
Epoch 32/150
3/3 [==============================] - ETA: 0s - loss: 0.0223
Epoch 32: val_loss improved from 0.05557 to 0.05411, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 761ms/step - loss: 0.0223 - val_loss: 0.0541
Epoch 33/150
3/3 [==============================] - ETA: 0s - loss: 0.0232
Epoch 33: val_loss improved from 0.05411 to 0.05234, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0232 - val_loss: 0.0523
Epoch 34/150
3/3 [==============================] - ETA: 0s - loss: 0.0221
Epoch 34: val_loss improved from 0.05234 to 0.05121, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 820ms/step - loss: 0.0221 - val_loss: 0.0512
Epoch 35/150
3/3 [==============================] - ETA: 0s - loss: 0.0228
Epoch 35: val_loss improved from 0.05121 to 0.04956, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0228 - val_loss: 0.0496
Epoch 36/150
3/3 [==============================] - ETA: 0s - loss: 0.0223
Epoch 36: val_loss improved from 0.04956 to 0.04808, saving model to /content/weights.best.hdf5
3/3 [==============================] - 4s 1s/step - loss: 0.0223 - val_loss: 0.0481
Epoch 37/150
3/3 [==============================] - ETA: 0s - loss: 0.0218
Epoch 37: val_loss improved from 0.04808 to 0.04691, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0218 - val_loss: 0.0469
Epoch 38/150
3/3 [==============================] - ETA: 0s - loss: 0.0220
Epoch 38: val_loss improved from 0.04691 to 0.04592, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0220 - val_loss: 0.0459
Epoch 39/150
3/3 [==============================] - ETA: 0s - loss: 0.0219
Epoch 39: val_loss improved from 0.04592 to 0.04499, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 816ms/step - loss: 0.0219 - val_loss: 0.0450
Epoch 40/150
3/3 [==============================] - ETA: 0s - loss: 0.0220
Epoch 40: val_loss improved from 0.04499 to 0.04367, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 775ms/step - loss: 0.0220 - val_loss: 0.0437
Epoch 41/150
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 41: val_loss improved from 0.04367 to 0.04264, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 766ms/step - loss: 0.0215 - val_loss: 0.0426
Epoch 42/150
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 42: val_loss improved from 0.04264 to 0.04120, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 765ms/step - loss: 0.0217 - val_loss: 0.0412
Epoch 43/150
3/3 [==============================] - ETA: 0s - loss: 0.0221
Epoch 43: val_loss improved from 0.04120 to 0.03964, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 756ms/step - loss: 0.0221 - val_loss: 0.0396
Epoch 44/150
3/3 [==============================] - ETA: 0s - loss: 0.0233
Epoch 44: val_loss improved from 0.03964 to 0.03795, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 771ms/step - loss: 0.0233 - val_loss: 0.0379
Epoch 45/150
3/3 [==============================] - ETA: 0s - loss: 0.0232
Epoch 45: val_loss improved from 0.03795 to 0.03765, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 761ms/step - loss: 0.0232 - val_loss: 0.0376
Epoch 46/150
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 46: val_loss improved from 0.03765 to 0.03610, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 767ms/step - loss: 0.0215 - val_loss: 0.0361
Epoch 47/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 47: val_loss improved from 0.03610 to 0.03460, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 758ms/step - loss: 0.0212 - val_loss: 0.0346
Epoch 48/150
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 48: val_loss improved from 0.03460 to 0.03334, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 756ms/step - loss: 0.0213 - val_loss: 0.0333
Epoch 49/150
3/3 [==============================] - ETA: 0s - loss: 0.0216
Epoch 49: val_loss improved from 0.03334 to 0.03235, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 755ms/step - loss: 0.0216 - val_loss: 0.0323
Epoch 50/150
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 50: val_loss improved from 0.03235 to 0.03130, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 742ms/step - loss: 0.0205 - val_loss: 0.0313
Epoch 51/150
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 51: val_loss improved from 0.03130 to 0.03013, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 747ms/step - loss: 0.0215 - val_loss: 0.0301
Epoch 52/150
3/3 [==============================] - ETA: 0s - loss: 0.0213
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Epoch 52: val_loss improved from 0.03013 to 0.02945, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 743ms/step - loss: 0.0213 - val_loss: 0.0294
Epoch 53/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 53: val_loss improved from 0.02945 to 0.02880, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 762ms/step - loss: 0.0212 - val_loss: 0.0288
Epoch 54/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 54: val_loss improved from 0.02880 to 0.02844, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 755ms/step - loss: 0.0212 - val_loss: 0.0284
Epoch 55/150
3/3 [==============================] - ETA: 0s - loss: 0.0216
Epoch 55: val_loss improved from 0.02844 to 0.02835, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 750ms/step - loss: 0.0216 - val_loss: 0.0284
Epoch 56/150
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 56: val_loss improved from 0.02835 to 0.02830, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 744ms/step - loss: 0.0209 - val_loss: 0.0283
Epoch 57/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 57: val_loss improved from 0.02830 to 0.02810, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 754ms/step - loss: 0.0212 - val_loss: 0.0281
Epoch 58/150
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 58: val_loss improved from 0.02810 to 0.02747, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 753ms/step - loss: 0.0213 - val_loss: 0.0275
Epoch 59/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 59: val_loss improved from 0.02747 to 0.02667, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 745ms/step - loss: 0.0212 - val_loss: 0.0267
Epoch 60/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 60: val_loss improved from 0.02667 to 0.02574, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 984ms/step - loss: 0.0212 - val_loss: 0.0257
Epoch 61/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 61: val_loss improved from 0.02574 to 0.02529, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 760ms/step - loss: 0.0210 - val_loss: 0.0253
Epoch 62/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 62: val_loss improved from 0.02529 to 0.02497, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 754ms/step - loss: 0.0210 - val_loss: 0.0250
Epoch 63/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 63: val_loss improved from 0.02497 to 0.02483, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 761ms/step - loss: 0.0207 - val_loss: 0.0248
Epoch 64/150
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 64: val_loss improved from 0.02483 to 0.02460, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 746ms/step - loss: 0.0211 - val_loss: 0.0246
Epoch 65/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 65: val_loss improved from 0.02460 to 0.02455, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 753ms/step - loss: 0.0210 - val_loss: 0.0246
Epoch 66/150
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 66: val_loss improved from 0.02455 to 0.02429, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 741ms/step - loss: 0.0217 - val_loss: 0.0243
Epoch 67/150
3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 67: val_loss improved from 0.02429 to 0.02410, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 734ms/step - loss: 0.0213 - val_loss: 0.0241
Epoch 68/150
3/3 [==============================] - ETA: 0s - loss: 0.0217
Epoch 68: val_loss improved from 0.02410 to 0.02397, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 738ms/step - loss: 0.0217 - val_loss: 0.0240
Epoch 69/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 69: val_loss did not improve from 0.02397
3/3 [==============================] - 2s 726ms/step - loss: 0.0212 - val_loss: 0.0241
Epoch 70/150
3/3 [==============================] - ETA: 0s - loss: 0.0214
Epoch 70: val_loss did not improve from 0.02397
3/3 [==============================] - 2s 749ms/step - loss: 0.0214 - val_loss: 0.0241
Epoch 71/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 71: val_loss improved from 0.02397 to 0.02349, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 747ms/step - loss: 0.0206 - val_loss: 0.0235
Epoch 72/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 72: val_loss improved from 0.02349 to 0.02292, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 756ms/step - loss: 0.0210 - val_loss: 0.0229
Epoch 73/150
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3/3 [==============================] - ETA: 0s - loss: 0.0213
Epoch 73: val_loss improved from 0.02292 to 0.02266, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 750ms/step - loss: 0.0213 - val_loss: 0.0227
Epoch 74/150
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 74: val_loss improved from 0.02266 to 0.02249, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 768ms/step - loss: 0.0208 - val_loss: 0.0225
Epoch 75/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 75: val_loss improved from 0.02249 to 0.02233, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 754ms/step - loss: 0.0207 - val_loss: 0.0223
Epoch 76/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 76: val_loss improved from 0.02233 to 0.02209, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 759ms/step - loss: 0.0206 - val_loss: 0.0221
Epoch 77/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 77: val_loss improved from 0.02209 to 0.02186, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 761ms/step - loss: 0.0207 - val_loss: 0.0219
Epoch 78/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 78: val_loss improved from 0.02186 to 0.02172, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1000ms/step - loss: 0.0207 - val_loss: 0.0217
Epoch 79/150
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 79: val_loss improved from 0.02172 to 0.02156, saving model to /content/weights.best.hdf5
3/3 [==============================] - 4s 1s/step - loss: 0.0211 - val_loss: 0.0216
Epoch 80/150
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 80: val_loss improved from 0.02156 to 0.02153, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 761ms/step - loss: 0.0204 - val_loss: 0.0215
Epoch 81/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 81: val_loss improved from 0.02153 to 0.02141, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 760ms/step - loss: 0.0207 - val_loss: 0.0214
Epoch 82/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 82: val_loss improved from 0.02141 to 0.02107, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 754ms/step - loss: 0.0210 - val_loss: 0.0211
Epoch 83/150
3/3 [==============================] - ETA: 0s - loss: 0.0219
Epoch 83: val_loss improved from 0.02107 to 0.02085, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 773ms/step - loss: 0.0219 - val_loss: 0.0208
Epoch 84/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 84: val_loss improved from 0.02085 to 0.02084, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 760ms/step - loss: 0.0210 - val_loss: 0.0208
Epoch 85/150
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 85: val_loss improved from 0.02084 to 0.02079, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 741ms/step - loss: 0.0208 - val_loss: 0.0208
Epoch 86/150
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 86: val_loss improved from 0.02079 to 0.02072, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 758ms/step - loss: 0.0209 - val_loss: 0.0207
Epoch 87/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 87: val_loss did not improve from 0.02072
3/3 [==============================] - 2s 735ms/step - loss: 0.0206 - val_loss: 0.0208
Epoch 88/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 88: val_loss did not improve from 0.02072
3/3 [==============================] - 2s 742ms/step - loss: 0.0207 - val_loss: 0.0207
Epoch 89/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 89: val_loss improved from 0.02072 to 0.02048, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 757ms/step - loss: 0.0206 - val_loss: 0.0205
Epoch 90/150
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 90: val_loss improved from 0.02048 to 0.02037, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 747ms/step - loss: 0.0211 - val_loss: 0.0204
Epoch 91/150
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 91: val_loss improved from 0.02037 to 0.02024, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 748ms/step - loss: 0.0205 - val_loss: 0.0202
Epoch 92/150
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 92: val_loss improved from 0.02024 to 0.02011, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 771ms/step - loss: 0.0200 - val_loss: 0.0201
Epoch 93/150
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 93: val_loss improved from 0.02011 to 0.02006, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 757ms/step - loss: 0.0215 - val_loss: 0.0201
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Epoch 94/150
3/3 [==============================] - ETA: 0s - loss: 0.0216
Epoch 94: val_loss did not improve from 0.02006
3/3 [==============================] - 2s 738ms/step - loss: 0.0216 - val_loss: 0.0202
Epoch 95/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 95: val_loss did not improve from 0.02006
3/3 [==============================] - 2s 758ms/step - loss: 0.0207 - val_loss: 0.0203
Epoch 96/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 96: val_loss did not improve from 0.02006
3/3 [==============================] - 2s 761ms/step - loss: 0.0210 - val_loss: 0.0202
Epoch 97/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 97: val_loss did not improve from 0.02006
3/3 [==============================] - 2s 751ms/step - loss: 0.0210 - val_loss: 0.0201
Epoch 98/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 98: val_loss improved from 0.02006 to 0.01998, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 758ms/step - loss: 0.0210 - val_loss: 0.0200
Epoch 99/150
3/3 [==============================] - ETA: 0s - loss: 0.0216
Epoch 99: val_loss improved from 0.01998 to 0.01989, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 764ms/step - loss: 0.0216 - val_loss: 0.0199
Epoch 100/150
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 100: val_loss did not improve from 0.01989
3/3 [==============================] - 2s 739ms/step - loss: 0.0208 - val_loss: 0.0199
Epoch 101/150
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 101: val_loss did not improve from 0.01989
3/3 [==============================] - 2s 738ms/step - loss: 0.0208 - val_loss: 0.0199
Epoch 102/150
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 102: val_loss did not improve from 0.01989
3/3 [==============================] - 2s 733ms/step - loss: 0.0209 - val_loss: 0.0200
Epoch 103/150
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 103: val_loss improved from 0.01989 to 0.01988, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 758ms/step - loss: 0.0215 - val_loss: 0.0199
Epoch 104/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 104: val_loss improved from 0.01988 to 0.01979, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 767ms/step - loss: 0.0207 - val_loss: 0.0198
Epoch 105/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 105: val_loss improved from 0.01979 to 0.01975, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0206 - val_loss: 0.0197
Epoch 106/150
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 106: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 742ms/step - loss: 0.0204 - val_loss: 0.0198
Epoch 107/150
3/3 [==============================] - ETA: 0s - loss: 0.0214
Epoch 107: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 736ms/step - loss: 0.0214 - val_loss: 0.0198
Epoch 108/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 108: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 742ms/step - loss: 0.0206 - val_loss: 0.0198
Epoch 109/150
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 109: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 760ms/step - loss: 0.0211 - val_loss: 0.0198
Epoch 110/150
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 110: val_loss did not improve from 0.01975
3/3 [==============================] - 2s 760ms/step - loss: 0.0205 - val_loss: 0.0198
Epoch 111/150
3/3 [==============================] - ETA: 0s - loss: 0.0201
Epoch 111: val_loss improved from 0.01975 to 0.01970, saving model to /content/weights.best.hdf5
3/3 [==============================] - 2s 753ms/step - loss: 0.0201 - val_loss: 0.0197
Epoch 112/150
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 112: val_loss improved from 0.01970 to 0.01965, saving model to /content/weights.best.hdf5
3/3 [==============================] - 3s 1s/step - loss: 0.0204 - val_loss: 0.0196
Epoch 113/150
3/3 [==============================] - ETA: 0s - loss: 0.0221
Epoch 113: val_loss did not improve from 0.01965
3/3 [==============================] - 2s 737ms/step - loss: 0.0221 - val_loss: 0.0197
Epoch 114/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 114: val_loss improved from 0.01965 to 0.01959, saving model to /content/weights.best.hdf5
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3/3 [==============================] - 2s 760ms/step - loss: 0.0210 - val_loss: 0.0196
Epoch 115/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 115: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 731ms/step - loss: 0.0206 - val_loss: 0.0196
Epoch 116/150
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 116: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 742ms/step - loss: 0.0208 - val_loss: 0.0196
Epoch 117/150
3/3 [==============================] - ETA: 0s - loss: 0.0218
Epoch 117: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 735ms/step - loss: 0.0218 - val_loss: 0.0196
Epoch 118/150
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 118: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 731ms/step - loss: 0.0208 - val_loss: 0.0197
Epoch 119/150
3/3 [==============================] - ETA: 0s - loss: 0.0208
Epoch 119: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 740ms/step - loss: 0.0208 - val_loss: 0.0196
Epoch 120/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 120: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 755ms/step - loss: 0.0212 - val_loss: 0.0196
Epoch 121/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 121: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 749ms/step - loss: 0.0207 - val_loss: 0.0197
Epoch 122/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 122: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 751ms/step - loss: 0.0207 - val_loss: 0.0197
Epoch 123/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 123: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 743ms/step - loss: 0.0206 - val_loss: 0.0197
Epoch 124/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 124: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 742ms/step - loss: 0.0212 - val_loss: 0.0197
Epoch 125/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 125: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 737ms/step - loss: 0.0207 - val_loss: 0.0197
Epoch 126/150
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 126: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 738ms/step - loss: 0.0204 - val_loss: 0.0197
Epoch 127/150
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 127: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 736ms/step - loss: 0.0205 - val_loss: 0.0197
Epoch 128/150
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 128: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 731ms/step - loss: 0.0211 - val_loss: 0.0198
Epoch 129/150
3/3 [==============================] - ETA: 0s - loss: 0.0200
Epoch 129: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 752ms/step - loss: 0.0200 - val_loss: 0.0200
Epoch 130/150
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 130: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 746ms/step - loss: 0.0215 - val_loss: 0.0201
Epoch 131/150
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 131: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 743ms/step - loss: 0.0205 - val_loss: 0.0201
Epoch 132/150
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 132: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 735ms/step - loss: 0.0211 - val_loss: 0.0201
Epoch 133/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 133: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 746ms/step - loss: 0.0212 - val_loss: 0.0202
Epoch 134/150
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 134: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 755ms/step - loss: 0.0203 - val_loss: 0.0202
Epoch 135/150
3/3 [==============================] - ETA: 0s - loss: 0.0204
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Epoch 135: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 751ms/step - loss: 0.0204 - val_loss: 0.0201
Epoch 136/150
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 136: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 758ms/step - loss: 0.0209 - val_loss: 0.0202
Epoch 137/150
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 137: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 746ms/step - loss: 0.0205 - val_loss: 0.0202
Epoch 138/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 138: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 750ms/step - loss: 0.0207 - val_loss: 0.0201
Epoch 139/150
3/3 [==============================] - ETA: 0s - loss: 0.0204
Epoch 139: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 754ms/step - loss: 0.0204 - val_loss: 0.0199
Epoch 140/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 140: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 748ms/step - loss: 0.0207 - val_loss: 0.0198
Epoch 141/150
3/3 [==============================] - ETA: 0s - loss: 0.0203
Epoch 141: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 732ms/step - loss: 0.0203 - val_loss: 0.0198
Epoch 142/150
3/3 [==============================] - ETA: 0s - loss: 0.0209
Epoch 142: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 747ms/step - loss: 0.0209 - val_loss: 0.0199
Epoch 143/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 143: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 752ms/step - loss: 0.0206 - val_loss: 0.0200
Epoch 144/150
3/3 [==============================] - ETA: 0s - loss: 0.0207
Epoch 144: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 775ms/step - loss: 0.0207 - val_loss: 0.0200
Epoch 145/150
3/3 [==============================] - ETA: 0s - loss: 0.0206
Epoch 145: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 782ms/step - loss: 0.0206 - val_loss: 0.0199
Epoch 146/150
3/3 [==============================] - ETA: 0s - loss: 0.0211
Epoch 146: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 764ms/step - loss: 0.0211 - val_loss: 0.0201
Epoch 147/150
3/3 [==============================] - ETA: 0s - loss: 0.0215
Epoch 147: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 747ms/step - loss: 0.0215 - val_loss: 0.0201
Epoch 148/150
3/3 [==============================] - ETA: 0s - loss: 0.0210
Epoch 148: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 760ms/step - loss: 0.0210 - val_loss: 0.0201
Epoch 149/150
3/3 [==============================] - ETA: 0s - loss: 0.0205
Epoch 149: val_loss did not improve from 0.01959
3/3 [==============================] - 2s 775ms/step - loss: 0.0205 - val_loss: 0.0204
Epoch 150/150
3/3 [==============================] - ETA: 0s - loss: 0.0212
Epoch 150: val_loss did not improve from 0.01959
3/3 [==============================] - 3s 850ms/step - loss: 0.0212 - val_loss: 0.0203
Created model and loaded weights from file
```

In [292]:

```
results.loc[index,['Architecture','Dropout and pooling','kernel size','Loss Fn', 'LR']] = ['ANN','3 Dropout','-',
'Mean-Squared-Error',0.001]
```

Train & Validation (MSE)

In [293]:

```
train_val_evaluation(model,results,index)
```

```
Train MSE: 0.020909827202558517
Validation MSE: 0.019591396674513817
```

Prediction:

In [294]:

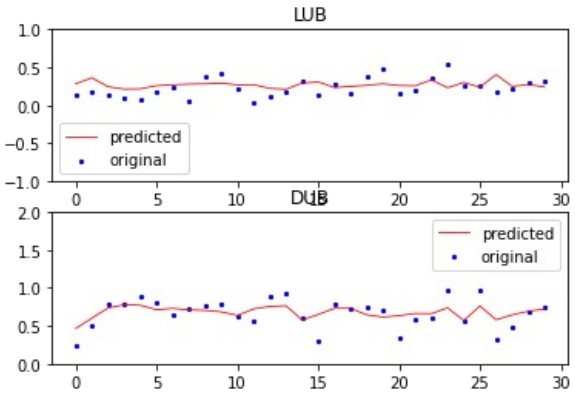
```
y_pred = model.predict(x_test)
print(y_pred)
```

```
1/1 [==============================] - 0s 196ms/step
[[0.28429586 0.46421984]
 [0.36351395 0.5999014 ]
 [0.24575002 0.7331689 ]
 [0.21499117 0.77705   ]
 [0.21764717 0.7694079 ]
 [0.25970864 0.71212   ]
 [0.27166116 0.7287889 ]
 [0.27990648 0.7106253 ]
 [0.28273174 0.70231473]
 [0.2922439  0.6835389 ]
 [0.26964554 0.63639736]
 [0.27266008 0.7220092 ]
 [0.22406854 0.75446224]
 [0.21228302 0.7653375 ]
 [0.29308215 0.5764994 ]
 [0.30899927 0.6487132 ]
 [0.23424566 0.72946644]
 [0.2493598  0.72976893]
 [0.26471132 0.6449088 ]
 [0.2833364  0.6144151 ]
 [0.26271963 0.63319755]
 [0.258252   0.6612338 ]
 [0.3365828  0.65929794]
 [0.23231974 0.73654914]
 [0.30082485 0.56914854]
 [0.24027373 0.75990134]
 [0.4052167  0.57939017]
 [0.2493516  0.643768  ]
 [0.27595124 0.69212747]
 [0.24188681 0.7198883 ]]
```

Plotting the predicted locations of LUB and DUB VS their original locations:

In [295]:

```
plot_LUB_DUB(y_test, y_pred)
```



Evaluation Metrics

Mean Squared Error (MSE), Root Mean Squared Error (RMSE), and Mean Absolute Error (MAE):

In [296]:

```
test_evaluation(model, y_pred,results,index)
```

```
Test MSE: 0.01867247372865677
Test RMSE: 0.13652767766291463
Test MAE: 0.10843760628038127
```

In [297]:

```
index = index +1
results
```

Out[297]:

	Architecture	LR	Dropout and pooling	kernel size	Loss Fn	Train MSE	Validation MSE	Test MSE	Test RMSE	Test MAE
0	CNN 2D	0.0001	No Dropout Layers, 1 max-pooling layer	1	Mean-Squared-Error	0.021081	0.018341	0.019292	0.138705	0.106015
1	CNN 2D	0.0001	No Dropout Layers, 3 max-pooling layers	2	Mean-Squared-Error	0.006356	0.022953	0.027629	0.152963	0.123263
2	ANN	0.001	1 Dropout	-	Mean-Squared-Error	0.020477	0.018905	0.018616	0.136401	0.106594
3	ANN	0.001	3 Dropout	-	Mean-Squared-Error	0.02091	0.019591	0.018672	0.136528	0.108438

RNN Experiment 1:

In [303]:

```
model = Sequential()
model.add(LSTM(units=64, dropout=0.05, recurrent_dropout=0.20, return_sequences=True,input_shape=(x_train.shape[1
],x_train.shape[2])))
model.add(LSTM(units=32, dropout=0.05, recurrent_dropout=0.20, return_sequences=False))
model.add(Dense(2, activation='linear'))
model.summary()
```

```
Model: "sequential_36"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 lstm_4 (LSTM)               (None, 40, 64)            51712

 lstm_5 (LSTM)               (None, 32)                12416

 dense_67 (Dense)            (None, 2)                 66

=================================================================
Total params: 64,194
Trainable params: 64,194
Non-trainable params: 0
_________________________________________________________________
```

In [305]:

```
history , model = compile_fit(model, epoch_no=300, LR=0.0001)
```

```
Epoch 1/300
3/3 [==============================] - ETA: 0s - loss: 0.0014
Epoch 1: val_loss improved from inf to 0.02707, saving model to /content/weights.best.hdf5
3/3 [==============================] - 5s 357ms/step - loss: 0.0014 - val_loss: 0.0271
Epoch 2/300
3/3 [==============================] - ETA: 0s - loss: 0.0020
Epoch 2: val_loss improved from 0.02707 to 0.02608, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 119ms/step - loss: 0.0020 - val_loss: 0.0261
Epoch 3/300
3/3 [==============================] - ETA: 0s - loss: 0.0017
Epoch 3: val_loss did not improve from 0.02608
3/3 [==============================] - 0s 113ms/step - loss: 0.0017 - val_loss: 0.0263
Epoch 4/300
3/3 [==============================] - ETA: 0s - loss: 9.3739e-04
Epoch 4: val_loss did not improve from 0.02608
3/3 [==============================] - 0s 120ms/step - loss: 9.3739e-04 - val_loss: 0.0267
Epoch 5/300
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 5: val_loss improved from 0.02608 to 0.02584, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 124ms/step - loss: 0.0011 - val_loss: 0.0258
Epoch 6/300
3/3 [==============================] - ETA: 0s - loss: 8.2464e-04
Epoch 6: val_loss improved from 0.02584 to 0.02502, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 127ms/step - loss: 8.2464e-04 - val_loss: 0.0250
Epoch 7/300
3/3 [==============================] - ETA: 0s - loss: 9.0934e-04
Epoch 7: val_loss did not improve from 0.02502
3/3 [==============================] - 0s 120ms/step - loss: 9.0934e-04 - val_loss: 0.0252
Epoch 8/300
3/3 [==============================] - ETA: 0s - loss: 9.0082e-04
```

```
Epoch 8: val_loss did not improve from 0.02502
3/3 [==============================] - 0s 119ms/step - loss: 9.0082e-04 - val_loss: 0.0256
Epoch 9/300
3/3 [==============================] - ETA: 0s - loss: 8.8776e-04
Epoch 9: val_loss did not improve from 0.02502
3/3 [==============================] - 0s 114ms/step - loss: 8.8776e-04 - val_loss: 0.0253
Epoch 10/300
3/3 [==============================] - ETA: 0s - loss: 8.7963e-04
Epoch 10: val_loss did not improve from 0.02502
3/3 [==============================] - 0s 113ms/step - loss: 8.7963e-04 - val_loss: 0.0258
Epoch 11/300
3/3 [==============================] - ETA: 0s - loss: 8.5444e-04
Epoch 11: val_loss did not improve from 0.02502
3/3 [==============================] - 0s 112ms/step - loss: 8.5444e-04 - val_loss: 0.0256
Epoch 12/300
3/3 [==============================] - ETA: 0s - loss: 7.8848e-04
Epoch 12: val_loss improved from 0.02502 to 0.02484, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 133ms/step - loss: 7.8848e-04 - val_loss: 0.0248
Epoch 13/300
3/3 [==============================] - ETA: 0s - loss: 7.2229e-04
Epoch 13: val_loss improved from 0.02484 to 0.02475, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 124ms/step - loss: 7.2229e-04 - val_loss: 0.0247
Epoch 14/300
3/3 [==============================] - ETA: 0s - loss: 6.1286e-04
Epoch 14: val_loss did not improve from 0.02475
3/3 [==============================] - 0s 114ms/step - loss: 6.1286e-04 - val_loss: 0.0252
Epoch 15/300
3/3 [==============================] - ETA: 0s - loss: 8.2819e-04
Epoch 15: val_loss did not improve from 0.02475
3/3 [==============================] - 0s 133ms/step - loss: 8.2819e-04 - val_loss: 0.0250
Epoch 16/300
3/3 [==============================] - ETA: 0s - loss: 7.7074e-04
Epoch 16: val_loss did not improve from 0.02475
3/3 [==============================] - 0s 123ms/step - loss: 7.7074e-04 - val_loss: 0.0248
Epoch 17/300
3/3 [==============================] - ETA: 0s - loss: 6.1602e-04
Epoch 17: val_loss did not improve from 0.02475
3/3 [==============================] - 0s 113ms/step - loss: 6.1602e-04 - val_loss: 0.0251
Epoch 18/300
3/3 [==============================] - ETA: 0s - loss: 8.3023e-04
Epoch 18: val_loss did not improve from 0.02475
3/3 [==============================] - 0s 125ms/step - loss: 8.3023e-04 - val_loss: 0.0248
Epoch 19/300
3/3 [==============================] - ETA: 0s - loss: 7.6626e-04
Epoch 19: val_loss improved from 0.02475 to 0.02455, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 126ms/step - loss: 7.6626e-04 - val_loss: 0.0245
Epoch 20/300
3/3 [==============================] - ETA: 0s - loss: 5.7086e-04
Epoch 20: val_loss improved from 0.02455 to 0.02448, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 128ms/step - loss: 5.7086e-04 - val_loss: 0.0245
Epoch 21/300
3/3 [==============================] - ETA: 0s - loss: 8.1429e-04
Epoch 21: val_loss did not improve from 0.02448
3/3 [==============================] - 0s 116ms/step - loss: 8.1429e-04 - val_loss: 0.0246
Epoch 22/300
3/3 [==============================] - ETA: 0s - loss: 5.6282e-04
Epoch 22: val_loss did not improve from 0.02448
3/3 [==============================] - 0s 110ms/step - loss: 5.6282e-04 - val_loss: 0.0246
Epoch 23/300
3/3 [==============================] - ETA: 0s - loss: 6.6348e-04
Epoch 23: val_loss did not improve from 0.02448
3/3 [==============================] - 0s 107ms/step - loss: 6.6348e-04 - val_loss: 0.0247
Epoch 24/300
3/3 [==============================] - ETA: 0s - loss: 6.7883e-04
Epoch 24: val_loss did not improve from 0.02448
3/3 [==============================] - 0s 121ms/step - loss: 6.7883e-04 - val_loss: 0.0249
Epoch 25/300
3/3 [==============================] - ETA: 0s - loss: 7.2055e-04
Epoch 25: val_loss improved from 0.02448 to 0.02444, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 129ms/step - loss: 7.2055e-04 - val_loss: 0.0244
Epoch 26/300
3/3 [==============================] - ETA: 0s - loss: 6.0694e-04
Epoch 26: val_loss improved from 0.02444 to 0.02440, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 121ms/step - loss: 6.0694e-04 - val_loss: 0.0244
Epoch 27/300
3/3 [==============================] - ETA: 0s - loss: 6.6145e-04
Epoch 27: val_loss did not improve from 0.02440
3/3 [==============================] - 0s 121ms/step - loss: 6.6145e-04 - val_loss: 0.0247
Epoch 28/300
3/3 [==============================] - ETA: 0s - loss: 7.2040e-04
Epoch 28: val_loss improved from 0.02440 to 0.02392, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 120ms/step - loss: 7.2040e-04 - val_loss: 0.0239
Epoch 29/300
```

```
3/3 [==============================] - ETA: 0s - loss: 6.4492e-04
Epoch 29: val_loss improved from 0.02392 to 0.02373, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 121ms/step - loss: 6.4492e-04 - val_loss: 0.0237
Epoch 30/300
3/3 [==============================] - ETA: 0s - loss: 6.4210e-04
Epoch 30: val_loss did not improve from 0.02373
3/3 [==============================] - 0s 115ms/step - loss: 6.4210e-04 - val_loss: 0.0241
Epoch 31/300
3/3 [==============================] - ETA: 0s - loss: 6.4077e-04
Epoch 31: val_loss did not improve from 0.02373
3/3 [==============================] - 0s 112ms/step - loss: 6.4077e-04 - val_loss: 0.0237
Epoch 32/300
3/3 [==============================] - ETA: 0s - loss: 6.9455e-04
Epoch 32: val_loss did not improve from 0.02373
3/3 [==============================] - 0s 128ms/step - loss: 6.9455e-04 - val_loss: 0.0241
Epoch 33/300
3/3 [==============================] - ETA: 0s - loss: 7.6494e-04
Epoch 33: val_loss did not improve from 0.02373
3/3 [==============================] - 0s 117ms/step - loss: 7.6494e-04 - val_loss: 0.0241
Epoch 34/300
3/3 [==============================] - ETA: 0s - loss: 6.8113e-04
Epoch 34: val_loss improved from 0.02373 to 0.02345, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 133ms/step - loss: 6.8113e-04 - val_loss: 0.0234
Epoch 35/300
3/3 [==============================] - ETA: 0s - loss: 7.2886e-04
Epoch 35: val_loss improved from 0.02345 to 0.02335, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 139ms/step - loss: 7.2886e-04 - val_loss: 0.0234
Epoch 36/300
3/3 [==============================] - ETA: 0s - loss: 7.6120e-04
Epoch 36: val_loss improved from 0.02335 to 0.02285, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 126ms/step - loss: 7.6120e-04 - val_loss: 0.0229
Epoch 37/300
3/3 [==============================] - ETA: 0s - loss: 7.2655e-04
Epoch 37: val_loss did not improve from 0.02285
3/3 [==============================] - 0s 113ms/step - loss: 7.2655e-04 - val_loss: 0.0230
Epoch 38/300
3/3 [==============================] - ETA: 0s - loss: 7.1785e-04
Epoch 38: val_loss did not improve from 0.02285
3/3 [==============================] - 0s 125ms/step - loss: 7.1785e-04 - val_loss: 0.0237
Epoch 39/300
3/3 [==============================] - ETA: 0s - loss: 6.3056e-04
Epoch 39: val_loss did not improve from 0.02285
3/3 [==============================] - 0s 115ms/step - loss: 6.3056e-04 - val_loss: 0.0236
Epoch 40/300
3/3 [==============================] - ETA: 0s - loss: 7.1475e-04
Epoch 40: val_loss did not improve from 0.02285
3/3 [==============================] - 0s 110ms/step - loss: 7.1475e-04 - val_loss: 0.0235
Epoch 41/300
3/3 [==============================] - ETA: 0s - loss: 6.9367e-04
Epoch 41: val_loss did not improve from 0.02285
3/3 [==============================] - 0s 129ms/step - loss: 6.9367e-04 - val_loss: 0.0236
Epoch 42/300
3/3 [==============================] - ETA: 0s - loss: 6.7401e-04
Epoch 42: val_loss did not improve from 0.02285
3/3 [==============================] - 0s 112ms/step - loss: 6.7401e-04 - val_loss: 0.0229
Epoch 43/300
3/3 [==============================] - ETA: 0s - loss: 4.4101e-04
Epoch 43: val_loss did not improve from 0.02285
3/3 [==============================] - 0s 120ms/step - loss: 4.4101e-04 - val_loss: 0.0230
Epoch 44/300
3/3 [==============================] - ETA: 0s - loss: 7.4933e-04
Epoch 44: val_loss improved from 0.02285 to 0.02278, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 145ms/step - loss: 7.4933e-04 - val_loss: 0.0228
Epoch 45/300
3/3 [==============================] - ETA: 0s - loss: 5.7530e-04
Epoch 45: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 120ms/step - loss: 5.7530e-04 - val_loss: 0.0233
Epoch 46/300
3/3 [==============================] - ETA: 0s - loss: 6.4760e-04
Epoch 46: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 115ms/step - loss: 6.4760e-04 - val_loss: 0.0233
Epoch 47/300
3/3 [==============================] - ETA: 0s - loss: 4.9078e-04
Epoch 47: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 128ms/step - loss: 4.9078e-04 - val_loss: 0.0236
Epoch 48/300
3/3 [==============================] - ETA: 0s - loss: 6.9354e-04
Epoch 48: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 116ms/step - loss: 6.9354e-04 - val_loss: 0.0231
Epoch 49/300
3/3 [==============================] - ETA: 0s - loss: 4.8256e-04
Epoch 49: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 123ms/step - loss: 4.8256e-04 - val_loss: 0.0234
```

```
Epoch 50/300
3/3 [==============================] - ETA: 0s - loss: 7.0473e-04
Epoch 50: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 129ms/step - loss: 7.0473e-04 - val_loss: 0.0231
Epoch 51/300
3/3 [==============================] - ETA: 0s - loss: 5.4847e-04
Epoch 51: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 116ms/step - loss: 5.4847e-04 - val_loss: 0.0231
Epoch 52/300
3/3 [==============================] - ETA: 0s - loss: 6.1890e-04
Epoch 52: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 117ms/step - loss: 6.1890e-04 - val_loss: 0.0235
Epoch 53/300
3/3 [==============================] - ETA: 0s - loss: 5.4400e-04
Epoch 53: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 126ms/step - loss: 5.4400e-04 - val_loss: 0.0232
Epoch 54/300
3/3 [==============================] - ETA: 0s - loss: 7.7028e-04
Epoch 54: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 120ms/step - loss: 7.7028e-04 - val_loss: 0.0230
Epoch 55/300
3/3 [==============================] - ETA: 0s - loss: 7.3543e-04
Epoch 55: val_loss did not improve from 0.02278
3/3 [==============================] - 0s 127ms/step - loss: 7.3543e-04 - val_loss: 0.0235
Epoch 56/300
3/3 [==============================] - ETA: 0s - loss: 6.9062e-04
Epoch 56: val_loss improved from 0.02278 to 0.02233, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 137ms/step - loss: 6.9062e-04 - val_loss: 0.0223
Epoch 57/300
3/3 [==============================] - ETA: 0s - loss: 7.1829e-04
Epoch 57: val_loss did not improve from 0.02233
3/3 [==============================] - 0s 119ms/step - loss: 7.1829e-04 - val_loss: 0.0226
Epoch 58/300
3/3 [==============================] - ETA: 0s - loss: 5.4327e-04
Epoch 58: val_loss did not improve from 0.02233
3/3 [==============================] - 0s 121ms/step - loss: 5.4327e-04 - val_loss: 0.0224
Epoch 59/300
3/3 [==============================] - ETA: 0s - loss: 5.8132e-04
Epoch 59: val_loss improved from 0.02233 to 0.02185, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 129ms/step - loss: 5.8132e-04 - val_loss: 0.0218
Epoch 60/300
3/3 [==============================] - ETA: 0s - loss: 6.3781e-04
Epoch 60: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 121ms/step - loss: 6.3781e-04 - val_loss: 0.0221
Epoch 61/300
3/3 [==============================] - ETA: 0s - loss: 5.4240e-04
Epoch 61: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 123ms/step - loss: 5.4240e-04 - val_loss: 0.0226
Epoch 62/300
3/3 [==============================] - ETA: 0s - loss: 6.7643e-04
Epoch 62: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 115ms/step - loss: 6.7643e-04 - val_loss: 0.0223
Epoch 63/300
3/3 [==============================] - ETA: 0s - loss: 5.8026e-04
Epoch 63: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 121ms/step - loss: 5.8026e-04 - val_loss: 0.0223
Epoch 64/300
3/3 [==============================] - ETA: 0s - loss: 5.1432e-04
Epoch 64: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 133ms/step - loss: 5.1432e-04 - val_loss: 0.0226
Epoch 65/300
3/3 [==============================] - ETA: 0s - loss: 6.6002e-04
Epoch 65: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 117ms/step - loss: 6.6002e-04 - val_loss: 0.0222
Epoch 66/300
3/3 [==============================] - ETA: 0s - loss: 5.3635e-04
Epoch 66: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 124ms/step - loss: 5.3635e-04 - val_loss: 0.0223
Epoch 67/300
3/3 [==============================] - ETA: 0s - loss: 6.2881e-04
Epoch 67: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 120ms/step - loss: 6.2881e-04 - val_loss: 0.0227
Epoch 68/300
3/3 [==============================] - ETA: 0s - loss: 5.3258e-04
Epoch 68: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 126ms/step - loss: 5.3258e-04 - val_loss: 0.0225
Epoch 69/300
3/3 [==============================] - ETA: 0s - loss: 4.8699e-04
Epoch 69: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 119ms/step - loss: 4.8699e-04 - val_loss: 0.0227
Epoch 70/300
3/3 [==============================] - ETA: 0s - loss: 5.4894e-04
Epoch 70: val_loss did not improve from 0.02185
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3/3 [==============================] - 0s 119ms/step - loss: 5.4894e-04 - val_loss: 0.0228
Epoch 71/300
3/3 [==============================] - ETA: 0s - loss: 4.5681e-04
Epoch 71: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 114ms/step - loss: 4.5681e-04 - val_loss: 0.0220
Epoch 72/300
3/3 [==============================] - ETA: 0s - loss: 4.7592e-04
Epoch 72: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 118ms/step - loss: 4.7592e-04 - val_loss: 0.0222
Epoch 73/300
3/3 [==============================] - ETA: 0s - loss: 4.6093e-04
Epoch 73: val_loss did not improve from 0.02185
3/3 [==============================] - 0s 128ms/step - loss: 4.6093e-04 - val_loss: 0.0219
Epoch 74/300
3/3 [==============================] - ETA: 0s - loss: 4.9462e-04
Epoch 74: val_loss improved from 0.02185 to 0.02175, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 130ms/step - loss: 4.9462e-04 - val_loss: 0.0217
Epoch 75/300
3/3 [==============================] - ETA: 0s - loss: 4.9840e-04
Epoch 75: val_loss did not improve from 0.02175
3/3 [==============================] - 0s 119ms/step - loss: 4.9840e-04 - val_loss: 0.0220
Epoch 76/300
3/3 [==============================] - ETA: 0s - loss: 5.0709e-04
Epoch 76: val_loss improved from 0.02175 to 0.02157, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 124ms/step - loss: 5.0709e-04 - val_loss: 0.0216
Epoch 77/300
3/3 [==============================] - ETA: 0s - loss: 4.2314e-04
Epoch 77: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 118ms/step - loss: 4.2314e-04 - val_loss: 0.0218
Epoch 78/300
3/3 [==============================] - ETA: 0s - loss: 4.9899e-04
Epoch 78: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 113ms/step - loss: 4.9899e-04 - val_loss: 0.0224
Epoch 79/300
3/3 [==============================] - ETA: 0s - loss: 5.2721e-04
Epoch 79: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 118ms/step - loss: 5.2721e-04 - val_loss: 0.0222
Epoch 80/300
3/3 [==============================] - ETA: 0s - loss: 5.4532e-04
Epoch 80: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 129ms/step - loss: 5.4532e-04 - val_loss: 0.0224
Epoch 81/300
3/3 [==============================] - ETA: 0s - loss: 6.1643e-04
Epoch 81: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 125ms/step - loss: 6.1643e-04 - val_loss: 0.0225
Epoch 82/300
3/3 [==============================] - ETA: 0s - loss: 6.2018e-04
Epoch 82: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 115ms/step - loss: 6.2018e-04 - val_loss: 0.0222
Epoch 83/300
3/3 [==============================] - ETA: 0s - loss: 4.3330e-04
Epoch 83: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 114ms/step - loss: 4.3330e-04 - val_loss: 0.0221
Epoch 84/300
3/3 [==============================] - ETA: 0s - loss: 4.5776e-04
Epoch 84: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 129ms/step - loss: 4.5776e-04 - val_loss: 0.0219
Epoch 85/300
3/3 [==============================] - ETA: 0s - loss: 4.2356e-04
Epoch 85: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 115ms/step - loss: 4.2356e-04 - val_loss: 0.0216
Epoch 86/300
3/3 [==============================] - ETA: 0s - loss: 5.1015e-04
Epoch 86: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 122ms/step - loss: 5.1015e-04 - val_loss: 0.0221
Epoch 87/300
3/3 [==============================] - ETA: 0s - loss: 4.9570e-04
Epoch 87: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 124ms/step - loss: 4.9570e-04 - val_loss: 0.0224
Epoch 88/300
3/3 [==============================] - ETA: 0s - loss: 4.9567e-04
Epoch 88: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 117ms/step - loss: 4.9567e-04 - val_loss: 0.0223
Epoch 89/300
3/3 [==============================] - ETA: 0s - loss: 4.5566e-04
Epoch 89: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 130ms/step - loss: 4.5566e-04 - val_loss: 0.0224
Epoch 90/300
3/3 [==============================] - ETA: 0s - loss: 4.4359e-04
Epoch 90: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 133ms/step - loss: 4.4359e-04 - val_loss: 0.0221
Epoch 91/300
3/3 [==============================] - ETA: 0s - loss: 3.9909e-04
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Epoch 91: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 116ms/step - loss: 3.9909e-04 - val_loss: 0.0220
Epoch 92/300
3/3 [==============================] - ETA: 0s - loss: 5.3736e-04
Epoch 92: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 117ms/step - loss: 5.3736e-04 - val_loss: 0.0218
Epoch 93/300
3/3 [==============================] - ETA: 0s - loss: 4.6985e-04
Epoch 93: val_loss did not improve from 0.02157
3/3 [==============================] - 0s 122ms/step - loss: 4.6985e-04 - val_loss: 0.0219
Epoch 94/300
3/3 [==============================] - ETA: 0s - loss: 4.2479e-04
Epoch 94: val_loss improved from 0.02157 to 0.02152, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 133ms/step - loss: 4.2479e-04 - val_loss: 0.0215
Epoch 95/300
3/3 [==============================] - ETA: 0s - loss: 4.9053e-04
Epoch 95: val_loss did not improve from 0.02152
3/3 [==============================] - 0s 122ms/step - loss: 4.9053e-04 - val_loss: 0.0216
Epoch 96/300
3/3 [==============================] - ETA: 0s - loss: 4.3459e-04
Epoch 96: val_loss did not improve from 0.02152
3/3 [==============================] - 0s 125ms/step - loss: 4.3459e-04 - val_loss: 0.0220
Epoch 97/300
3/3 [==============================] - ETA: 0s - loss: 4.1605e-04
Epoch 97: val_loss did not improve from 0.02152
3/3 [==============================] - 0s 114ms/step - loss: 4.1605e-04 - val_loss: 0.0216
Epoch 98/300
3/3 [==============================] - ETA: 0s - loss: 4.6053e-04
Epoch 98: val_loss did not improve from 0.02152
3/3 [==============================] - 0s 120ms/step - loss: 4.6053e-04 - val_loss: 0.0220
Epoch 99/300
3/3 [==============================] - ETA: 0s - loss: 4.4749e-04
Epoch 99: val_loss did not improve from 0.02152
3/3 [==============================] - 0s 125ms/step - loss: 4.4749e-04 - val_loss: 0.0221
Epoch 100/300
3/3 [==============================] - ETA: 0s - loss: 5.4608e-04
Epoch 100: val_loss improved from 0.02152 to 0.02146, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 140ms/step - loss: 5.4608e-04 - val_loss: 0.0215
Epoch 101/300
3/3 [==============================] - ETA: 0s - loss: 5.1114e-04
Epoch 101: val_loss did not improve from 0.02146
3/3 [==============================] - 1s 215ms/step - loss: 5.1114e-04 - val_loss: 0.0216
Epoch 102/300
3/3 [==============================] - ETA: 0s - loss: 4.2806e-04
Epoch 102: val_loss improved from 0.02146 to 0.02114, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 323ms/step - loss: 4.2806e-04 - val_loss: 0.0211
Epoch 103/300
3/3 [==============================] - ETA: 0s - loss: 5.5203e-04
Epoch 103: val_loss improved from 0.02114 to 0.02102, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 293ms/step - loss: 5.5203e-04 - val_loss: 0.0210
Epoch 104/300
3/3 [==============================] - ETA: 0s - loss: 4.2728e-04
Epoch 104: val_loss did not improve from 0.02102
3/3 [==============================] - 1s 208ms/step - loss: 4.2728e-04 - val_loss: 0.0217
Epoch 105/300
3/3 [==============================] - ETA: 0s - loss: 3.4681e-04
Epoch 105: val_loss did not improve from 0.02102
3/3 [==============================] - 1s 228ms/step - loss: 3.4681e-04 - val_loss: 0.0216
Epoch 106/300
3/3 [==============================] - ETA: 0s - loss: 4.3421e-04
Epoch 106: val_loss did not improve from 0.02102
3/3 [==============================] - 1s 204ms/step - loss: 4.3421e-04 - val_loss: 0.0220
Epoch 107/300
3/3 [==============================] - ETA: 0s - loss: 4.5312e-04
Epoch 107: val_loss did not improve from 0.02102
3/3 [==============================] - 1s 222ms/step - loss: 4.5312e-04 - val_loss: 0.0224
Epoch 108/300
3/3 [==============================] - ETA: 0s - loss: 4.2988e-04
Epoch 108: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 121ms/step - loss: 4.2988e-04 - val_loss: 0.0219
Epoch 109/300
3/3 [==============================] - ETA: 0s - loss: 3.9125e-04
Epoch 109: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 118ms/step - loss: 3.9125e-04 - val_loss: 0.0218
Epoch 110/300
3/3 [==============================] - ETA: 0s - loss: 4.7435e-04
Epoch 110: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 125ms/step - loss: 4.7435e-04 - val_loss: 0.0218
Epoch 111/300
3/3 [==============================] - ETA: 0s - loss: 4.3668e-04
Epoch 111: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 121ms/step - loss: 4.3668e-04 - val_loss: 0.0218
Epoch 112/300
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3/3 [==============================] - ETA: 0s - loss: 4.3445e-04
Epoch 112: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 122ms/step - loss: 4.3445e-04 - val_loss: 0.0215
Epoch 113/300
3/3 [==============================] - ETA: 0s - loss: 3.9226e-04
Epoch 113: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 119ms/step - loss: 3.9226e-04 - val_loss: 0.0214
Epoch 114/300
3/3 [==============================] - ETA: 0s - loss: 3.7574e-04
Epoch 114: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 133ms/step - loss: 3.7574e-04 - val_loss: 0.0216
Epoch 115/300
3/3 [==============================] - ETA: 0s - loss: 4.4786e-04
Epoch 115: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 131ms/step - loss: 4.4786e-04 - val_loss: 0.0217
Epoch 116/300
3/3 [==============================] - ETA: 0s - loss: 3.8722e-04
Epoch 116: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 116ms/step - loss: 3.8722e-04 - val_loss: 0.0216
Epoch 117/300
3/3 [==============================] - ETA: 0s - loss: 3.8073e-04
Epoch 117: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 118ms/step - loss: 3.8073e-04 - val_loss: 0.0213
Epoch 118/300
3/3 [==============================] - ETA: 0s - loss: 3.8274e-04
Epoch 118: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 125ms/step - loss: 3.8274e-04 - val_loss: 0.0211
Epoch 119/300
3/3 [==============================] - ETA: 0s - loss: 3.7101e-04
Epoch 119: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 124ms/step - loss: 3.7101e-04 - val_loss: 0.0213
Epoch 120/300
3/3 [==============================] - ETA: 0s - loss: 3.9705e-04
Epoch 120: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 119ms/step - loss: 3.9705e-04 - val_loss: 0.0219
Epoch 121/300
3/3 [==============================] - ETA: 0s - loss: 4.6990e-04
Epoch 121: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 125ms/step - loss: 4.6990e-04 - val_loss: 0.0215
Epoch 122/300
3/3 [==============================] - ETA: 0s - loss: 4.0896e-04
Epoch 122: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 121ms/step - loss: 4.0896e-04 - val_loss: 0.0216
Epoch 123/300
3/3 [==============================] - ETA: 0s - loss: 3.9264e-04
Epoch 123: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 123ms/step - loss: 3.9264e-04 - val_loss: 0.0212
Epoch 124/300
3/3 [==============================] - ETA: 0s - loss: 3.5266e-04
Epoch 124: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 126ms/step - loss: 3.5266e-04 - val_loss: 0.0215
Epoch 125/300
3/3 [==============================] - ETA: 0s - loss: 3.8275e-04
Epoch 125: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 121ms/step - loss: 3.8275e-04 - val_loss: 0.0212
Epoch 126/300
3/3 [==============================] - ETA: 0s - loss: 2.5917e-04
Epoch 126: val_loss did not improve from 0.02102
3/3 [==============================] - 0s 133ms/step - loss: 2.5917e-04 - val_loss: 0.0212
Epoch 127/300
3/3 [==============================] - ETA: 0s - loss: 3.6296e-04
Epoch 127: val_loss improved from 0.02102 to 0.02087, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 135ms/step - loss: 3.6296e-04 - val_loss: 0.0209
Epoch 128/300
3/3 [==============================] - ETA: 0s - loss: 4.4253e-04
Epoch 128: val_loss improved from 0.02087 to 0.02063, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 130ms/step - loss: 4.4253e-04 - val_loss: 0.0206
Epoch 129/300
3/3 [==============================] - ETA: 0s - loss: 3.4297e-04
Epoch 129: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 128ms/step - loss: 3.4297e-04 - val_loss: 0.0209
Epoch 130/300
3/3 [==============================] - ETA: 0s - loss: 4.0381e-04
Epoch 130: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 131ms/step - loss: 4.0381e-04 - val_loss: 0.0209
Epoch 131/300
3/3 [==============================] - ETA: 0s - loss: 4.3310e-04
Epoch 131: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 120ms/step - loss: 4.3310e-04 - val_loss: 0.0213
Epoch 132/300
3/3 [==============================] - ETA: 0s - loss: 3.1748e-04
Epoch 132: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 127ms/step - loss: 3.1748e-04 - val_loss: 0.0212
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Epoch 133/300
3/3 [==============================] - ETA: 0s - loss: 4.6207e-04
Epoch 133: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 123ms/step - loss: 4.6207e-04 - val_loss: 0.0210
Epoch 134/300
3/3 [==============================] - ETA: 0s - loss: 4.1045e-04
Epoch 134: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 117ms/step - loss: 4.1045e-04 - val_loss: 0.0210
Epoch 135/300
3/3 [==============================] - ETA: 0s - loss: 4.4740e-04
Epoch 135: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 121ms/step - loss: 4.4740e-04 - val_loss: 0.0211
Epoch 136/300
3/3 [==============================] - ETA: 0s - loss: 3.7543e-04
Epoch 136: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 120ms/step - loss: 3.7543e-04 - val_loss: 0.0210
Epoch 137/300
3/3 [==============================] - ETA: 0s - loss: 3.5221e-04
Epoch 137: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 129ms/step - loss: 3.5221e-04 - val_loss: 0.0212
Epoch 138/300
3/3 [==============================] - ETA: 0s - loss: 3.7588e-04
Epoch 138: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 118ms/step - loss: 3.7588e-04 - val_loss: 0.0209
Epoch 139/300
3/3 [==============================] - ETA: 0s - loss: 3.4540e-04
Epoch 139: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 137ms/step - loss: 3.4540e-04 - val_loss: 0.0209
Epoch 140/300
3/3 [==============================] - ETA: 0s - loss: 3.8743e-04
Epoch 140: val_loss did not improve from 0.02063
3/3 [==============================] - 0s 141ms/step - loss: 3.8743e-04 - val_loss: 0.0209
Epoch 141/300
3/3 [==============================] - ETA: 0s - loss: 3.4335e-04
Epoch 141: val_loss improved from 0.02063 to 0.02060, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 133ms/step - loss: 3.4335e-04 - val_loss: 0.0206
Epoch 142/300
3/3 [==============================] - ETA: 0s - loss: 3.3334e-04
Epoch 142: val_loss did not improve from 0.02060
3/3 [==============================] - 0s 127ms/step - loss: 3.3334e-04 - val_loss: 0.0208
Epoch 143/300
3/3 [==============================] - ETA: 0s - loss: 3.6171e-04
Epoch 143: val_loss did not improve from 0.02060
3/3 [==============================] - 0s 130ms/step - loss: 3.6171e-04 - val_loss: 0.0209
Epoch 144/300
3/3 [==============================] - ETA: 0s - loss: 3.4877e-04
Epoch 144: val_loss did not improve from 0.02060
3/3 [==============================] - 0s 123ms/step - loss: 3.4877e-04 - val_loss: 0.0210
Epoch 145/300
3/3 [==============================] - ETA: 0s - loss: 3.6699e-04
Epoch 145: val_loss did not improve from 0.02060
3/3 [==============================] - 0s 127ms/step - loss: 3.6699e-04 - val_loss: 0.0208
Epoch 146/300
3/3 [==============================] - ETA: 0s - loss: 4.1930e-04
Epoch 146: val_loss did not improve from 0.02060
3/3 [==============================] - 0s 123ms/step - loss: 4.1930e-04 - val_loss: 0.0210
Epoch 147/300
3/3 [==============================] - ETA: 0s - loss: 4.5600e-04
Epoch 147: val_loss did not improve from 0.02060
3/3 [==============================] - 0s 119ms/step - loss: 4.5600e-04 - val_loss: 0.0206
Epoch 148/300
3/3 [==============================] - ETA: 0s - loss: 3.9812e-04
Epoch 148: val_loss improved from 0.02060 to 0.02043, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 132ms/step - loss: 3.9812e-04 - val_loss: 0.0204
Epoch 149/300
3/3 [==============================] - ETA: 0s - loss: 3.9032e-04
Epoch 149: val_loss did not improve from 0.02043
3/3 [==============================] - 0s 122ms/step - loss: 3.9032e-04 - val_loss: 0.0210
Epoch 150/300
3/3 [==============================] - ETA: 0s - loss: 3.5220e-04
Epoch 150: val_loss did not improve from 0.02043
3/3 [==============================] - 0s 116ms/step - loss: 3.5220e-04 - val_loss: 0.0210
Epoch 151/300
3/3 [==============================] - ETA: 0s - loss: 3.8266e-04
Epoch 151: val_loss did not improve from 0.02043
3/3 [==============================] - 0s 134ms/step - loss: 3.8266e-04 - val_loss: 0.0211
Epoch 152/300
3/3 [==============================] - ETA: 0s - loss: 3.4669e-04
Epoch 152: val_loss did not improve from 0.02043
3/3 [==============================] - 0s 119ms/step - loss: 3.4669e-04 - val_loss: 0.0205
Epoch 153/300
3/3 [==============================] - ETA: 0s - loss: 4.2053e-04
Epoch 153: val_loss did not improve from 0.02043
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3/3 [==============================] - 0s 122ms/step - loss: 4.2053e-04 - val_loss: 0.0205
Epoch 154/300
3/3 [==============================] - ETA: 0s - loss: 3.1243e-04
Epoch 154: val_loss did not improve from 0.02043
3/3 [==============================] - 0s 131ms/step - loss: 3.1243e-04 - val_loss: 0.0205
Epoch 155/300
3/3 [==============================] - ETA: 0s - loss: 3.1841e-04
Epoch 155: val_loss did not improve from 0.02043
3/3 [==============================] - 1s 335ms/step - loss: 3.1841e-04 - val_loss: 0.0205
Epoch 156/300
3/3 [==============================] - ETA: 0s - loss: 3.1635e-04
Epoch 156: val_loss improved from 0.02043 to 0.02039, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 130ms/step - loss: 3.1635e-04 - val_loss: 0.0204
Epoch 157/300
3/3 [==============================] - ETA: 0s - loss: 4.1466e-04
Epoch 157: val_loss did not improve from 0.02039
3/3 [==============================] - 1s 359ms/step - loss: 4.1466e-04 - val_loss: 0.0205
Epoch 158/300
3/3 [==============================] - ETA: 0s - loss: 3.9973e-04
Epoch 158: val_loss did not improve from 0.02039
3/3 [==============================] - 1s 166ms/step - loss: 3.9973e-04 - val_loss: 0.0206
Epoch 159/300
3/3 [==============================] - ETA: 0s - loss: 3.1841e-04
Epoch 159: val_loss improved from 0.02039 to 0.02026, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 357ms/step - loss: 3.1841e-04 - val_loss: 0.0203
Epoch 160/300
3/3 [==============================] - ETA: 0s - loss: 3.1141e-04
Epoch 160: val_loss did not improve from 0.02026
3/3 [==============================] - 1s 187ms/step - loss: 3.1141e-04 - val_loss: 0.0203
Epoch 161/300
3/3 [==============================] - ETA: 0s - loss: 3.3750e-04
Epoch 161: val_loss improved from 0.02026 to 0.01989, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 150ms/step - loss: 3.3750e-04 - val_loss: 0.0199
Epoch 162/300
3/3 [==============================] - ETA: 0s - loss: 3.2876e-04
Epoch 162: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 127ms/step - loss: 3.2876e-04 - val_loss: 0.0205
Epoch 163/300
3/3 [==============================] - ETA: 0s - loss: 3.6215e-04
Epoch 163: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 126ms/step - loss: 3.6215e-04 - val_loss: 0.0206
Epoch 164/300
3/3 [==============================] - ETA: 0s - loss: 3.3505e-04
Epoch 164: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 123ms/step - loss: 3.3505e-04 - val_loss: 0.0203
Epoch 165/300
3/3 [==============================] - ETA: 0s - loss: 3.1652e-04
Epoch 165: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 122ms/step - loss: 3.1652e-04 - val_loss: 0.0206
Epoch 166/300
3/3 [==============================] - ETA: 0s - loss: 3.3423e-04
Epoch 166: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 131ms/step - loss: 3.3423e-04 - val_loss: 0.0205
Epoch 167/300
3/3 [==============================] - ETA: 0s - loss: 4.0233e-04
Epoch 167: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 141ms/step - loss: 4.0233e-04 - val_loss: 0.0207
Epoch 168/300
3/3 [==============================] - ETA: 0s - loss: 3.2276e-04
Epoch 168: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 138ms/step - loss: 3.2276e-04 - val_loss: 0.0204
Epoch 169/300
3/3 [==============================] - ETA: 0s - loss: 2.5749e-04
Epoch 169: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 118ms/step - loss: 2.5749e-04 - val_loss: 0.0203
Epoch 170/300
3/3 [==============================] - ETA: 0s - loss: 3.5310e-04
Epoch 170: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 123ms/step - loss: 3.5310e-04 - val_loss: 0.0200
Epoch 171/300
3/3 [==============================] - ETA: 0s - loss: 3.5548e-04
Epoch 171: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 131ms/step - loss: 3.5548e-04 - val_loss: 0.0201
Epoch 172/300
3/3 [==============================] - ETA: 0s - loss: 3.5626e-04
Epoch 172: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 128ms/step - loss: 3.5626e-04 - val_loss: 0.0203
Epoch 173/300
3/3 [==============================] - ETA: 0s - loss: 4.2101e-04
Epoch 173: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 128ms/step - loss: 4.2101e-04 - val_loss: 0.0201
Epoch 174/300
3/3 [==============================] - ETA: 0s - loss: 3.9308e-04
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Epoch 174: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 125ms/step - loss: 3.9308e-04 - val_loss: 0.0203
Epoch 175/300
3/3 [==============================] - ETA: 0s - loss: 3.6245e-04
Epoch 175: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 121ms/step - loss: 3.6245e-04 - val_loss: 0.0205
Epoch 176/300
3/3 [==============================] - ETA: 0s - loss: 3.9499e-04
Epoch 176: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 126ms/step - loss: 3.9499e-04 - val_loss: 0.0203
Epoch 177/300
3/3 [==============================] - ETA: 0s - loss: 3.3234e-04
Epoch 177: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 121ms/step - loss: 3.3234e-04 - val_loss: 0.0203
Epoch 178/300
3/3 [==============================] - ETA: 0s - loss: 3.4312e-04
Epoch 178: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 126ms/step - loss: 3.4312e-04 - val_loss: 0.0200
Epoch 179/300
3/3 [==============================] - ETA: 0s - loss: 4.0734e-04
Epoch 179: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 124ms/step - loss: 4.0734e-04 - val_loss: 0.0199
Epoch 180/300
3/3 [==============================] - ETA: 0s - loss: 3.3079e-04
Epoch 180: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 125ms/step - loss: 3.3079e-04 - val_loss: 0.0200
Epoch 181/300
3/3 [==============================] - ETA: 0s - loss: 4.0412e-04
Epoch 181: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 141ms/step - loss: 4.0412e-04 - val_loss: 0.0200
Epoch 182/300
3/3 [==============================] - ETA: 0s - loss: 3.9014e-04
Epoch 182: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 117ms/step - loss: 3.9014e-04 - val_loss: 0.0203
Epoch 183/300
3/3 [==============================] - ETA: 0s - loss: 3.1176e-04
Epoch 183: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 119ms/step - loss: 3.1176e-04 - val_loss: 0.0199
Epoch 184/300
3/3 [==============================] - ETA: 0s - loss: 3.3222e-04
Epoch 184: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 129ms/step - loss: 3.3222e-04 - val_loss: 0.0200
Epoch 185/300
3/3 [==============================] - ETA: 0s - loss: 3.1219e-04
Epoch 185: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 125ms/step - loss: 3.1219e-04 - val_loss: 0.0205
Epoch 186/300
3/3 [==============================] - ETA: 0s - loss: 3.6458e-04
Epoch 186: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 126ms/step - loss: 3.6458e-04 - val_loss: 0.0201
Epoch 187/300
3/3 [==============================] - ETA: 0s - loss: 3.5491e-04
Epoch 187: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 134ms/step - loss: 3.5491e-04 - val_loss: 0.0202
Epoch 188/300
3/3 [==============================] - ETA: 0s - loss: 3.4636e-04
Epoch 188: val_loss did not improve from 0.01989
3/3 [==============================] - 0s 137ms/step - loss: 3.4636e-04 - val_loss: 0.0201
Epoch 189/300
3/3 [==============================] - ETA: 0s - loss: 2.8298e-04
Epoch 189: val_loss improved from 0.01989 to 0.01961, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 139ms/step - loss: 2.8298e-04 - val_loss: 0.0196
Epoch 190/300
3/3 [==============================] - ETA: 0s - loss: 3.1984e-04
Epoch 190: val_loss did not improve from 0.01961
3/3 [==============================] - 0s 123ms/step - loss: 3.1984e-04 - val_loss: 0.0197
Epoch 191/300
3/3 [==============================] - ETA: 0s - loss: 2.8796e-04
Epoch 191: val_loss did not improve from 0.01961
3/3 [==============================] - 0s 116ms/step - loss: 2.8796e-04 - val_loss: 0.0198
Epoch 192/300
3/3 [==============================] - ETA: 0s - loss: 2.4772e-04
Epoch 192: val_loss did not improve from 0.01961
3/3 [==============================] - 0s 119ms/step - loss: 2.4772e-04 - val_loss: 0.0198
Epoch 193/300
3/3 [==============================] - ETA: 0s - loss: 2.9773e-04
Epoch 193: val_loss did not improve from 0.01961
3/3 [==============================] - 0s 121ms/step - loss: 2.9773e-04 - val_loss: 0.0198
Epoch 194/300
3/3 [==============================] - ETA: 0s - loss: 3.4765e-04
Epoch 194: val_loss improved from 0.01961 to 0.01945, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 126ms/step - loss: 3.4765e-04 - val_loss: 0.0195
Epoch 195/300
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3/3 [==============================] - ETA: 0s - loss: 3.6526e-04
Epoch 195: val_loss did not improve from 0.01945
3/3 [==============================] - 0s 115ms/step - loss: 3.6526e-04 - val_loss: 0.0196
Epoch 196/300
3/3 [==============================] - ETA: 0s - loss: 3.4196e-04
Epoch 196: val_loss did not improve from 0.01945
3/3 [==============================] - 0s 125ms/step - loss: 3.4196e-04 - val_loss: 0.0195
Epoch 197/300
3/3 [==============================] - ETA: 0s - loss: 3.1827e-04
Epoch 197: val_loss did not improve from 0.01945
3/3 [==============================] - 0s 117ms/step - loss: 3.1827e-04 - val_loss: 0.0196
Epoch 198/300
3/3 [==============================] - ETA: 0s - loss: 2.5989e-04
Epoch 198: val_loss did not improve from 0.01945
3/3 [==============================] - 0s 131ms/step - loss: 2.5989e-04 - val_loss: 0.0197
Epoch 199/300
3/3 [==============================] - ETA: 0s - loss: 3.6707e-04
Epoch 199: val_loss improved from 0.01945 to 0.01921, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 135ms/step - loss: 3.6707e-04 - val_loss: 0.0192
Epoch 200/300
3/3 [==============================] - ETA: 0s - loss: 3.5427e-04
Epoch 200: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 125ms/step - loss: 3.5427e-04 - val_loss: 0.0198
Epoch 201/300
3/3 [==============================] - ETA: 0s - loss: 3.3361e-04
Epoch 201: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 133ms/step - loss: 3.3361e-04 - val_loss: 0.0197
Epoch 202/300
3/3 [==============================] - ETA: 0s - loss: 3.1769e-04
Epoch 202: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 128ms/step - loss: 3.1769e-04 - val_loss: 0.0197
Epoch 203/300
3/3 [==============================] - ETA: 0s - loss: 3.0396e-04
Epoch 203: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 126ms/step - loss: 3.0396e-04 - val_loss: 0.0203
Epoch 204/300
3/3 [==============================] - ETA: 0s - loss: 3.3635e-04
Epoch 204: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 117ms/step - loss: 3.3635e-04 - val_loss: 0.0196
Epoch 205/300
3/3 [==============================] - ETA: 0s - loss: 2.9007e-04
Epoch 205: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 122ms/step - loss: 2.9007e-04 - val_loss: 0.0197
Epoch 206/300
3/3 [==============================] - ETA: 0s - loss: 3.0153e-04
Epoch 206: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 128ms/step - loss: 3.0153e-04 - val_loss: 0.0197
Epoch 207/300
3/3 [==============================] - ETA: 0s - loss: 2.8439e-04
Epoch 207: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 117ms/step - loss: 2.8439e-04 - val_loss: 0.0195
Epoch 208/300
3/3 [==============================] - ETA: 0s - loss: 3.7500e-04
Epoch 208: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 122ms/step - loss: 3.7500e-04 - val_loss: 0.0195
Epoch 209/300
3/3 [==============================] - ETA: 0s - loss: 2.7541e-04
Epoch 209: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 126ms/step - loss: 2.7541e-04 - val_loss: 0.0198
Epoch 210/300
3/3 [==============================] - ETA: 0s - loss: 2.6711e-04
Epoch 210: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 121ms/step - loss: 2.6711e-04 - val_loss: 0.0197
Epoch 211/300
3/3 [==============================] - ETA: 0s - loss: 3.5249e-04
Epoch 211: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 124ms/step - loss: 3.5249e-04 - val_loss: 0.0201
Epoch 212/300
3/3 [==============================] - ETA: 0s - loss: 3.3229e-04
Epoch 212: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 120ms/step - loss: 3.3229e-04 - val_loss: 0.0199
Epoch 213/300
3/3 [==============================] - ETA: 0s - loss: 2.9784e-04
Epoch 213: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 119ms/step - loss: 2.9784e-04 - val_loss: 0.0199
Epoch 214/300
3/3 [==============================] - ETA: 0s - loss: 2.8101e-04
Epoch 214: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 120ms/step - loss: 2.8101e-04 - val_loss: 0.0200
Epoch 215/300
3/3 [==============================] - ETA: 0s - loss: 3.1759e-04
Epoch 215: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 117ms/step - loss: 3.1759e-04 - val_loss: 0.0195
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Epoch 216/300
3/3 [==============================] - ETA: 0s - loss: 3.5730e-04
Epoch 216: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 119ms/step - loss: 3.5730e-04 - val_loss: 0.0200
Epoch 217/300
3/3 [==============================] - ETA: 0s - loss: 2.6815e-04
Epoch 217: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 125ms/step - loss: 2.6815e-04 - val_loss: 0.0198
Epoch 218/300
3/3 [==============================] - ETA: 0s - loss: 2.8513e-04
Epoch 218: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 129ms/step - loss: 2.8513e-04 - val_loss: 0.0198
Epoch 219/300
3/3 [==============================] - ETA: 0s - loss: 2.2366e-04
Epoch 219: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 119ms/step - loss: 2.2366e-04 - val_loss: 0.0199
Epoch 220/300
3/3 [==============================] - ETA: 0s - loss: 2.8361e-04
Epoch 220: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 135ms/step - loss: 2.8361e-04 - val_loss: 0.0195
Epoch 221/300
3/3 [==============================] - ETA: 0s - loss: 2.9995e-04
Epoch 221: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 124ms/step - loss: 2.9995e-04 - val_loss: 0.0199
Epoch 222/300
3/3 [==============================] - ETA: 0s - loss: 3.0443e-04
Epoch 222: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 132ms/step - loss: 3.0443e-04 - val_loss: 0.0199
Epoch 223/300
3/3 [==============================] - ETA: 0s - loss: 3.1157e-04
Epoch 223: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 134ms/step - loss: 3.1157e-04 - val_loss: 0.0198
Epoch 224/300
3/3 [==============================] - ETA: 0s - loss: 3.3245e-04
Epoch 224: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 122ms/step - loss: 3.3245e-04 - val_loss: 0.0200
Epoch 225/300
3/3 [==============================] - ETA: 0s - loss: 3.0607e-04
Epoch 225: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 121ms/step - loss: 3.0607e-04 - val_loss: 0.0202
Epoch 226/300
3/3 [==============================] - ETA: 0s - loss: 2.2473e-04
Epoch 226: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 125ms/step - loss: 2.2473e-04 - val_loss: 0.0197
Epoch 227/300
3/3 [==============================] - ETA: 0s - loss: 3.4113e-04
Epoch 227: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 120ms/step - loss: 3.4113e-04 - val_loss: 0.0204
Epoch 228/300
3/3 [==============================] - ETA: 0s - loss: 2.9312e-04
Epoch 228: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 124ms/step - loss: 2.9312e-04 - val_loss: 0.0201
Epoch 229/300
3/3 [==============================] - ETA: 0s - loss: 2.7506e-04
Epoch 229: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 126ms/step - loss: 2.7506e-04 - val_loss: 0.0200
Epoch 230/300
3/3 [==============================] - ETA: 0s - loss: 2.8608e-04
Epoch 230: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 120ms/step - loss: 2.8608e-04 - val_loss: 0.0204
Epoch 231/300
3/3 [==============================] - ETA: 0s - loss: 3.5293e-04
Epoch 231: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 121ms/step - loss: 3.5293e-04 - val_loss: 0.0200
Epoch 232/300
3/3 [==============================] - ETA: 0s - loss: 3.2191e-04
Epoch 232: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 122ms/step - loss: 3.2191e-04 - val_loss: 0.0200
Epoch 233/300
3/3 [==============================] - ETA: 0s - loss: 2.1213e-04
Epoch 233: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 129ms/step - loss: 2.1213e-04 - val_loss: 0.0200
Epoch 234/300
3/3 [==============================] - ETA: 0s - loss: 3.0383e-04
Epoch 234: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 130ms/step - loss: 3.0383e-04 - val_loss: 0.0196
Epoch 235/300
3/3 [==============================] - ETA: 0s - loss: 2.5805e-04
Epoch 235: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 120ms/step - loss: 2.5805e-04 - val_loss: 0.0194
Epoch 236/300
3/3 [==============================] - ETA: 0s - loss: 2.9575e-04
Epoch 236: val_loss did not improve from 0.01921
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3/3 [==============================] - 0s 117ms/step - loss: 2.9575e-04 - val_loss: 0.0199
Epoch 237/300
3/3 [==============================] - ETA: 0s - loss: 2.8932e-04
Epoch 237: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 127ms/step - loss: 2.8932e-04 - val_loss: 0.0194
Epoch 238/300
3/3 [==============================] - ETA: 0s - loss: 3.0683e-04
Epoch 238: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 118ms/step - loss: 3.0683e-04 - val_loss: 0.0198
Epoch 239/300
3/3 [==============================] - ETA: 0s - loss: 2.9738e-04
Epoch 239: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 117ms/step - loss: 2.9738e-04 - val_loss: 0.0196
Epoch 240/300
3/3 [==============================] - ETA: 0s - loss: 2.8288e-04
Epoch 240: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 131ms/step - loss: 2.8288e-04 - val_loss: 0.0196
Epoch 241/300
3/3 [==============================] - ETA: 0s - loss: 2.5604e-04
Epoch 241: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 119ms/step - loss: 2.5604e-04 - val_loss: 0.0199
Epoch 242/300
3/3 [==============================] - ETA: 0s - loss: 2.5429e-04
Epoch 242: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 121ms/step - loss: 2.5429e-04 - val_loss: 0.0197
Epoch 243/300
3/3 [==============================] - ETA: 0s - loss: 2.2166e-04
Epoch 243: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 124ms/step - loss: 2.2166e-04 - val_loss: 0.0196
Epoch 244/300
3/3 [==============================] - ETA: 0s - loss: 2.9184e-04
Epoch 244: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 122ms/step - loss: 2.9184e-04 - val_loss: 0.0194
Epoch 245/300
3/3 [==============================] - ETA: 0s - loss: 2.5843e-04
Epoch 245: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 126ms/step - loss: 2.5843e-04 - val_loss: 0.0195
Epoch 246/300
3/3 [==============================] - ETA: 0s - loss: 2.4356e-04
Epoch 246: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 116ms/step - loss: 2.4356e-04 - val_loss: 0.0195
Epoch 247/300
3/3 [==============================] - ETA: 0s - loss: 2.7950e-04
Epoch 247: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 114ms/step - loss: 2.7950e-04 - val_loss: 0.0196
Epoch 248/300
3/3 [==============================] - ETA: 0s - loss: 3.6190e-04
Epoch 248: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 128ms/step - loss: 3.6190e-04 - val_loss: 0.0198
Epoch 249/300
3/3 [==============================] - ETA: 0s - loss: 2.4013e-04
Epoch 249: val_loss did not improve from 0.01921
3/3 [==============================] - 0s 118ms/step - loss: 2.4013e-04 - val_loss: 0.0198
Epoch 250/300
3/3 [==============================] - ETA: 0s - loss: 3.1660e-04
Epoch 250: val_loss improved from 0.01921 to 0.01912, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 131ms/step - loss: 3.1660e-04 - val_loss: 0.0191
Epoch 251/300
3/3 [==============================] - ETA: 0s - loss: 2.9292e-04
Epoch 251: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 128ms/step - loss: 2.9292e-04 - val_loss: 0.0194
Epoch 252/300
3/3 [==============================] - ETA: 0s - loss: 2.7207e-04
Epoch 252: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 119ms/step - loss: 2.7207e-04 - val_loss: 0.0193
Epoch 253/300
3/3 [==============================] - ETA: 0s - loss: 2.8906e-04
Epoch 253: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 134ms/step - loss: 2.8906e-04 - val_loss: 0.0192
Epoch 254/300
3/3 [==============================] - ETA: 0s - loss: 3.1342e-04
Epoch 254: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 144ms/step - loss: 3.1342e-04 - val_loss: 0.0197
Epoch 255/300
3/3 [==============================] - ETA: 0s - loss: 2.7924e-04
Epoch 255: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 120ms/step - loss: 2.7924e-04 - val_loss: 0.0197
Epoch 256/300
3/3 [==============================] - ETA: 0s - loss: 2.5340e-04
Epoch 256: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 126ms/step - loss: 2.5340e-04 - val_loss: 0.0198
Epoch 257/300
3/3 [==============================] - ETA: 0s - loss: 2.8486e-04
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Epoch 257: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 127ms/step - loss: 2.8486e-04 - val_loss: 0.0197
Epoch 258/300
3/3 [==============================] - ETA: 0s - loss: 2.6481e-04
Epoch 258: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 120ms/step - loss: 2.6481e-04 - val_loss: 0.0198
Epoch 259/300
3/3 [==============================] - ETA: 0s - loss: 2.6778e-04
Epoch 259: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 129ms/step - loss: 2.6778e-04 - val_loss: 0.0193
Epoch 260/300
3/3 [==============================] - ETA: 0s - loss: 2.7990e-04
Epoch 260: val_loss did not improve from 0.01912
3/3 [==============================] - 0s 127ms/step - loss: 2.7990e-04 - val_loss: 0.0193
Epoch 261/300
3/3 [==============================] - ETA: 0s - loss: 2.4727e-04
Epoch 261: val_loss improved from 0.01912 to 0.01910, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 140ms/step - loss: 2.4727e-04 - val_loss: 0.0191
Epoch 262/300
3/3 [==============================] - ETA: 0s - loss: 2.4754e-04
Epoch 262: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 137ms/step - loss: 2.4754e-04 - val_loss: 0.0193
Epoch 263/300
3/3 [==============================] - ETA: 0s - loss: 2.4189e-04
Epoch 263: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 123ms/step - loss: 2.4189e-04 - val_loss: 0.0195
Epoch 264/300
3/3 [==============================] - ETA: 0s - loss: 2.6150e-04
Epoch 264: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 119ms/step - loss: 2.6150e-04 - val_loss: 0.0195
Epoch 265/300
3/3 [==============================] - ETA: 0s - loss: 2.7410e-04
Epoch 265: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 130ms/step - loss: 2.7410e-04 - val_loss: 0.0196
Epoch 266/300
3/3 [==============================] - ETA: 0s - loss: 2.4652e-04
Epoch 266: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 129ms/step - loss: 2.4652e-04 - val_loss: 0.0199
Epoch 267/300
3/3 [==============================] - ETA: 0s - loss: 2.9303e-04
Epoch 267: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 127ms/step - loss: 2.9303e-04 - val_loss: 0.0193
Epoch 268/300
3/3 [==============================] - ETA: 0s - loss: 2.5941e-04
Epoch 268: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 122ms/step - loss: 2.5941e-04 - val_loss: 0.0192
Epoch 269/300
3/3 [==============================] - ETA: 0s - loss: 2.3298e-04
Epoch 269: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 119ms/step - loss: 2.3298e-04 - val_loss: 0.0195
Epoch 270/300
3/3 [==============================] - ETA: 0s - loss: 2.5313e-04
Epoch 270: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 126ms/step - loss: 2.5313e-04 - val_loss: 0.0193
Epoch 271/300
3/3 [==============================] - ETA: 0s - loss: 2.5716e-04
Epoch 271: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 122ms/step - loss: 2.5716e-04 - val_loss: 0.0193
Epoch 272/300
3/3 [==============================] - ETA: 0s - loss: 2.1711e-04
Epoch 272: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 120ms/step - loss: 2.1711e-04 - val_loss: 0.0196
Epoch 273/300
3/3 [==============================] - ETA: 0s - loss: 2.5010e-04
Epoch 273: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 127ms/step - loss: 2.5010e-04 - val_loss: 0.0198
Epoch 274/300
3/3 [==============================] - ETA: 0s - loss: 2.4989e-04
Epoch 274: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 124ms/step - loss: 2.4989e-04 - val_loss: 0.0197
Epoch 275/300
3/3 [==============================] - ETA: 0s - loss: 2.4777e-04
Epoch 275: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 121ms/step - loss: 2.4777e-04 - val_loss: 0.0197
Epoch 276/300
3/3 [==============================] - ETA: 0s - loss: 2.4381e-04
Epoch 276: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 132ms/step - loss: 2.4381e-04 - val_loss: 0.0197
Epoch 277/300
3/3 [==============================] - ETA: 0s - loss: 2.3977e-04
Epoch 277: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 122ms/step - loss: 2.3977e-04 - val_loss: 0.0197
Epoch 278/300
```

```
3/3 [==============================] - ETA: 0s - loss: 2.2186e-04
Epoch 278: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 135ms/step - loss: 2.2186e-04 - val_loss: 0.0195
Epoch 279/300
3/3 [==============================] - ETA: 0s - loss: 2.5831e-04
Epoch 279: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 130ms/step - loss: 2.5831e-04 - val_loss: 0.0195
Epoch 280/300
3/3 [==============================] - ETA: 0s - loss: 3.0023e-04
Epoch 280: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 124ms/step - loss: 3.0023e-04 - val_loss: 0.0193
Epoch 281/300
3/3 [==============================] - ETA: 0s - loss: 2.2793e-04
Epoch 281: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 138ms/step - loss: 2.2793e-04 - val_loss: 0.0194
Epoch 282/300
3/3 [==============================] - ETA: 0s - loss: 2.8703e-04
Epoch 282: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 117ms/step - loss: 2.8703e-04 - val_loss: 0.0193
Epoch 283/300
3/3 [==============================] - ETA: 0s - loss: 2.4708e-04
Epoch 283: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 121ms/step - loss: 2.4708e-04 - val_loss: 0.0195
Epoch 284/300
3/3 [==============================] - ETA: 0s - loss: 2.6265e-04
Epoch 284: val_loss did not improve from 0.01910
3/3 [==============================] - 0s 121ms/step - loss: 2.6265e-04 - val_loss: 0.0192
Epoch 285/300
3/3 [==============================] - ETA: 0s - loss: 2.6601e-04
Epoch 285: val_loss improved from 0.01910 to 0.01908, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 134ms/step - loss: 2.6601e-04 - val_loss: 0.0191
Epoch 286/300
3/3 [==============================] - ETA: 0s - loss: 2.4838e-04
Epoch 286: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 129ms/step - loss: 2.4838e-04 - val_loss: 0.0192
Epoch 287/300
3/3 [==============================] - ETA: 0s - loss: 2.6078e-04
Epoch 287: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 136ms/step - loss: 2.6078e-04 - val_loss: 0.0196
Epoch 288/300
3/3 [==============================] - ETA: 0s - loss: 3.2138e-04
Epoch 288: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 131ms/step - loss: 3.2138e-04 - val_loss: 0.0195
Epoch 289/300
3/3 [==============================] - ETA: 0s - loss: 2.0863e-04
Epoch 289: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 128ms/step - loss: 2.0863e-04 - val_loss: 0.0193
Epoch 290/300
3/3 [==============================] - ETA: 0s - loss: 2.9335e-04
Epoch 290: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 125ms/step - loss: 2.9335e-04 - val_loss: 0.0194
Epoch 291/300
3/3 [==============================] - ETA: 0s - loss: 2.5795e-04
Epoch 291: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 131ms/step - loss: 2.5795e-04 - val_loss: 0.0192
Epoch 292/300
3/3 [==============================] - ETA: 0s - loss: 3.1216e-04
Epoch 292: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 119ms/step - loss: 3.1216e-04 - val_loss: 0.0196
Epoch 293/300
3/3 [==============================] - ETA: 0s - loss: 2.9826e-04
Epoch 293: val_loss did not improve from 0.01908
3/3 [==============================] - 0s 119ms/step - loss: 2.9826e-04 - val_loss: 0.0191
Epoch 294/300
3/3 [==============================] - ETA: 0s - loss: 3.1719e-04
Epoch 294: val_loss improved from 0.01908 to 0.01897, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 139ms/step - loss: 3.1719e-04 - val_loss: 0.0190
Epoch 295/300
3/3 [==============================] - ETA: 0s - loss: 3.2399e-04
Epoch 295: val_loss did not improve from 0.01897
3/3 [==============================] - 0s 146ms/step - loss: 3.2399e-04 - val_loss: 0.0190
Epoch 296/300
3/3 [==============================] - ETA: 0s - loss: 3.1067e-04
Epoch 296: val_loss improved from 0.01897 to 0.01894, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 135ms/step - loss: 3.1067e-04 - val_loss: 0.0189
Epoch 297/300
3/3 [==============================] - ETA: 0s - loss: 1.9701e-04
Epoch 297: val_loss did not improve from 0.01894
3/3 [==============================] - 0s 127ms/step - loss: 1.9701e-04 - val_loss: 0.0192
Epoch 298/300
3/3 [==============================] - ETA: 0s - loss: 2.6272e-04
Epoch 298: val_loss did not improve from 0.01894
3/3 [==============================] - 0s 129ms/step - loss: 2.6272e-04 - val_loss: 0.0194
```

```
Epoch 299/300
3/3 [==============================] - ETA: 0s - loss: 2.1504e-04
Epoch 299: val_loss did not improve from 0.01894
3/3 [==============================] - 0s 120ms/step - loss: 2.1504e-04 - val_loss: 0.0191
Epoch 300/300
3/3 [==============================] - ETA: 0s - loss: 2.9121e-04
Epoch 300: val_loss did not improve from 0.01894
3/3 [==============================] - 0s 124ms/step - loss: 2.9121e-04 - val_loss: 0.0195
Created model and loaded weights from file
```

In [306]:

```
results.loc[index,['Architecture','Dropout and pooling','kernel size','Loss Fn', 'LR']] = ['RNN',0.05,'-', 'Mean-Squared-Error',0.0001]
```

Train & Validation (MSE):

In [307]:

```
train_val_evaluation(model,results,index)
```

```
Train MSE: 8.706280641490594e-05
Validation MSE: 0.018935399129986763
```

Prediction:

In [308]:

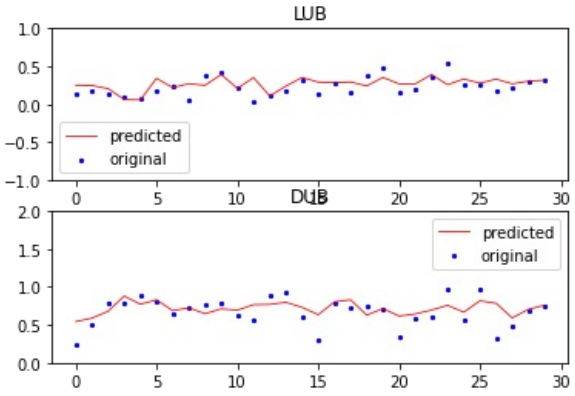
```
y_pred = model.predict(x_test)
print(y_pred)
```

```
1/1 [==============================] - 1s 667ms/step
[[0.25242016 0.5425881 ]
 [0.24906209 0.5870044 ]
 [0.2078066  0.6763939 ]
 [0.06431777 0.877593  ]
 [0.0594763  0.7706892 ]
 [0.3429276  0.82828355]
 [0.22001083 0.685735  ]
 [0.27284026 0.7231954 ]
 [0.2507504  0.6454253 ]
 [0.39364287 0.70894945]
 [0.21051621 0.69240767]
 [0.35239586 0.76451576]
 [0.11021812 0.76765203]
 [0.23999202 0.795769  ]
 [0.35446116 0.72906554]
 [0.29338303 0.6332439 ]
 [0.28501216 0.80103844]
 [0.29444596 0.8289521 ]
 [0.24303758 0.62647474]
 [0.35460445 0.71329105]
 [0.26997325 0.61462694]
 [0.2687757  0.6425773 ]
 [0.39234102 0.6932895 ]
 [0.2590944  0.75657094]
 [0.33396015 0.6657334 ]
 [0.27994516 0.81484157]
 [0.33281913 0.7833489 ]
 [0.27048033 0.5904684 ]
 [0.3054619  0.7037455 ]
 [0.3186404  0.7577348 ]]
```

Plotting the predicted locations of LUB and DUB VS their original locations:

In [309]:

```
plot_LUB_DUB(y_test, y_pred)
```



Evaluation Metrics

Mean Squared Error (MSE), Root Mean Squared Error (RMSE), and Mean Absolute Error (MAE):

In [310]:

```
test_evaluation(model, y_pred,results,index)
```

```
Test MSE: 0.020013730973005295
Test RMSE: 0.13995665195260448
Test MAE: 0.10637048588601006
```

COMMENTS

> Overfitting was **highly** observed.

In [311]:

```
index = index +1
results
```

Out[311]:

	Architecture	LR	Dropout and pooling	kernel size	Loss Fn	Train MSE	Validation MSE	Test MSE	Test RMSE	Test MAE
0	CNN 2D	0.0001	No Dropout Layers, 1 max-pooling layer	1	Mean-Squared-Error	0.021081	0.018341	0.019292	0.138705	0.106015
1	CNN 2D	0.0001	No Dropout Layers, 3 max-pooling layers	2	Mean-Squared-Error	0.006356	0.022953	0.027629	0.152963	0.123263
2	ANN	0.001	1 Dropout	-	Mean-Squared-Error	0.020477	0.018905	0.018616	0.136401	0.106594
3	ANN	0.001	3 Dropout	-	Mean-Squared-Error	0.02091	0.019591	0.018672	0.136528	0.108438
4	RNN	0.0001	0.05	-	Mean-Squared-Error	0.000087	0.018935	0.020014	0.139957	0.10637

RNN Experiment 2:

Changed in Architecture

In [323]:

```
model = Sequential()
model.add(LSTM(units=64, dropout=0.05, recurrent_dropout=0.20, return_sequences=True,input_shape=(x_train.shape[1
],x_train.shape[2])))
model.add(LSTM(units=32, dropout=0.05, recurrent_dropout=0.20, return_sequences=True))
model.add(LSTM(units=16, dropout=0.05, recurrent_dropout=0.20, return_sequences=False))
model.add(Dense(2, activation='linear'))
model.summary()
```

```
Model: "sequential_41"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 lstm_14 (LSTM)              (None, 40, 64)            51712

 lstm_15 (LSTM)              (None, 40, 32)            12416

 lstm_16 (LSTM)              (None, 16)                3136

 dense_72 (Dense)            (None, 2)                 34

=================================================================
Total params: 67,298
Trainable params: 67,298
Non-trainable params: 0
_________________________________________________________________
```

In [324]:

```
history , model = compile_fit(model, epoch_no=700, LR=0.0001)
```

```
Epoch 1/700
3/3 [==============================] - ETA: 0s - loss: 0.2639
Epoch 1: val_loss improved from inf to 0.21207, saving model to /content/weights.best.hdf5
3/3 [==============================] - 10s 556ms/step - loss: 0.2639 - val_loss: 0.2121
Epoch 2/700
3/3 [==============================] - ETA: 0s - loss: 0.1680
Epoch 2: val_loss improved from 0.21207 to 0.14320, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 180ms/step - loss: 0.1680 - val_loss: 0.1432
Epoch 3/700
3/3 [==============================] - ETA: 0s - loss: 0.1008
Epoch 3: val_loss improved from 0.14320 to 0.08588, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 164ms/step - loss: 0.1008 - val_loss: 0.0859
Epoch 4/700
3/3 [==============================] - ETA: 0s - loss: 0.0522
Epoch 4: val_loss improved from 0.08588 to 0.05125, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 160ms/step - loss: 0.0522 - val_loss: 0.0513
Epoch 5/700
3/3 [==============================] - ETA: 0s - loss: 0.0323
Epoch 5: val_loss improved from 0.05125 to 0.03905, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 164ms/step - loss: 0.0323 - val_loss: 0.0391
Epoch 6/700
3/3 [==============================] - ETA: 0s - loss: 0.0307
Epoch 6: val_loss improved from 0.03905 to 0.03629, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 170ms/step - loss: 0.0307 - val_loss: 0.0363
Epoch 7/700
3/3 [==============================] - ETA: 0s - loss: 0.0281
Epoch 7: val_loss improved from 0.03629 to 0.03150, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 175ms/step - loss: 0.0281 - val_loss: 0.0315
Epoch 8/700
3/3 [==============================] - ETA: 0s - loss: 0.0243
Epoch 8: val_loss improved from 0.03150 to 0.02612, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 159ms/step - loss: 0.0243 - val_loss: 0.0261
Epoch 9/700
3/3 [==============================] - ETA: 0s - loss: 0.0198
Epoch 9: val_loss improved from 0.02612 to 0.02301, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 159ms/step - loss: 0.0198 - val_loss: 0.0230
Epoch 10/700
3/3 [==============================] - ETA: 0s - loss: 0.0189
Epoch 10: val_loss improved from 0.02301 to 0.02229, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 172ms/step - loss: 0.0189 - val_loss: 0.0223
Epoch 11/700
3/3 [==============================] - ETA: 0s - loss: 0.0184
Epoch 11: val_loss improved from 0.02229 to 0.02218, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 172ms/step - loss: 0.0184 - val_loss: 0.0222
Epoch 12/700
3/3 [==============================] - ETA: 0s - loss: 0.0189
Epoch 12: val_loss improved from 0.02218 to 0.02156, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 161ms/step - loss: 0.0189 - val_loss: 0.0216
Epoch 13/700
3/3 [==============================] - ETA: 0s - loss: 0.0187
Epoch 13: val_loss improved from 0.02156 to 0.02113, saving model to /content/weights.best.hdf5
```

```
3/3 [==============================] - 1s 180ms/step - loss: 0.0187 - val_loss: 0.0211
Epoch 14/700
3/3 [==============================] - ETA: 0s - loss: 0.0170
Epoch 14: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 152ms/step - loss: 0.0170 - val_loss: 0.0214
Epoch 15/700
3/3 [==============================] - ETA: 0s - loss: 0.0157
Epoch 15: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 154ms/step - loss: 0.0157 - val_loss: 0.0220
Epoch 16/700
3/3 [==============================] - ETA: 0s - loss: 0.0153
Epoch 16: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 163ms/step - loss: 0.0153 - val_loss: 0.0230
Epoch 17/700
3/3 [==============================] - ETA: 0s - loss: 0.0146
Epoch 17: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 158ms/step - loss: 0.0146 - val_loss: 0.0230
Epoch 18/700
3/3 [==============================] - ETA: 0s - loss: 0.0151
Epoch 18: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 153ms/step - loss: 0.0151 - val_loss: 0.0225
Epoch 19/700
3/3 [==============================] - ETA: 0s - loss: 0.0135
Epoch 19: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 147ms/step - loss: 0.0135 - val_loss: 0.0221
Epoch 20/700
3/3 [==============================] - ETA: 0s - loss: 0.0135
Epoch 20: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 148ms/step - loss: 0.0135 - val_loss: 0.0220
Epoch 21/700
3/3 [==============================] - ETA: 0s - loss: 0.0118
Epoch 21: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 157ms/step - loss: 0.0118 - val_loss: 0.0222
Epoch 22/700
3/3 [==============================] - ETA: 0s - loss: 0.0118
Epoch 22: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 147ms/step - loss: 0.0118 - val_loss: 0.0222
Epoch 23/700
3/3 [==============================] - ETA: 0s - loss: 0.0107
Epoch 23: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 156ms/step - loss: 0.0107 - val_loss: 0.0224
Epoch 24/700
3/3 [==============================] - ETA: 0s - loss: 0.0107
Epoch 24: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 159ms/step - loss: 0.0107 - val_loss: 0.0226
Epoch 25/700
3/3 [==============================] - ETA: 0s - loss: 0.0102
Epoch 25: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 148ms/step - loss: 0.0102 - val_loss: 0.0226
Epoch 26/700
3/3 [==============================] - ETA: 0s - loss: 0.0091
Epoch 26: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 150ms/step - loss: 0.0091 - val_loss: 0.0223
Epoch 27/700
3/3 [==============================] - ETA: 0s - loss: 0.0084
Epoch 27: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 163ms/step - loss: 0.0084 - val_loss: 0.0223
Epoch 28/700
3/3 [==============================] - ETA: 0s - loss: 0.0079
Epoch 28: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 154ms/step - loss: 0.0079 - val_loss: 0.0222
Epoch 29/700
3/3 [==============================] - ETA: 0s - loss: 0.0073
Epoch 29: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 146ms/step - loss: 0.0073 - val_loss: 0.0222
Epoch 30/700
3/3 [==============================] - ETA: 0s - loss: 0.0065
Epoch 30: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 158ms/step - loss: 0.0065 - val_loss: 0.0224
Epoch 31/700
3/3 [==============================] - ETA: 0s - loss: 0.0059
Epoch 31: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 150ms/step - loss: 0.0059 - val_loss: 0.0220
Epoch 32/700
3/3 [==============================] - ETA: 0s - loss: 0.0054
Epoch 32: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 154ms/step - loss: 0.0054 - val_loss: 0.0222
Epoch 33/700
3/3 [==============================] - ETA: 0s - loss: 0.0050
Epoch 33: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 161ms/step - loss: 0.0050 - val_loss: 0.0223
Epoch 34/700
3/3 [==============================] - ETA: 0s - loss: 0.0047
```

```
Epoch 34: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 148ms/step - loss: 0.0047 - val_loss: 0.0221
Epoch 35/700
3/3 [==============================] - ETA: 0s - loss: 0.0039
Epoch 35: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 162ms/step - loss: 0.0039 - val_loss: 0.0223
Epoch 36/700
3/3 [==============================] - ETA: 0s - loss: 0.0040
Epoch 36: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 147ms/step - loss: 0.0040 - val_loss: 0.0227
Epoch 37/700
3/3 [==============================] - ETA: 0s - loss: 0.0039
Epoch 37: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 165ms/step - loss: 0.0039 - val_loss: 0.0232
Epoch 38/700
3/3 [==============================] - ETA: 0s - loss: 0.0035
Epoch 38: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 148ms/step - loss: 0.0035 - val_loss: 0.0230
Epoch 39/700
3/3 [==============================] - ETA: 0s - loss: 0.0032
Epoch 39: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 158ms/step - loss: 0.0032 - val_loss: 0.0228
Epoch 40/700
3/3 [==============================] - ETA: 0s - loss: 0.0030
Epoch 40: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 148ms/step - loss: 0.0030 - val_loss: 0.0227
Epoch 41/700
3/3 [==============================] - ETA: 0s - loss: 0.0028
Epoch 41: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 155ms/step - loss: 0.0028 - val_loss: 0.0228
Epoch 42/700
3/3 [==============================] - ETA: 0s - loss: 0.0025
Epoch 42: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 152ms/step - loss: 0.0025 - val_loss: 0.0226
Epoch 43/700
3/3 [==============================] - ETA: 0s - loss: 0.0026
Epoch 43: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 146ms/step - loss: 0.0026 - val_loss: 0.0224
Epoch 44/700
3/3 [==============================] - ETA: 0s - loss: 0.0024
Epoch 44: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 158ms/step - loss: 0.0024 - val_loss: 0.0230
Epoch 45/700
3/3 [==============================] - ETA: 0s - loss: 0.0024
Epoch 45: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 147ms/step - loss: 0.0024 - val_loss: 0.0229
Epoch 46/700
3/3 [==============================] - ETA: 0s - loss: 0.0026
Epoch 46: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 158ms/step - loss: 0.0026 - val_loss: 0.0224
Epoch 47/700
3/3 [==============================] - ETA: 0s - loss: 0.0023
Epoch 47: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 146ms/step - loss: 0.0023 - val_loss: 0.0222
Epoch 48/700
3/3 [==============================] - ETA: 0s - loss: 0.0021
Epoch 48: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 158ms/step - loss: 0.0021 - val_loss: 0.0228
Epoch 49/700
3/3 [==============================] - ETA: 0s - loss: 0.0020
Epoch 49: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 150ms/step - loss: 0.0020 - val_loss: 0.0224
Epoch 50/700
3/3 [==============================] - ETA: 0s - loss: 0.0018
Epoch 50: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 156ms/step - loss: 0.0018 - val_loss: 0.0223
Epoch 51/700
3/3 [==============================] - ETA: 0s - loss: 0.0018
Epoch 51: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 149ms/step - loss: 0.0018 - val_loss: 0.0232
Epoch 52/700
3/3 [==============================] - ETA: 0s - loss: 0.0018
Epoch 52: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 146ms/step - loss: 0.0018 - val_loss: 0.0231
Epoch 53/700
3/3 [==============================] - ETA: 0s - loss: 0.0018
Epoch 53: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 154ms/step - loss: 0.0018 - val_loss: 0.0232
Epoch 54/700
3/3 [==============================] - ETA: 0s - loss: 0.0019
Epoch 54: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 149ms/step - loss: 0.0019 - val_loss: 0.0227
Epoch 55/700
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3/3 [==============================] - ETA: 0s - loss: 0.0016
Epoch 55: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 156ms/step - loss: 0.0016 - val_loss: 0.0227
Epoch 56/700
3/3 [==============================] - ETA: 0s - loss: 0.0017
Epoch 56: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 152ms/step - loss: 0.0017 - val_loss: 0.0218
Epoch 57/700
3/3 [==============================] - ETA: 0s - loss: 0.0016
Epoch 57: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 157ms/step - loss: 0.0016 - val_loss: 0.0218
Epoch 58/700
3/3 [==============================] - ETA: 0s - loss: 0.0018
Epoch 58: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 147ms/step - loss: 0.0018 - val_loss: 0.0219
Epoch 59/700
3/3 [==============================] - ETA: 0s - loss: 0.0018
Epoch 59: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 151ms/step - loss: 0.0018 - val_loss: 0.0219
Epoch 60/700
3/3 [==============================] - ETA: 0s - loss: 0.0015
Epoch 60: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 165ms/step - loss: 0.0015 - val_loss: 0.0216
Epoch 61/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 61: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 152ms/step - loss: 0.0013 - val_loss: 0.0217
Epoch 62/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 62: val_loss did not improve from 0.02113
3/3 [==============================] - 0s 153ms/step - loss: 0.0013 - val_loss: 0.0217
Epoch 63/700
3/3 [==============================] - ETA: 0s - loss: 0.0015
Epoch 63: val_loss improved from 0.02113 to 0.02098, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 161ms/step - loss: 0.0015 - val_loss: 0.0210
Epoch 64/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 64: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 155ms/step - loss: 0.0013 - val_loss: 0.0212
Epoch 65/700
3/3 [==============================] - ETA: 0s - loss: 0.0014
Epoch 65: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 151ms/step - loss: 0.0014 - val_loss: 0.0214
Epoch 66/700
3/3 [==============================] - ETA: 0s - loss: 0.0015
Epoch 66: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 166ms/step - loss: 0.0015 - val_loss: 0.0218
Epoch 67/700
3/3 [==============================] - ETA: 0s - loss: 0.0015
Epoch 67: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 149ms/step - loss: 0.0015 - val_loss: 0.0218
Epoch 68/700
3/3 [==============================] - ETA: 0s - loss: 0.0015
Epoch 68: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 156ms/step - loss: 0.0015 - val_loss: 0.0215
Epoch 69/700
3/3 [==============================] - ETA: 0s - loss: 0.0016
Epoch 69: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 150ms/step - loss: 0.0016 - val_loss: 0.0212
Epoch 70/700
3/3 [==============================] - ETA: 0s - loss: 0.0015
Epoch 70: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 148ms/step - loss: 0.0015 - val_loss: 0.0215
Epoch 71/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 71: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 156ms/step - loss: 0.0013 - val_loss: 0.0218
Epoch 72/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 72: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 146ms/step - loss: 0.0012 - val_loss: 0.0215
Epoch 73/700
3/3 [==============================] - ETA: 0s - loss: 0.0014
Epoch 73: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 158ms/step - loss: 0.0014 - val_loss: 0.0214
Epoch 74/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 74: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 153ms/step - loss: 0.0012 - val_loss: 0.0215
Epoch 75/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 75: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 162ms/step - loss: 0.0011 - val_loss: 0.0213
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Epoch 76/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 76: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 154ms/step - loss: 0.0013 - val_loss: 0.0211
Epoch 77/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 77: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 161ms/step - loss: 0.0013 - val_loss: 0.0212
Epoch 78/700
3/3 [==============================] - ETA: 0s - loss: 0.0014
Epoch 78: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 149ms/step - loss: 0.0014 - val_loss: 0.0211
Epoch 79/700
3/3 [==============================] - ETA: 0s - loss: 0.0015
Epoch 79: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 159ms/step - loss: 0.0015 - val_loss: 0.0213
Epoch 80/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 80: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 156ms/step - loss: 0.0013 - val_loss: 0.0213
Epoch 81/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 81: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 152ms/step - loss: 0.0013 - val_loss: 0.0214
Epoch 82/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 82: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 162ms/step - loss: 0.0011 - val_loss: 0.0213
Epoch 83/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 83: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 151ms/step - loss: 0.0012 - val_loss: 0.0216
Epoch 84/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 84: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 163ms/step - loss: 0.0013 - val_loss: 0.0215
Epoch 85/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 85: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 155ms/step - loss: 0.0012 - val_loss: 0.0215
Epoch 86/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 86: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 166ms/step - loss: 0.0013 - val_loss: 0.0219
Epoch 87/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 87: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 147ms/step - loss: 0.0012 - val_loss: 0.0221
Epoch 88/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 88: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 150ms/step - loss: 0.0013 - val_loss: 0.0222
Epoch 89/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 89: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 149ms/step - loss: 0.0012 - val_loss: 0.0219
Epoch 90/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 90: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 156ms/step - loss: 0.0011 - val_loss: 0.0212
Epoch 91/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 91: val_loss did not improve from 0.02098
3/3 [==============================] - 0s 161ms/step - loss: 0.0012 - val_loss: 0.0211
Epoch 92/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 92: val_loss improved from 0.02098 to 0.02087, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 172ms/step - loss: 0.0013 - val_loss: 0.0209
Epoch 93/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 93: val_loss improved from 0.02087 to 0.02057, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 184ms/step - loss: 0.0012 - val_loss: 0.0206
Epoch 94/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 94: val_loss improved from 0.02057 to 0.02030, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 184ms/step - loss: 0.0011 - val_loss: 0.0203
Epoch 95/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 95: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 162ms/step - loss: 0.0013 - val_loss: 0.0205
Epoch 96/700
3/3 [==============================] - ETA: 0s - loss: 9.2518e-04
Epoch 96: val_loss did not improve from 0.02030
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3/3 [==============================] - 0s 160ms/step - loss: 9.2518e-04 - val_loss: 0.0207
Epoch 97/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 97: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 164ms/step - loss: 0.0012 - val_loss: 0.0209
Epoch 98/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 98: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 158ms/step - loss: 0.0012 - val_loss: 0.0211
Epoch 99/700
3/3 [==============================] - ETA: 0s - loss: 0.0014
Epoch 99: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 164ms/step - loss: 0.0014 - val_loss: 0.0209
Epoch 100/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 100: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 153ms/step - loss: 0.0011 - val_loss: 0.0213
Epoch 101/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 101: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 156ms/step - loss: 0.0013 - val_loss: 0.0212
Epoch 102/700
3/3 [==============================] - ETA: 0s - loss: 0.0013
Epoch 102: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 152ms/step - loss: 0.0013 - val_loss: 0.0209
Epoch 103/700
3/3 [==============================] - ETA: 0s - loss: 0.0010
Epoch 103: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 161ms/step - loss: 0.0010 - val_loss: 0.0210
Epoch 104/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 104: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 161ms/step - loss: 0.0011 - val_loss: 0.0210
Epoch 105/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 105: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 164ms/step - loss: 0.0012 - val_loss: 0.0209
Epoch 106/700
3/3 [==============================] - ETA: 0s - loss: 9.9388e-04
Epoch 106: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 161ms/step - loss: 9.9388e-04 - val_loss: 0.0210
Epoch 107/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 107: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 162ms/step - loss: 0.0011 - val_loss: 0.0212
Epoch 108/700
3/3 [==============================] - ETA: 0s - loss: 9.0861e-04
Epoch 108: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 158ms/step - loss: 9.0861e-04 - val_loss: 0.0215
Epoch 109/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 109: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 151ms/step - loss: 0.0011 - val_loss: 0.0212
Epoch 110/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 110: val_loss did not improve from 0.02030
3/3 [==============================] - 1s 166ms/step - loss: 0.0011 - val_loss: 0.0212
Epoch 111/700
3/3 [==============================] - ETA: 0s - loss: 0.0012
Epoch 111: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 160ms/step - loss: 0.0012 - val_loss: 0.0218
Epoch 112/700
3/3 [==============================] - ETA: 0s - loss: 0.0010
Epoch 112: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 151ms/step - loss: 0.0010 - val_loss: 0.0218
Epoch 113/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 113: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 150ms/step - loss: 0.0011 - val_loss: 0.0211
Epoch 114/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 114: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 165ms/step - loss: 0.0011 - val_loss: 0.0207
Epoch 115/700
3/3 [==============================] - ETA: 0s - loss: 9.8104e-04
Epoch 115: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 151ms/step - loss: 9.8104e-04 - val_loss: 0.0209
Epoch 116/700
3/3 [==============================] - ETA: 0s - loss: 9.2320e-04
Epoch 116: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 162ms/step - loss: 9.2320e-04 - val_loss: 0.0210
Epoch 117/700
3/3 [==============================] - ETA: 0s - loss: 0.0010
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Epoch 117: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 161ms/step - loss: 0.0010 - val_loss: 0.0206
Epoch 118/700
3/3 [==============================] - ETA: 0s - loss: 0.0010
Epoch 118: val_loss did not improve from 0.02030
3/3 [==============================] - 1s 177ms/step - loss: 0.0010 - val_loss: 0.0205
Epoch 119/700
3/3 [==============================] - ETA: 0s - loss: 9.8931e-04
Epoch 119: val_loss did not improve from 0.02030
3/3 [==============================] - 1s 168ms/step - loss: 9.8931e-04 - val_loss: 0.0209
Epoch 120/700
3/3 [==============================] - ETA: 0s - loss: 9.2912e-04
Epoch 120: val_loss did not improve from 0.02030
3/3 [==============================] - 0s 160ms/step - loss: 9.2912e-04 - val_loss: 0.0207
Epoch 121/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 121: val_loss improved from 0.02030 to 0.02028, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 0.0011 - val_loss: 0.0203
Epoch 122/700
3/3 [==============================] - ETA: 0s - loss: 8.5857e-04
Epoch 122: val_loss did not improve from 0.02028
3/3 [==============================] - 0s 168ms/step - loss: 8.5857e-04 - val_loss: 0.0203
Epoch 123/700
3/3 [==============================] - ETA: 0s - loss: 8.7545e-04
Epoch 123: val_loss improved from 0.02028 to 0.02014, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 174ms/step - loss: 8.7545e-04 - val_loss: 0.0201
Epoch 124/700
3/3 [==============================] - ETA: 0s - loss: 9.1012e-04
Epoch 124: val_loss improved from 0.02014 to 0.01979, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 187ms/step - loss: 9.1012e-04 - val_loss: 0.0198
Epoch 125/700
3/3 [==============================] - ETA: 0s - loss: 9.6590e-04
Epoch 125: val_loss did not improve from 0.01979
3/3 [==============================] - 0s 158ms/step - loss: 9.6590e-04 - val_loss: 0.0201
Epoch 126/700
3/3 [==============================] - ETA: 0s - loss: 8.9098e-04
Epoch 126: val_loss did not improve from 0.01979
3/3 [==============================] - 0s 163ms/step - loss: 8.9098e-04 - val_loss: 0.0204
Epoch 127/700
3/3 [==============================] - ETA: 0s - loss: 9.4468e-04
Epoch 127: val_loss did not improve from 0.01979
3/3 [==============================] - 1s 462ms/step - loss: 9.4468e-04 - val_loss: 0.0203
Epoch 128/700
3/3 [==============================] - ETA: 0s - loss: 9.1038e-04
Epoch 128: val_loss did not improve from 0.01979
3/3 [==============================] - 1s 172ms/step - loss: 9.1038e-04 - val_loss: 0.0204
Epoch 129/700
3/3 [==============================] - ETA: 0s - loss: 8.1807e-04
Epoch 129: val_loss did not improve from 0.01979
3/3 [==============================] - 1s 452ms/step - loss: 8.1807e-04 - val_loss: 0.0204
Epoch 130/700
3/3 [==============================] - ETA: 0s - loss: 8.7477e-04
Epoch 130: val_loss did not improve from 0.01979
3/3 [==============================] - 1s 160ms/step - loss: 8.7477e-04 - val_loss: 0.0199
Epoch 131/700
3/3 [==============================] - ETA: 0s - loss: 8.6322e-04
Epoch 131: val_loss improved from 0.01979 to 0.01957, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 174ms/step - loss: 8.6322e-04 - val_loss: 0.0196
Epoch 132/700
3/3 [==============================] - ETA: 0s - loss: 8.6247e-04
Epoch 132: val_loss did not improve from 0.01957
3/3 [==============================] - 0s 160ms/step - loss: 8.6247e-04 - val_loss: 0.0200
Epoch 133/700
3/3 [==============================] - ETA: 0s - loss: 0.0010
Epoch 133: val_loss did not improve from 0.01957
3/3 [==============================] - 0s 158ms/step - loss: 0.0010 - val_loss: 0.0196
Epoch 134/700
3/3 [==============================] - ETA: 0s - loss: 0.0010
Epoch 134: val_loss improved from 0.01957 to 0.01922, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 174ms/step - loss: 0.0010 - val_loss: 0.0192
Epoch 135/700
3/3 [==============================] - ETA: 0s - loss: 9.1206e-04
Epoch 135: val_loss did not improve from 0.01922
3/3 [==============================] - 1s 278ms/step - loss: 9.1206e-04 - val_loss: 0.0194
Epoch 136/700
3/3 [==============================] - ETA: 0s - loss: 8.1210e-04
Epoch 136: val_loss did not improve from 0.01922
3/3 [==============================] - 1s 277ms/step - loss: 8.1210e-04 - val_loss: 0.0192
Epoch 137/700
3/3 [==============================] - ETA: 0s - loss: 0.0011
Epoch 137: val_loss improved from 0.01922 to 0.01887, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 317ms/step - loss: 0.0011 - val_loss: 0.0189
Epoch 138/700
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3/3 [==============================] - ETA: 0s - loss: 0.0010
Epoch 138: val_loss improved from 0.01887 to 0.01868, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 286ms/step - loss: 0.0010 - val_loss: 0.0187
Epoch 139/700
3/3 [==============================] - ETA: 0s - loss: 9.6852e-04
Epoch 139: val_loss did not improve from 0.01868
3/3 [==============================] - 1s 278ms/step - loss: 9.6852e-04 - val_loss: 0.0187
Epoch 140/700
3/3 [==============================] - ETA: 0s - loss: 8.5621e-04
Epoch 140: val_loss did not improve from 0.01868
3/3 [==============================] - 1s 159ms/step - loss: 8.5621e-04 - val_loss: 0.0189
Epoch 141/700
3/3 [==============================] - ETA: 0s - loss: 7.8427e-04
Epoch 141: val_loss did not improve from 0.01868
3/3 [==============================] - 1s 179ms/step - loss: 7.8427e-04 - val_loss: 0.0190
Epoch 142/700
3/3 [==============================] - ETA: 0s - loss: 8.3098e-04
Epoch 142: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 159ms/step - loss: 8.3098e-04 - val_loss: 0.0189
Epoch 143/700
3/3 [==============================] - ETA: 0s - loss: 8.1953e-04
Epoch 143: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 160ms/step - loss: 8.1953e-04 - val_loss: 0.0193
Epoch 144/700
3/3 [==============================] - ETA: 0s - loss: 7.4254e-04
Epoch 144: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 156ms/step - loss: 7.4254e-04 - val_loss: 0.0193
Epoch 145/700
3/3 [==============================] - ETA: 0s - loss: 7.3677e-04
Epoch 145: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 160ms/step - loss: 7.3677e-04 - val_loss: 0.0194
Epoch 146/700
3/3 [==============================] - ETA: 0s - loss: 7.8666e-04
Epoch 146: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 156ms/step - loss: 7.8666e-04 - val_loss: 0.0193
Epoch 147/700
3/3 [==============================] - ETA: 0s - loss: 7.2706e-04
Epoch 147: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 156ms/step - loss: 7.2706e-04 - val_loss: 0.0193
Epoch 148/700
3/3 [==============================] - ETA: 0s - loss: 8.0290e-04
Epoch 148: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 160ms/step - loss: 8.0290e-04 - val_loss: 0.0195
Epoch 149/700
3/3 [==============================] - ETA: 0s - loss: 7.4169e-04
Epoch 149: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 166ms/step - loss: 7.4169e-04 - val_loss: 0.0196
Epoch 150/700
3/3 [==============================] - ETA: 0s - loss: 8.1668e-04
Epoch 150: val_loss did not improve from 0.01868
3/3 [==============================] - 1s 186ms/step - loss: 8.1668e-04 - val_loss: 0.0193
Epoch 151/700
3/3 [==============================] - ETA: 0s - loss: 8.3577e-04
Epoch 151: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 174ms/step - loss: 8.3577e-04 - val_loss: 0.0196
Epoch 152/700
3/3 [==============================] - ETA: 0s - loss: 8.8041e-04
Epoch 152: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 168ms/step - loss: 8.8041e-04 - val_loss: 0.0198
Epoch 153/700
3/3 [==============================] - ETA: 0s - loss: 8.1639e-04
Epoch 153: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 169ms/step - loss: 8.1639e-04 - val_loss: 0.0195
Epoch 154/700
3/3 [==============================] - ETA: 0s - loss: 6.9350e-04
Epoch 154: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 170ms/step - loss: 6.9350e-04 - val_loss: 0.0195
Epoch 155/700
3/3 [==============================] - ETA: 0s - loss: 7.7845e-04
Epoch 155: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 153ms/step - loss: 7.7845e-04 - val_loss: 0.0200
Epoch 156/700
3/3 [==============================] - ETA: 0s - loss: 9.5907e-04
Epoch 156: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 172ms/step - loss: 9.5907e-04 - val_loss: 0.0202
Epoch 157/700
3/3 [==============================] - ETA: 0s - loss: 7.0981e-04
Epoch 157: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 158ms/step - loss: 7.0981e-04 - val_loss: 0.0196
Epoch 158/700
3/3 [==============================] - ETA: 0s - loss: 8.5886e-04
Epoch 158: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 167ms/step - loss: 8.5886e-04 - val_loss: 0.0196
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Epoch 159/700
3/3 [==============================] - ETA: 0s - loss: 7.3989e-04
Epoch 159: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 162ms/step - loss: 7.3989e-04 - val_loss: 0.0195
Epoch 160/700
3/3 [==============================] - ETA: 0s - loss: 7.7529e-04
Epoch 160: val_loss did not improve from 0.01868
3/3 [==============================] - 0s 161ms/step - loss: 7.7529e-04 - val_loss: 0.0193
Epoch 161/700
3/3 [==============================] - ETA: 0s - loss: 8.3060e-04
Epoch 161: val_loss improved from 0.01868 to 0.01849, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 166ms/step - loss: 8.3060e-04 - val_loss: 0.0185
Epoch 162/700
3/3 [==============================] - ETA: 0s - loss: 9.1028e-04
Epoch 162: val_loss did not improve from 0.01849
3/3 [==============================] - 1s 170ms/step - loss: 9.1028e-04 - val_loss: 0.0187
Epoch 163/700
3/3 [==============================] - ETA: 0s - loss: 7.5523e-04
Epoch 163: val_loss did not improve from 0.01849
3/3 [==============================] - 1s 169ms/step - loss: 7.5523e-04 - val_loss: 0.0190
Epoch 164/700
3/3 [==============================] - ETA: 0s - loss: 8.4099e-04
Epoch 164: val_loss did not improve from 0.01849
3/3 [==============================] - 0s 164ms/step - loss: 8.4099e-04 - val_loss: 0.0187
Epoch 165/700
3/3 [==============================] - ETA: 0s - loss: 7.8466e-04
Epoch 165: val_loss improved from 0.01849 to 0.01832, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 174ms/step - loss: 7.8466e-04 - val_loss: 0.0183
Epoch 166/700
3/3 [==============================] - ETA: 0s - loss: 6.6656e-04
Epoch 166: val_loss improved from 0.01832 to 0.01826, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 173ms/step - loss: 6.6656e-04 - val_loss: 0.0183
Epoch 167/700
3/3 [==============================] - ETA: 0s - loss: 8.0688e-04
Epoch 167: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 156ms/step - loss: 8.0688e-04 - val_loss: 0.0188
Epoch 168/700
3/3 [==============================] - ETA: 0s - loss: 8.0184e-04
Epoch 168: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 161ms/step - loss: 8.0184e-04 - val_loss: 0.0186
Epoch 169/700
3/3 [==============================] - ETA: 0s - loss: 6.8767e-04
Epoch 169: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 162ms/step - loss: 6.8767e-04 - val_loss: 0.0185
Epoch 170/700
3/3 [==============================] - ETA: 0s - loss: 9.0618e-04
Epoch 170: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 157ms/step - loss: 9.0618e-04 - val_loss: 0.0186
Epoch 171/700
3/3 [==============================] - ETA: 0s - loss: 7.0355e-04
Epoch 171: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 157ms/step - loss: 7.0355e-04 - val_loss: 0.0188
Epoch 172/700
3/3 [==============================] - ETA: 0s - loss: 6.6806e-04
Epoch 172: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 164ms/step - loss: 6.6806e-04 - val_loss: 0.0188
Epoch 173/700
3/3 [==============================] - ETA: 0s - loss: 7.1516e-04
Epoch 173: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 166ms/step - loss: 7.1516e-04 - val_loss: 0.0187
Epoch 174/700
3/3 [==============================] - ETA: 0s - loss: 6.5268e-04
Epoch 174: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 178ms/step - loss: 6.5268e-04 - val_loss: 0.0185
Epoch 175/700
3/3 [==============================] - ETA: 0s - loss: 7.0617e-04
Epoch 175: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 159ms/step - loss: 7.0617e-04 - val_loss: 0.0188
Epoch 176/700
3/3 [==============================] - ETA: 0s - loss: 7.9999e-04
Epoch 176: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 165ms/step - loss: 7.9999e-04 - val_loss: 0.0194
Epoch 177/700
3/3 [==============================] - ETA: 0s - loss: 7.8275e-04
Epoch 177: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 166ms/step - loss: 7.8275e-04 - val_loss: 0.0195
Epoch 178/700
3/3 [==============================] - ETA: 0s - loss: 6.4299e-04
Epoch 178: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 165ms/step - loss: 6.4299e-04 - val_loss: 0.0191
Epoch 179/700
3/3 [==============================] - ETA: 0s - loss: 7.6119e-04
Epoch 179: val_loss did not improve from 0.01826
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3/3 [==============================] - 0s 157ms/step - loss: 7.6119e-04 - val_loss: 0.0192
Epoch 180/700
3/3 [==============================] - ETA: 0s - loss: 6.7318e-04
Epoch 180: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 150ms/step - loss: 6.7318e-04 - val_loss: 0.0194
Epoch 181/700
3/3 [==============================] - ETA: 0s - loss: 6.6600e-04
Epoch 181: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 161ms/step - loss: 6.6600e-04 - val_loss: 0.0190
Epoch 182/700
3/3 [==============================] - ETA: 0s - loss: 7.5949e-04
Epoch 182: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 161ms/step - loss: 7.5949e-04 - val_loss: 0.0186
Epoch 183/700
3/3 [==============================] - ETA: 0s - loss: 6.9103e-04
Epoch 183: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 158ms/step - loss: 6.9103e-04 - val_loss: 0.0184
Epoch 184/700
3/3 [==============================] - ETA: 0s - loss: 7.5162e-04
Epoch 184: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 167ms/step - loss: 7.5162e-04 - val_loss: 0.0190
Epoch 185/700
3/3 [==============================] - ETA: 0s - loss: 7.9349e-04
Epoch 185: val_loss did not improve from 0.01826
3/3 [==============================] - 0s 158ms/step - loss: 7.9349e-04 - val_loss: 0.0187
Epoch 186/700
3/3 [==============================] - ETA: 0s - loss: 6.5766e-04
Epoch 186: val_loss improved from 0.01826 to 0.01817, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 173ms/step - loss: 6.5766e-04 - val_loss: 0.0182
Epoch 187/700
3/3 [==============================] - ETA: 0s - loss: 6.7692e-04
Epoch 187: val_loss did not improve from 0.01817
3/3 [==============================] - 0s 163ms/step - loss: 6.7692e-04 - val_loss: 0.0185
Epoch 188/700
3/3 [==============================] - ETA: 0s - loss: 7.4916e-04
Epoch 188: val_loss did not improve from 0.01817
3/3 [==============================] - 0s 159ms/step - loss: 7.4916e-04 - val_loss: 0.0185
Epoch 189/700
3/3 [==============================] - ETA: 0s - loss: 7.2698e-04
Epoch 189: val_loss improved from 0.01817 to 0.01792, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 172ms/step - loss: 7.2698e-04 - val_loss: 0.0179
Epoch 190/700
3/3 [==============================] - ETA: 0s - loss: 8.3177e-04
Epoch 190: val_loss improved from 0.01792 to 0.01787, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 188ms/step - loss: 8.3177e-04 - val_loss: 0.0179
Epoch 191/700
3/3 [==============================] - ETA: 0s - loss: 7.8030e-04
Epoch 191: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 157ms/step - loss: 7.8030e-04 - val_loss: 0.0185
Epoch 192/700
3/3 [==============================] - ETA: 0s - loss: 8.0306e-04
Epoch 192: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 169ms/step - loss: 8.0306e-04 - val_loss: 0.0186
Epoch 193/700
3/3 [==============================] - ETA: 0s - loss: 8.0904e-04
Epoch 193: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 167ms/step - loss: 8.0904e-04 - val_loss: 0.0179
Epoch 194/700
3/3 [==============================] - ETA: 0s - loss: 7.7319e-04
Epoch 194: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 161ms/step - loss: 7.7319e-04 - val_loss: 0.0182
Epoch 195/700
3/3 [==============================] - ETA: 0s - loss: 6.7043e-04
Epoch 195: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 163ms/step - loss: 6.7043e-04 - val_loss: 0.0189
Epoch 196/700
3/3 [==============================] - ETA: 0s - loss: 6.2141e-04
Epoch 196: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 157ms/step - loss: 6.2141e-04 - val_loss: 0.0188
Epoch 197/700
3/3 [==============================] - ETA: 0s - loss: 6.1431e-04
Epoch 197: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 165ms/step - loss: 6.1431e-04 - val_loss: 0.0186
Epoch 198/700
3/3 [==============================] - ETA: 0s - loss: 6.0658e-04
Epoch 198: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 163ms/step - loss: 6.0658e-04 - val_loss: 0.0189
Epoch 199/700
3/3 [==============================] - ETA: 0s - loss: 6.3039e-04
Epoch 199: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 169ms/step - loss: 6.3039e-04 - val_loss: 0.0189
Epoch 200/700
3/3 [==============================] - ETA: 0s - loss: 6.9568e-04
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Epoch 200: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 157ms/step - loss: 6.9568e-04 - val_loss: 0.0188
Epoch 201/700
3/3 [==============================] - ETA: 0s - loss: 6.3436e-04
Epoch 201: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 177ms/step - loss: 6.3436e-04 - val_loss: 0.0186
Epoch 202/700
3/3 [==============================] - ETA: 0s - loss: 5.8885e-04
Epoch 202: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 162ms/step - loss: 5.8885e-04 - val_loss: 0.0191
Epoch 203/700
3/3 [==============================] - ETA: 0s - loss: 7.4892e-04
Epoch 203: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 168ms/step - loss: 7.4892e-04 - val_loss: 0.0193
Epoch 204/700
3/3 [==============================] - ETA: 0s - loss: 6.9462e-04
Epoch 204: val_loss did not improve from 0.01787
3/3 [==============================] - 1s 176ms/step - loss: 6.9462e-04 - val_loss: 0.0186
Epoch 205/700
3/3 [==============================] - ETA: 0s - loss: 6.8084e-04
Epoch 205: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 159ms/step - loss: 6.8084e-04 - val_loss: 0.0187
Epoch 206/700
3/3 [==============================] - ETA: 0s - loss: 6.4539e-04
Epoch 206: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 155ms/step - loss: 6.4539e-04 - val_loss: 0.0193
Epoch 207/700
3/3 [==============================] - ETA: 0s - loss: 7.7004e-04
Epoch 207: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 160ms/step - loss: 7.7004e-04 - val_loss: 0.0188
Epoch 208/700
3/3 [==============================] - ETA: 0s - loss: 7.0159e-04
Epoch 208: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 157ms/step - loss: 7.0159e-04 - val_loss: 0.0182
Epoch 209/700
3/3 [==============================] - ETA: 0s - loss: 6.8569e-04
Epoch 209: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 168ms/step - loss: 6.8569e-04 - val_loss: 0.0182
Epoch 210/700
3/3 [==============================] - ETA: 0s - loss: 5.8389e-04
Epoch 210: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 167ms/step - loss: 5.8389e-04 - val_loss: 0.0187
Epoch 211/700
3/3 [==============================] - ETA: 0s - loss: 6.9086e-04
Epoch 211: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 152ms/step - loss: 6.9086e-04 - val_loss: 0.0187
Epoch 212/700
3/3 [==============================] - ETA: 0s - loss: 6.5868e-04
Epoch 212: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 163ms/step - loss: 6.5868e-04 - val_loss: 0.0184
Epoch 213/700
3/3 [==============================] - ETA: 0s - loss: 5.2451e-04
Epoch 213: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 156ms/step - loss: 5.2451e-04 - val_loss: 0.0179
Epoch 214/700
3/3 [==============================] - ETA: 0s - loss: 6.1987e-04
Epoch 214: val_loss did not improve from 0.01787
3/3 [==============================] - 1s 187ms/step - loss: 6.1987e-04 - val_loss: 0.0179
Epoch 215/700
3/3 [==============================] - ETA: 0s - loss: 5.3173e-04
Epoch 215: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 154ms/step - loss: 5.3173e-04 - val_loss: 0.0184
Epoch 216/700
3/3 [==============================] - ETA: 0s - loss: 6.7136e-04
Epoch 216: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 172ms/step - loss: 6.7136e-04 - val_loss: 0.0182
Epoch 217/700
3/3 [==============================] - ETA: 0s - loss: 6.8224e-04
Epoch 217: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 154ms/step - loss: 6.8224e-04 - val_loss: 0.0179
Epoch 218/700
3/3 [==============================] - ETA: 0s - loss: 6.6113e-04
Epoch 218: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 167ms/step - loss: 6.6113e-04 - val_loss: 0.0180
Epoch 219/700
3/3 [==============================] - ETA: 0s - loss: 5.2931e-04
Epoch 219: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 158ms/step - loss: 5.2931e-04 - val_loss: 0.0181
Epoch 220/700
3/3 [==============================] - ETA: 0s - loss: 6.7399e-04
Epoch 220: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 179ms/step - loss: 6.7399e-04 - val_loss: 0.0181
Epoch 221/700
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3/3 [==============================] - ETA: 0s - loss: 6.3387e-04
Epoch 221: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 155ms/step - loss: 6.3387e-04 - val_loss: 0.0182
Epoch 222/700
3/3 [==============================] - ETA: 0s - loss: 5.8021e-04
Epoch 222: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 177ms/step - loss: 5.8021e-04 - val_loss: 0.0184
Epoch 223/700
3/3 [==============================] - ETA: 0s - loss: 5.9354e-04
Epoch 223: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 160ms/step - loss: 5.9354e-04 - val_loss: 0.0182
Epoch 224/700
3/3 [==============================] - ETA: 0s - loss: 5.6891e-04
Epoch 224: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 169ms/step - loss: 5.6891e-04 - val_loss: 0.0184
Epoch 225/700
3/3 [==============================] - ETA: 0s - loss: 7.6039e-04
Epoch 225: val_loss did not improve from 0.01787
3/3 [==============================] - 0s 160ms/step - loss: 7.6039e-04 - val_loss: 0.0183
Epoch 226/700
3/3 [==============================] - ETA: 0s - loss: 6.5298e-04
Epoch 226: val_loss improved from 0.01787 to 0.01754, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 189ms/step - loss: 6.5298e-04 - val_loss: 0.0175
Epoch 227/700
3/3 [==============================] - ETA: 0s - loss: 7.5536e-04
Epoch 227: val_loss improved from 0.01754 to 0.01750, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 176ms/step - loss: 7.5536e-04 - val_loss: 0.0175
Epoch 228/700
3/3 [==============================] - ETA: 0s - loss: 5.7377e-04
Epoch 228: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 166ms/step - loss: 5.7377e-04 - val_loss: 0.0180
Epoch 229/700
3/3 [==============================] - ETA: 0s - loss: 6.4454e-04
Epoch 229: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 161ms/step - loss: 6.4454e-04 - val_loss: 0.0179
Epoch 230/700
3/3 [==============================] - ETA: 0s - loss: 5.9858e-04
Epoch 230: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 159ms/step - loss: 5.9858e-04 - val_loss: 0.0178
Epoch 231/700
3/3 [==============================] - ETA: 0s - loss: 6.5327e-04
Epoch 231: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 163ms/step - loss: 6.5327e-04 - val_loss: 0.0185
Epoch 232/700
3/3 [==============================] - ETA: 0s - loss: 6.6984e-04
Epoch 232: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 155ms/step - loss: 6.6984e-04 - val_loss: 0.0183
Epoch 233/700
3/3 [==============================] - ETA: 0s - loss: 6.1307e-04
Epoch 233: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 162ms/step - loss: 6.1307e-04 - val_loss: 0.0179
Epoch 234/700
3/3 [==============================] - ETA: 0s - loss: 6.8088e-04
Epoch 234: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 162ms/step - loss: 6.8088e-04 - val_loss: 0.0180
Epoch 235/700
3/3 [==============================] - ETA: 0s - loss: 5.7938e-04
Epoch 235: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 167ms/step - loss: 5.7938e-04 - val_loss: 0.0182
Epoch 236/700
3/3 [==============================] - ETA: 0s - loss: 6.6053e-04
Epoch 236: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 155ms/step - loss: 6.6053e-04 - val_loss: 0.0179
Epoch 237/700
3/3 [==============================] - ETA: 0s - loss: 6.2741e-04
Epoch 237: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 172ms/step - loss: 6.2741e-04 - val_loss: 0.0176
Epoch 238/700
3/3 [==============================] - ETA: 0s - loss: 5.9069e-04
Epoch 238: val_loss did not improve from 0.01750
3/3 [==============================] - 1s 173ms/step - loss: 5.9069e-04 - val_loss: 0.0177
Epoch 239/700
3/3 [==============================] - ETA: 0s - loss: 5.9850e-04
Epoch 239: val_loss did not improve from 0.01750
3/3 [==============================] - 1s 171ms/step - loss: 5.9850e-04 - val_loss: 0.0178
Epoch 240/700
3/3 [==============================] - ETA: 0s - loss: 6.0235e-04
Epoch 240: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 158ms/step - loss: 6.0235e-04 - val_loss: 0.0178
Epoch 241/700
3/3 [==============================] - ETA: 0s - loss: 5.6989e-04
Epoch 241: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 174ms/step - loss: 5.6989e-04 - val_loss: 0.0177
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Epoch 242/700
3/3 [==============================] - ETA: 0s - loss: 6.5302e-04
Epoch 242: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 161ms/step - loss: 6.5302e-04 - val_loss: 0.0180
Epoch 243/700
3/3 [==============================] - ETA: 0s - loss: 6.0219e-04
Epoch 243: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 176ms/step - loss: 6.0219e-04 - val_loss: 0.0178
Epoch 244/700
3/3 [==============================] - ETA: 0s - loss: 6.0055e-04
Epoch 244: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 155ms/step - loss: 6.0055e-04 - val_loss: 0.0180
Epoch 245/700
3/3 [==============================] - ETA: 0s - loss: 5.5538e-04
Epoch 245: val_loss did not improve from 0.01750
3/3 [==============================] - 1s 191ms/step - loss: 5.5538e-04 - val_loss: 0.0183
Epoch 246/700
3/3 [==============================] - ETA: 0s - loss: 5.1630e-04
Epoch 246: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 155ms/step - loss: 5.1630e-04 - val_loss: 0.0181
Epoch 247/700
3/3 [==============================] - ETA: 0s - loss: 6.7199e-04
Epoch 247: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 171ms/step - loss: 6.7199e-04 - val_loss: 0.0180
Epoch 248/700
3/3 [==============================] - ETA: 0s - loss: 5.4513e-04
Epoch 248: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 160ms/step - loss: 5.4513e-04 - val_loss: 0.0180
Epoch 249/700
3/3 [==============================] - ETA: 0s - loss: 6.0950e-04
Epoch 249: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 159ms/step - loss: 6.0950e-04 - val_loss: 0.0181
Epoch 250/700
3/3 [==============================] - ETA: 0s - loss: 5.9587e-04
Epoch 250: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 153ms/step - loss: 5.9587e-04 - val_loss: 0.0179
Epoch 251/700
3/3 [==============================] - ETA: 0s - loss: 4.9299e-04
Epoch 251: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 164ms/step - loss: 4.9299e-04 - val_loss: 0.0176
Epoch 252/700
3/3 [==============================] - ETA: 0s - loss: 4.9359e-04
Epoch 252: val_loss improved from 0.01750 to 0.01750, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 4.9359e-04 - val_loss: 0.0175
Epoch 253/700
3/3 [==============================] - ETA: 0s - loss: 4.8461e-04
Epoch 253: val_loss did not improve from 0.01750
3/3 [==============================] - 1s 176ms/step - loss: 4.8461e-04 - val_loss: 0.0178
Epoch 254/700
3/3 [==============================] - ETA: 0s - loss: 6.0816e-04
Epoch 254: val_loss did not improve from 0.01750
3/3 [==============================] - 0s 166ms/step - loss: 6.0816e-04 - val_loss: 0.0178
Epoch 255/700
3/3 [==============================] - ETA: 0s - loss: 5.1994e-04
Epoch 255: val_loss improved from 0.01750 to 0.01748, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 171ms/step - loss: 5.1994e-04 - val_loss: 0.0175
Epoch 256/700
3/3 [==============================] - ETA: 0s - loss: 5.4616e-04
Epoch 256: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 158ms/step - loss: 5.4616e-04 - val_loss: 0.0176
Epoch 257/700
3/3 [==============================] - ETA: 0s - loss: 5.5704e-04
Epoch 257: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 174ms/step - loss: 5.5704e-04 - val_loss: 0.0181
Epoch 258/700
3/3 [==============================] - ETA: 0s - loss: 5.7200e-04
Epoch 258: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 166ms/step - loss: 5.7200e-04 - val_loss: 0.0182
Epoch 259/700
3/3 [==============================] - ETA: 0s - loss: 4.9797e-04
Epoch 259: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 168ms/step - loss: 4.9797e-04 - val_loss: 0.0179
Epoch 260/700
3/3 [==============================] - ETA: 0s - loss: 5.6581e-04
Epoch 260: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 164ms/step - loss: 5.6581e-04 - val_loss: 0.0178
Epoch 261/700
3/3 [==============================] - ETA: 0s - loss: 6.2081e-04
Epoch 261: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 156ms/step - loss: 6.2081e-04 - val_loss: 0.0179
Epoch 262/700
3/3 [==============================] - ETA: 0s - loss: 5.6357e-04
Epoch 262: val_loss did not improve from 0.01748
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3/3 [==============================] - 1s 174ms/step - loss: 5.6357e-04 - val_loss: 0.0176
Epoch 263/700
3/3 [==============================] - ETA: 0s - loss: 5.2600e-04
Epoch 263: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 159ms/step - loss: 5.2600e-04 - val_loss: 0.0175
Epoch 264/700
3/3 [==============================] - ETA: 0s - loss: 4.9734e-04
Epoch 264: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 166ms/step - loss: 4.9734e-04 - val_loss: 0.0178
Epoch 265/700
3/3 [==============================] - ETA: 0s - loss: 5.1890e-04
Epoch 265: val_loss did not improve from 0.01748
3/3 [==============================] - 0s 158ms/step - loss: 5.1890e-04 - val_loss: 0.0176
Epoch 266/700
3/3 [==============================] - ETA: 0s - loss: 4.4302e-04
Epoch 266: val_loss improved from 0.01748 to 0.01736, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 175ms/step - loss: 4.4302e-04 - val_loss: 0.0174
Epoch 267/700
3/3 [==============================] - ETA: 0s - loss: 5.0636e-04
Epoch 267: val_loss improved from 0.01736 to 0.01732, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 177ms/step - loss: 5.0636e-04 - val_loss: 0.0173
Epoch 268/700
3/3 [==============================] - ETA: 0s - loss: 5.0166e-04
Epoch 268: val_loss did not improve from 0.01732
3/3 [==============================] - 0s 157ms/step - loss: 5.0166e-04 - val_loss: 0.0176
Epoch 269/700
3/3 [==============================] - ETA: 0s - loss: 4.5468e-04
Epoch 269: val_loss did not improve from 0.01732
3/3 [==============================] - 0s 166ms/step - loss: 4.5468e-04 - val_loss: 0.0177
Epoch 270/700
3/3 [==============================] - ETA: 0s - loss: 5.8083e-04
Epoch 270: val_loss did not improve from 0.01732
3/3 [==============================] - 0s 157ms/step - loss: 5.8083e-04 - val_loss: 0.0175
Epoch 271/700
3/3 [==============================] - ETA: 0s - loss: 4.8619e-04
Epoch 271: val_loss improved from 0.01732 to 0.01724, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 165ms/step - loss: 4.8619e-04 - val_loss: 0.0172
Epoch 272/700
3/3 [==============================] - ETA: 0s - loss: 5.6126e-04
Epoch 272: val_loss did not improve from 0.01724
3/3 [==============================] - 0s 152ms/step - loss: 5.6126e-04 - val_loss: 0.0172
Epoch 273/700
3/3 [==============================] - ETA: 0s - loss: 4.0777e-04
Epoch 273: val_loss did not improve from 0.01724
3/3 [==============================] - 0s 165ms/step - loss: 4.0777e-04 - val_loss: 0.0173
Epoch 274/700
3/3 [==============================] - ETA: 0s - loss: 5.2813e-04
Epoch 274: val_loss did not improve from 0.01724
3/3 [==============================] - 0s 165ms/step - loss: 5.2813e-04 - val_loss: 0.0173
Epoch 275/700
3/3 [==============================] - ETA: 0s - loss: 4.9467e-04
Epoch 275: val_loss improved from 0.01724 to 0.01705, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 4.9467e-04 - val_loss: 0.0171
Epoch 276/700
3/3 [==============================] - ETA: 0s - loss: 6.0539e-04
Epoch 276: val_loss improved from 0.01705 to 0.01704, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 180ms/step - loss: 6.0539e-04 - val_loss: 0.0170
Epoch 277/700
3/3 [==============================] - ETA: 0s - loss: 5.3140e-04
Epoch 277: val_loss did not improve from 0.01704
3/3 [==============================] - 0s 165ms/step - loss: 5.3140e-04 - val_loss: 0.0172
Epoch 278/700
3/3 [==============================] - ETA: 0s - loss: 4.8654e-04
Epoch 278: val_loss improved from 0.01704 to 0.01689, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 166ms/step - loss: 4.8654e-04 - val_loss: 0.0169
Epoch 279/700
3/3 [==============================] - ETA: 0s - loss: 4.6808e-04
Epoch 279: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 157ms/step - loss: 4.6808e-04 - val_loss: 0.0170
Epoch 280/700
3/3 [==============================] - ETA: 0s - loss: 4.4269e-04
Epoch 280: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 156ms/step - loss: 4.4269e-04 - val_loss: 0.0171
Epoch 281/700
3/3 [==============================] - ETA: 0s - loss: 5.8478e-04
Epoch 281: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 165ms/step - loss: 5.8478e-04 - val_loss: 0.0173
Epoch 282/700
3/3 [==============================] - ETA: 0s - loss: 4.9852e-04
Epoch 282: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 159ms/step - loss: 4.9852e-04 - val_loss: 0.0171
Epoch 283/700
3/3 [==============================] - ETA: 0s - loss: 5.0294e-04
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Epoch 283: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 165ms/step - loss: 5.0294e-04 - val_loss: 0.0169
Epoch 284/700
3/3 [==============================] - ETA: 0s - loss: 4.7158e-04
Epoch 284: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 156ms/step - loss: 4.7158e-04 - val_loss: 0.0172
Epoch 285/700
3/3 [==============================] - ETA: 0s - loss: 4.3824e-04
Epoch 285: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 160ms/step - loss: 4.3824e-04 - val_loss: 0.0173
Epoch 286/700
3/3 [==============================] - ETA: 0s - loss: 5.2045e-04
Epoch 286: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 161ms/step - loss: 5.2045e-04 - val_loss: 0.0172
Epoch 287/700
3/3 [==============================] - ETA: 0s - loss: 4.1505e-04
Epoch 287: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 159ms/step - loss: 4.1505e-04 - val_loss: 0.0173
Epoch 288/700
3/3 [==============================] - ETA: 0s - loss: 5.1918e-04
Epoch 288: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 158ms/step - loss: 5.1918e-04 - val_loss: 0.0177
Epoch 289/700
3/3 [==============================] - ETA: 0s - loss: 4.1734e-04
Epoch 289: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 158ms/step - loss: 4.1734e-04 - val_loss: 0.0179
Epoch 290/700
3/3 [==============================] - ETA: 0s - loss: 5.3133e-04
Epoch 290: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 157ms/step - loss: 5.3133e-04 - val_loss: 0.0175
Epoch 291/700
3/3 [==============================] - ETA: 0s - loss: 4.6888e-04
Epoch 291: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 156ms/step - loss: 4.6888e-04 - val_loss: 0.0173
Epoch 292/700
3/3 [==============================] - ETA: 0s - loss: 4.6828e-04
Epoch 292: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 157ms/step - loss: 4.6828e-04 - val_loss: 0.0171
Epoch 293/700
3/3 [==============================] - ETA: 0s - loss: 5.0065e-04
Epoch 293: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 168ms/step - loss: 5.0065e-04 - val_loss: 0.0171
Epoch 294/700
3/3 [==============================] - ETA: 0s - loss: 4.5972e-04
Epoch 294: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 166ms/step - loss: 4.5972e-04 - val_loss: 0.0169
Epoch 295/700
3/3 [==============================] - ETA: 0s - loss: 5.2488e-04
Epoch 295: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 167ms/step - loss: 5.2488e-04 - val_loss: 0.0169
Epoch 296/700
3/3 [==============================] - ETA: 0s - loss: 4.8917e-04
Epoch 296: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 158ms/step - loss: 4.8917e-04 - val_loss: 0.0173
Epoch 297/700
3/3 [==============================] - ETA: 0s - loss: 4.8192e-04
Epoch 297: val_loss did not improve from 0.01689
3/3 [==============================] - 0s 163ms/step - loss: 4.8192e-04 - val_loss: 0.0172
Epoch 298/700
3/3 [==============================] - ETA: 0s - loss: 4.6509e-04
Epoch 298: val_loss improved from 0.01689 to 0.01688, saving model to /content/weights.best.hdf5
3/3 [==============================] - 0s 171ms/step - loss: 4.6509e-04 - val_loss: 0.0169
Epoch 299/700
3/3 [==============================] - ETA: 0s - loss: 4.9726e-04
Epoch 299: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 174ms/step - loss: 4.9726e-04 - val_loss: 0.0169
Epoch 300/700
3/3 [==============================] - ETA: 0s - loss: 4.6118e-04
Epoch 300: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 174ms/step - loss: 4.6118e-04 - val_loss: 0.0171
Epoch 301/700
3/3 [==============================] - ETA: 0s - loss: 4.9848e-04
Epoch 301: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 161ms/step - loss: 4.9848e-04 - val_loss: 0.0174
Epoch 302/700
3/3 [==============================] - ETA: 0s - loss: 5.8429e-04
Epoch 302: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 157ms/step - loss: 5.8429e-04 - val_loss: 0.0173
Epoch 303/700
3/3 [==============================] - ETA: 0s - loss: 4.2560e-04
Epoch 303: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 168ms/step - loss: 4.2560e-04 - val_loss: 0.0171
Epoch 304/700
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3/3 [==============================] - ETA: 0s - loss: 5.3154e-04
Epoch 304: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 163ms/step - loss: 5.3154e-04 - val_loss: 0.0172
Epoch 305/700
3/3 [==============================] - ETA: 0s - loss: 5.3484e-04
Epoch 305: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 171ms/step - loss: 5.3484e-04 - val_loss: 0.0174
Epoch 306/700
3/3 [==============================] - ETA: 0s - loss: 4.6735e-04
Epoch 306: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 248ms/step - loss: 4.6735e-04 - val_loss: 0.0173
Epoch 307/700
3/3 [==============================] - ETA: 0s - loss: 4.4248e-04
Epoch 307: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 257ms/step - loss: 4.4248e-04 - val_loss: 0.0171
Epoch 308/700
3/3 [==============================] - ETA: 0s - loss: 4.7571e-04
Epoch 308: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 271ms/step - loss: 4.7571e-04 - val_loss: 0.0172
Epoch 309/700
3/3 [==============================] - ETA: 0s - loss: 5.4840e-04
Epoch 309: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 314ms/step - loss: 5.4840e-04 - val_loss: 0.0171
Epoch 310/700
3/3 [==============================] - ETA: 0s - loss: 4.6126e-04
Epoch 310: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 286ms/step - loss: 4.6126e-04 - val_loss: 0.0171
Epoch 311/700
3/3 [==============================] - ETA: 0s - loss: 4.3118e-04
Epoch 311: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 230ms/step - loss: 4.3118e-04 - val_loss: 0.0173
Epoch 312/700
3/3 [==============================] - ETA: 0s - loss: 4.9414e-04
Epoch 312: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 167ms/step - loss: 4.9414e-04 - val_loss: 0.0175
Epoch 313/700
3/3 [==============================] - ETA: 0s - loss: 5.1845e-04
Epoch 313: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 167ms/step - loss: 5.1845e-04 - val_loss: 0.0175
Epoch 314/700
3/3 [==============================] - ETA: 0s - loss: 4.9527e-04
Epoch 314: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 169ms/step - loss: 4.9527e-04 - val_loss: 0.0173
Epoch 315/700
3/3 [==============================] - ETA: 0s - loss: 4.4492e-04
Epoch 315: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 164ms/step - loss: 4.4492e-04 - val_loss: 0.0176
Epoch 316/700
3/3 [==============================] - ETA: 0s - loss: 5.0543e-04
Epoch 316: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 166ms/step - loss: 5.0543e-04 - val_loss: 0.0179
Epoch 317/700
3/3 [==============================] - ETA: 0s - loss: 4.4858e-04
Epoch 317: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 171ms/step - loss: 4.4858e-04 - val_loss: 0.0177
Epoch 318/700
3/3 [==============================] - ETA: 0s - loss: 4.8230e-04
Epoch 318: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 164ms/step - loss: 4.8230e-04 - val_loss: 0.0174
Epoch 319/700
3/3 [==============================] - ETA: 0s - loss: 4.7070e-04
Epoch 319: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 162ms/step - loss: 4.7070e-04 - val_loss: 0.0175
Epoch 320/700
3/3 [==============================] - ETA: 0s - loss: 4.2114e-04
Epoch 320: val_loss did not improve from 0.01688
3/3 [==============================] - 1s 169ms/step - loss: 4.2114e-04 - val_loss: 0.0178
Epoch 321/700
3/3 [==============================] - ETA: 0s - loss: 4.8147e-04
Epoch 321: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 166ms/step - loss: 4.8147e-04 - val_loss: 0.0177
Epoch 322/700
3/3 [==============================] - ETA: 0s - loss: 4.3216e-04
Epoch 322: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 173ms/step - loss: 4.3216e-04 - val_loss: 0.0175
Epoch 323/700
3/3 [==============================] - ETA: 0s - loss: 4.8502e-04
Epoch 323: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 166ms/step - loss: 4.8502e-04 - val_loss: 0.0177
Epoch 324/700
3/3 [==============================] - ETA: 0s - loss: 5.4375e-04
Epoch 324: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 168ms/step - loss: 5.4375e-04 - val_loss: 0.0178
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Epoch 325/700
3/3 [==============================] - ETA: 0s - loss: 3.8687e-04
Epoch 325: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 170ms/step - loss: 3.8687e-04 - val_loss: 0.0177
Epoch 326/700
3/3 [==============================] - ETA: 0s - loss: 4.8819e-04
Epoch 326: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 170ms/step - loss: 4.8819e-04 - val_loss: 0.0177
Epoch 327/700
3/3 [==============================] - ETA: 0s - loss: 5.1851e-04
Epoch 327: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 155ms/step - loss: 5.1851e-04 - val_loss: 0.0180
Epoch 328/700
3/3 [==============================] - ETA: 0s - loss: 4.5719e-04
Epoch 328: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 162ms/step - loss: 4.5719e-04 - val_loss: 0.0177
Epoch 329/700
3/3 [==============================] - ETA: 0s - loss: 5.0237e-04
Epoch 329: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 161ms/step - loss: 5.0237e-04 - val_loss: 0.0173
Epoch 330/700
3/3 [==============================] - ETA: 0s - loss: 4.3352e-04
Epoch 330: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 159ms/step - loss: 4.3352e-04 - val_loss: 0.0176
Epoch 331/700
3/3 [==============================] - ETA: 0s - loss: 3.8792e-04
Epoch 331: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 162ms/step - loss: 3.8792e-04 - val_loss: 0.0178
Epoch 332/700
3/3 [==============================] - ETA: 0s - loss: 4.2555e-04
Epoch 332: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 167ms/step - loss: 4.2555e-04 - val_loss: 0.0174
Epoch 333/700
3/3 [==============================] - ETA: 0s - loss: 4.2038e-04
Epoch 333: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 162ms/step - loss: 4.2038e-04 - val_loss: 0.0170
Epoch 334/700
3/3 [==============================] - ETA: 0s - loss: 4.3827e-04
Epoch 334: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 161ms/step - loss: 4.3827e-04 - val_loss: 0.0173
Epoch 335/700
3/3 [==============================] - ETA: 0s - loss: 5.0181e-04
Epoch 335: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 166ms/step - loss: 5.0181e-04 - val_loss: 0.0173
Epoch 336/700
3/3 [==============================] - ETA: 0s - loss: 3.9977e-04
Epoch 336: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 165ms/step - loss: 3.9977e-04 - val_loss: 0.0172
Epoch 337/700
3/3 [==============================] - ETA: 0s - loss: 4.2121e-04
Epoch 337: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 164ms/step - loss: 4.2121e-04 - val_loss: 0.0176
Epoch 338/700
3/3 [==============================] - ETA: 0s - loss: 4.2943e-04
Epoch 338: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 167ms/step - loss: 4.2943e-04 - val_loss: 0.0178
Epoch 339/700
3/3 [==============================] - ETA: 0s - loss: 4.5306e-04
Epoch 339: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 163ms/step - loss: 4.5306e-04 - val_loss: 0.0176
Epoch 340/700
3/3 [==============================] - ETA: 0s - loss: 3.5689e-04
Epoch 340: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 167ms/step - loss: 3.5689e-04 - val_loss: 0.0177
Epoch 341/700
3/3 [==============================] - ETA: 0s - loss: 4.9942e-04
Epoch 341: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 155ms/step - loss: 4.9942e-04 - val_loss: 0.0181
Epoch 342/700
3/3 [==============================] - ETA: 0s - loss: 4.4323e-04
Epoch 342: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 160ms/step - loss: 4.4323e-04 - val_loss: 0.0179
Epoch 343/700
3/3 [==============================] - ETA: 0s - loss: 4.6038e-04
Epoch 343: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 162ms/step - loss: 4.6038e-04 - val_loss: 0.0174
Epoch 344/700
3/3 [==============================] - ETA: 0s - loss: 4.8822e-04
Epoch 344: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 166ms/step - loss: 4.8822e-04 - val_loss: 0.0176
Epoch 345/700
3/3 [==============================] - ETA: 0s - loss: 4.3956e-04
Epoch 345: val_loss did not improve from 0.01688
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3/3 [==============================] - 0s 165ms/step - loss: 4.3956e-04 - val_loss: 0.0178
Epoch 346/700
3/3 [==============================] - ETA: 0s - loss: 4.0068e-04
Epoch 346: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 165ms/step - loss: 4.0068e-04 - val_loss: 0.0178
Epoch 347/700
3/3 [==============================] - ETA: 0s - loss: 3.8327e-04
Epoch 347: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 155ms/step - loss: 3.8327e-04 - val_loss: 0.0178
Epoch 348/700
3/3 [==============================] - ETA: 0s - loss: 3.6164e-04
Epoch 348: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 165ms/step - loss: 3.6164e-04 - val_loss: 0.0178
Epoch 349/700
3/3 [==============================] - ETA: 0s - loss: 4.6793e-04
Epoch 349: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 170ms/step - loss: 4.6793e-04 - val_loss: 0.0178
Epoch 350/700
3/3 [==============================] - ETA: 0s - loss: 4.3159e-04
Epoch 350: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 164ms/step - loss: 4.3159e-04 - val_loss: 0.0176
Epoch 351/700
3/3 [==============================] - ETA: 0s - loss: 4.0922e-04
Epoch 351: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 163ms/step - loss: 4.0922e-04 - val_loss: 0.0173
Epoch 352/700
3/3 [==============================] - ETA: 0s - loss: 4.6713e-04
Epoch 352: val_loss did not improve from 0.01688
3/3 [==============================] - 0s 162ms/step - loss: 4.6713e-04 - val_loss: 0.0170
Epoch 353/700
3/3 [==============================] - ETA: 0s - loss: 4.4254e-04
Epoch 353: val_loss improved from 0.01688 to 0.01671, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 4.4254e-04 - val_loss: 0.0167
Epoch 354/700
3/3 [==============================] - ETA: 0s - loss: 4.4637e-04
Epoch 354: val_loss improved from 0.01671 to 0.01659, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 180ms/step - loss: 4.4637e-04 - val_loss: 0.0166
Epoch 355/700
3/3 [==============================] - ETA: 0s - loss: 4.4736e-04
Epoch 355: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 164ms/step - loss: 4.4736e-04 - val_loss: 0.0168
Epoch 356/700
3/3 [==============================] - ETA: 0s - loss: 4.3269e-04
Epoch 356: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 165ms/step - loss: 4.3269e-04 - val_loss: 0.0168
Epoch 357/700
3/3 [==============================] - ETA: 0s - loss: 4.2155e-04
Epoch 357: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 173ms/step - loss: 4.2155e-04 - val_loss: 0.0167
Epoch 358/700
3/3 [==============================] - ETA: 0s - loss: 3.8029e-04
Epoch 358: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 168ms/step - loss: 3.8029e-04 - val_loss: 0.0169
Epoch 359/700
3/3 [==============================] - ETA: 0s - loss: 4.3959e-04
Epoch 359: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 169ms/step - loss: 4.3959e-04 - val_loss: 0.0171
Epoch 360/700
3/3 [==============================] - ETA: 0s - loss: 3.0796e-04
Epoch 360: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 3.0796e-04 - val_loss: 0.0171
Epoch 361/700
3/3 [==============================] - ETA: 0s - loss: 3.4102e-04
Epoch 361: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 3.4102e-04 - val_loss: 0.0171
Epoch 362/700
3/3 [==============================] - ETA: 0s - loss: 3.4971e-04
Epoch 362: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 155ms/step - loss: 3.4971e-04 - val_loss: 0.0171
Epoch 363/700
3/3 [==============================] - ETA: 0s - loss: 4.1210e-04
Epoch 363: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 199ms/step - loss: 4.1210e-04 - val_loss: 0.0172
Epoch 364/700
3/3 [==============================] - ETA: 0s - loss: 4.4047e-04
Epoch 364: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 175ms/step - loss: 4.4047e-04 - val_loss: 0.0174
Epoch 365/700
3/3 [==============================] - ETA: 0s - loss: 4.1127e-04
Epoch 365: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 171ms/step - loss: 4.1127e-04 - val_loss: 0.0173
Epoch 366/700
3/3 [==============================] - ETA: 0s - loss: 4.8622e-04
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Epoch 366: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 154ms/step - loss: 4.8622e-04 - val_loss: 0.0172
Epoch 367/700
3/3 [==============================] - ETA: 0s - loss: 4.1062e-04
Epoch 367: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 186ms/step - loss: 4.1062e-04 - val_loss: 0.0175
Epoch 368/700
3/3 [==============================] - ETA: 0s - loss: 3.8202e-04
Epoch 368: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 163ms/step - loss: 3.8202e-04 - val_loss: 0.0177
Epoch 369/700
3/3 [==============================] - ETA: 0s - loss: 3.5449e-04
Epoch 369: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 3.5449e-04 - val_loss: 0.0177
Epoch 370/700
3/3 [==============================] - ETA: 0s - loss: 4.3280e-04
Epoch 370: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 4.3280e-04 - val_loss: 0.0177
Epoch 371/700
3/3 [==============================] - ETA: 0s - loss: 3.6810e-04
Epoch 371: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 161ms/step - loss: 3.6810e-04 - val_loss: 0.0176
Epoch 372/700
3/3 [==============================] - ETA: 0s - loss: 4.0881e-04
Epoch 372: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 158ms/step - loss: 4.0881e-04 - val_loss: 0.0173
Epoch 373/700
3/3 [==============================] - ETA: 0s - loss: 3.8598e-04
Epoch 373: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 171ms/step - loss: 3.8598e-04 - val_loss: 0.0170
Epoch 374/700
3/3 [==============================] - ETA: 0s - loss: 4.0925e-04
Epoch 374: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 157ms/step - loss: 4.0925e-04 - val_loss: 0.0173
Epoch 375/700
3/3 [==============================] - ETA: 0s - loss: 4.4179e-04
Epoch 375: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 176ms/step - loss: 4.4179e-04 - val_loss: 0.0179
Epoch 376/700
3/3 [==============================] - ETA: 0s - loss: 4.5596e-04
Epoch 376: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 159ms/step - loss: 4.5596e-04 - val_loss: 0.0176
Epoch 377/700
3/3 [==============================] - ETA: 0s - loss: 4.3409e-04
Epoch 377: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 178ms/step - loss: 4.3409e-04 - val_loss: 0.0171
Epoch 378/700
3/3 [==============================] - ETA: 0s - loss: 3.9021e-04
Epoch 378: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 163ms/step - loss: 3.9021e-04 - val_loss: 0.0170
Epoch 379/700
3/3 [==============================] - ETA: 0s - loss: 4.0493e-04
Epoch 379: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 171ms/step - loss: 4.0493e-04 - val_loss: 0.0172
Epoch 380/700
3/3 [==============================] - ETA: 0s - loss: 4.1068e-04
Epoch 380: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 4.1068e-04 - val_loss: 0.0170
Epoch 381/700
3/3 [==============================] - ETA: 0s - loss: 4.0060e-04
Epoch 381: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 172ms/step - loss: 4.0060e-04 - val_loss: 0.0172
Epoch 382/700
3/3 [==============================] - ETA: 0s - loss: 3.7152e-04
Epoch 382: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 163ms/step - loss: 3.7152e-04 - val_loss: 0.0175
Epoch 383/700
3/3 [==============================] - ETA: 0s - loss: 3.5202e-04
Epoch 383: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 3.5202e-04 - val_loss: 0.0176
Epoch 384/700
3/3 [==============================] - ETA: 0s - loss: 4.0486e-04
Epoch 384: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 161ms/step - loss: 4.0486e-04 - val_loss: 0.0174
Epoch 385/700
3/3 [==============================] - ETA: 0s - loss: 3.3431e-04
Epoch 385: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 169ms/step - loss: 3.3431e-04 - val_loss: 0.0174
Epoch 386/700
3/3 [==============================] - ETA: 0s - loss: 3.2703e-04
Epoch 386: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 164ms/step - loss: 3.2703e-04 - val_loss: 0.0176
Epoch 387/700
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3/3 [==============================] - ETA: 0s - loss: 3.7753e-04
Epoch 387: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 192ms/step - loss: 3.7753e-04 - val_loss: 0.0177
Epoch 388/700
3/3 [==============================] - ETA: 0s - loss: 3.7053e-04
Epoch 388: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 165ms/step - loss: 3.7053e-04 - val_loss: 0.0181
Epoch 389/700
3/3 [==============================] - ETA: 0s - loss: 3.5916e-04
Epoch 389: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 168ms/step - loss: 3.5916e-04 - val_loss: 0.0180
Epoch 390/700
3/3 [==============================] - ETA: 0s - loss: 4.3494e-04
Epoch 390: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 172ms/step - loss: 4.3494e-04 - val_loss: 0.0178
Epoch 391/700
3/3 [==============================] - ETA: 0s - loss: 4.5502e-04
Epoch 391: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 168ms/step - loss: 4.5502e-04 - val_loss: 0.0178
Epoch 392/700
3/3 [==============================] - ETA: 0s - loss: 4.4662e-04
Epoch 392: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 164ms/step - loss: 4.4662e-04 - val_loss: 0.0179
Epoch 393/700
3/3 [==============================] - ETA: 0s - loss: 4.1636e-04
Epoch 393: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 163ms/step - loss: 4.1636e-04 - val_loss: 0.0179
Epoch 394/700
3/3 [==============================] - ETA: 0s - loss: 4.3132e-04
Epoch 394: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 165ms/step - loss: 4.3132e-04 - val_loss: 0.0179
Epoch 395/700
3/3 [==============================] - ETA: 0s - loss: 3.4617e-04
Epoch 395: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 163ms/step - loss: 3.4617e-04 - val_loss: 0.0180
Epoch 396/700
3/3 [==============================] - ETA: 0s - loss: 4.7909e-04
Epoch 396: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 165ms/step - loss: 4.7909e-04 - val_loss: 0.0184
Epoch 397/700
3/3 [==============================] - ETA: 0s - loss: 2.8343e-04
Epoch 397: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 164ms/step - loss: 2.8343e-04 - val_loss: 0.0185
Epoch 398/700
3/3 [==============================] - ETA: 0s - loss: 4.0865e-04
Epoch 398: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 168ms/step - loss: 4.0865e-04 - val_loss: 0.0182
Epoch 399/700
3/3 [==============================] - ETA: 0s - loss: 3.5826e-04
Epoch 399: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 151ms/step - loss: 3.5826e-04 - val_loss: 0.0179
Epoch 400/700
3/3 [==============================] - ETA: 0s - loss: 3.4545e-04
Epoch 400: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 169ms/step - loss: 3.4545e-04 - val_loss: 0.0179
Epoch 401/700
3/3 [==============================] - ETA: 0s - loss: 3.3881e-04
Epoch 401: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 159ms/step - loss: 3.3881e-04 - val_loss: 0.0180
Epoch 402/700
3/3 [==============================] - ETA: 0s - loss: 3.5596e-04
Epoch 402: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 179ms/step - loss: 3.5596e-04 - val_loss: 0.0181
Epoch 403/700
3/3 [==============================] - ETA: 0s - loss: 3.3401e-04
Epoch 403: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 158ms/step - loss: 3.3401e-04 - val_loss: 0.0182
Epoch 404/700
3/3 [==============================] - ETA: 0s - loss: 3.7504e-04
Epoch 404: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 3.7504e-04 - val_loss: 0.0179
Epoch 405/700
3/3 [==============================] - ETA: 0s - loss: 3.8968e-04
Epoch 405: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 161ms/step - loss: 3.8968e-04 - val_loss: 0.0177
Epoch 406/700
3/3 [==============================] - ETA: 0s - loss: 4.9015e-04
Epoch 406: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 171ms/step - loss: 4.9015e-04 - val_loss: 0.0179
Epoch 407/700
3/3 [==============================] - ETA: 0s - loss: 3.7772e-04
Epoch 407: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 165ms/step - loss: 3.7772e-04 - val_loss: 0.0180
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Epoch 408/700
3/3 [==============================] - ETA: 0s - loss: 3.8144e-04
Epoch 408: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 170ms/step - loss: 3.8144e-04 - val_loss: 0.0180
Epoch 409/700
3/3 [==============================] - ETA: 0s - loss: 4.0873e-04
Epoch 409: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 155ms/step - loss: 4.0873e-04 - val_loss: 0.0180
Epoch 410/700
3/3 [==============================] - ETA: 0s - loss: 3.6857e-04
Epoch 410: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 171ms/step - loss: 3.6857e-04 - val_loss: 0.0178
Epoch 411/700
3/3 [==============================] - ETA: 0s - loss: 3.0420e-04
Epoch 411: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 153ms/step - loss: 3.0420e-04 - val_loss: 0.0177
Epoch 412/700
3/3 [==============================] - ETA: 0s - loss: 3.3198e-04
Epoch 412: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 176ms/step - loss: 3.3198e-04 - val_loss: 0.0174
Epoch 413/700
3/3 [==============================] - ETA: 0s - loss: 3.4144e-04
Epoch 413: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 161ms/step - loss: 3.4144e-04 - val_loss: 0.0174
Epoch 414/700
3/3 [==============================] - ETA: 0s - loss: 3.7384e-04
Epoch 414: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 3.7384e-04 - val_loss: 0.0176
Epoch 415/700
3/3 [==============================] - ETA: 0s - loss: 3.6572e-04
Epoch 415: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 3.6572e-04 - val_loss: 0.0176
Epoch 416/700
3/3 [==============================] - ETA: 0s - loss: 3.7467e-04
Epoch 416: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 3.7467e-04 - val_loss: 0.0176
Epoch 417/700
3/3 [==============================] - ETA: 0s - loss: 3.0905e-04
Epoch 417: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 165ms/step - loss: 3.0905e-04 - val_loss: 0.0176
Epoch 418/700
3/3 [==============================] - ETA: 0s - loss: 3.2862e-04
Epoch 418: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 170ms/step - loss: 3.2862e-04 - val_loss: 0.0175
Epoch 419/700
3/3 [==============================] - ETA: 0s - loss: 2.8843e-04
Epoch 419: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 167ms/step - loss: 2.8843e-04 - val_loss: 0.0176
Epoch 420/700
3/3 [==============================] - ETA: 0s - loss: 3.3576e-04
Epoch 420: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 170ms/step - loss: 3.3576e-04 - val_loss: 0.0175
Epoch 421/700
3/3 [==============================] - ETA: 0s - loss: 3.1401e-04
Epoch 421: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 167ms/step - loss: 3.1401e-04 - val_loss: 0.0175
Epoch 422/700
3/3 [==============================] - ETA: 0s - loss: 3.2497e-04
Epoch 422: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 159ms/step - loss: 3.2497e-04 - val_loss: 0.0175
Epoch 423/700
3/3 [==============================] - ETA: 0s - loss: 3.3186e-04
Epoch 423: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 174ms/step - loss: 3.3186e-04 - val_loss: 0.0176
Epoch 424/700
3/3 [==============================] - ETA: 0s - loss: 3.3171e-04
Epoch 424: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 165ms/step - loss: 3.3171e-04 - val_loss: 0.0175
Epoch 425/700
3/3 [==============================] - ETA: 0s - loss: 3.1114e-04
Epoch 425: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 3.1114e-04 - val_loss: 0.0176
Epoch 426/700
3/3 [==============================] - ETA: 0s - loss: 3.0123e-04
Epoch 426: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 159ms/step - loss: 3.0123e-04 - val_loss: 0.0176
Epoch 427/700
3/3 [==============================] - ETA: 0s - loss: 3.3487e-04
Epoch 427: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 170ms/step - loss: 3.3487e-04 - val_loss: 0.0176
Epoch 428/700
3/3 [==============================] - ETA: 0s - loss: 3.3614e-04
Epoch 428: val_loss did not improve from 0.01659
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3/3 [==============================] - 1s 172ms/step - loss: 3.3614e-04 - val_loss: 0.0176
Epoch 429/700
3/3 [==============================] - ETA: 0s - loss: 3.5446e-04
Epoch 429: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 169ms/step - loss: 3.5446e-04 - val_loss: 0.0177
Epoch 430/700
3/3 [==============================] - ETA: 0s - loss: 4.0077e-04
Epoch 430: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 158ms/step - loss: 4.0077e-04 - val_loss: 0.0176
Epoch 431/700
3/3 [==============================] - ETA: 0s - loss: 3.3278e-04
Epoch 431: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 159ms/step - loss: 3.3278e-04 - val_loss: 0.0177
Epoch 432/700
3/3 [==============================] - ETA: 0s - loss: 4.0498e-04
Epoch 432: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 158ms/step - loss: 4.0498e-04 - val_loss: 0.0178
Epoch 433/700
3/3 [==============================] - ETA: 0s - loss: 3.9008e-04
Epoch 433: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 175ms/step - loss: 3.9008e-04 - val_loss: 0.0179
Epoch 434/700
3/3 [==============================] - ETA: 0s - loss: 3.6343e-04
Epoch 434: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 161ms/step - loss: 3.6343e-04 - val_loss: 0.0177
Epoch 435/700
3/3 [==============================] - ETA: 0s - loss: 3.2527e-04
Epoch 435: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 3.2527e-04 - val_loss: 0.0177
Epoch 436/700
3/3 [==============================] - ETA: 0s - loss: 3.1035e-04
Epoch 436: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 169ms/step - loss: 3.1035e-04 - val_loss: 0.0179
Epoch 437/700
3/3 [==============================] - ETA: 0s - loss: 3.4849e-04
Epoch 437: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 3.4849e-04 - val_loss: 0.0177
Epoch 438/700
3/3 [==============================] - ETA: 0s - loss: 3.7214e-04
Epoch 438: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 3.7214e-04 - val_loss: 0.0175
Epoch 439/700
3/3 [==============================] - ETA: 0s - loss: 3.1540e-04
Epoch 439: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 169ms/step - loss: 3.1540e-04 - val_loss: 0.0176
Epoch 440/700
3/3 [==============================] - ETA: 0s - loss: 3.4807e-04
Epoch 440: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 243ms/step - loss: 3.4807e-04 - val_loss: 0.0176
Epoch 441/700
3/3 [==============================] - ETA: 0s - loss: 3.8845e-04
Epoch 441: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 273ms/step - loss: 3.8845e-04 - val_loss: 0.0176
Epoch 442/700
3/3 [==============================] - ETA: 0s - loss: 2.8488e-04
Epoch 442: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 277ms/step - loss: 2.8488e-04 - val_loss: 0.0176
Epoch 443/700
3/3 [==============================] - ETA: 0s - loss: 2.9814e-04
Epoch 443: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 272ms/step - loss: 2.9814e-04 - val_loss: 0.0175
Epoch 444/700
3/3 [==============================] - ETA: 0s - loss: 3.6070e-04
Epoch 444: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 296ms/step - loss: 3.6070e-04 - val_loss: 0.0175
Epoch 445/700
3/3 [==============================] - ETA: 0s - loss: 2.8966e-04
Epoch 445: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 211ms/step - loss: 2.8966e-04 - val_loss: 0.0177
Epoch 446/700
3/3 [==============================] - ETA: 0s - loss: 3.0754e-04
Epoch 446: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 165ms/step - loss: 3.0754e-04 - val_loss: 0.0181
Epoch 447/700
3/3 [==============================] - ETA: 0s - loss: 3.2956e-04
Epoch 447: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 158ms/step - loss: 3.2956e-04 - val_loss: 0.0177
Epoch 448/700
3/3 [==============================] - ETA: 0s - loss: 2.8449e-04
Epoch 448: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 167ms/step - loss: 2.8449e-04 - val_loss: 0.0175
Epoch 449/700
3/3 [==============================] - ETA: 0s - loss: 3.4016e-04
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Epoch 449: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 3.4016e-04 - val_loss: 0.0177
Epoch 450/700
3/3 [==============================] - ETA: 0s - loss: 3.5062e-04
Epoch 450: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 157ms/step - loss: 3.5062e-04 - val_loss: 0.0179
Epoch 451/700
3/3 [==============================] - ETA: 0s - loss: 3.3974e-04
Epoch 451: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 156ms/step - loss: 3.3974e-04 - val_loss: 0.0174
Epoch 452/700
3/3 [==============================] - ETA: 0s - loss: 3.2652e-04
Epoch 452: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 171ms/step - loss: 3.2652e-04 - val_loss: 0.0173
Epoch 453/700
3/3 [==============================] - ETA: 0s - loss: 3.2867e-04
Epoch 453: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 169ms/step - loss: 3.2867e-04 - val_loss: 0.0176
Epoch 454/700
3/3 [==============================] - ETA: 0s - loss: 3.4938e-04
Epoch 454: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 187ms/step - loss: 3.4938e-04 - val_loss: 0.0175
Epoch 455/700
3/3 [==============================] - ETA: 0s - loss: 3.0907e-04
Epoch 455: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 168ms/step - loss: 3.0907e-04 - val_loss: 0.0172
Epoch 456/700
3/3 [==============================] - ETA: 0s - loss: 2.6713e-04
Epoch 456: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 174ms/step - loss: 2.6713e-04 - val_loss: 0.0172
Epoch 457/700
3/3 [==============================] - ETA: 0s - loss: 3.3951e-04
Epoch 457: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 156ms/step - loss: 3.3951e-04 - val_loss: 0.0173
Epoch 458/700
3/3 [==============================] - ETA: 0s - loss: 3.0544e-04
Epoch 458: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 175ms/step - loss: 3.0544e-04 - val_loss: 0.0173
Epoch 459/700
3/3 [==============================] - ETA: 0s - loss: 3.4061e-04
Epoch 459: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 3.4061e-04 - val_loss: 0.0174
Epoch 460/700
3/3 [==============================] - ETA: 0s - loss: 3.3509e-04
Epoch 460: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 170ms/step - loss: 3.3509e-04 - val_loss: 0.0173
Epoch 461/700
3/3 [==============================] - ETA: 0s - loss: 2.9222e-04
Epoch 461: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 2.9222e-04 - val_loss: 0.0176
Epoch 462/700
3/3 [==============================] - ETA: 0s - loss: 3.3400e-04
Epoch 462: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 172ms/step - loss: 3.3400e-04 - val_loss: 0.0175
Epoch 463/700
3/3 [==============================] - ETA: 0s - loss: 3.0599e-04
Epoch 463: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 3.0599e-04 - val_loss: 0.0173
Epoch 464/700
3/3 [==============================] - ETA: 0s - loss: 2.7857e-04
Epoch 464: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 2.7857e-04 - val_loss: 0.0177
Epoch 465/700
3/3 [==============================] - ETA: 0s - loss: 2.6792e-04
Epoch 465: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 163ms/step - loss: 2.6792e-04 - val_loss: 0.0178
Epoch 466/700
3/3 [==============================] - ETA: 0s - loss: 2.8008e-04
Epoch 466: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 167ms/step - loss: 2.8008e-04 - val_loss: 0.0176
Epoch 467/700
3/3 [==============================] - ETA: 0s - loss: 3.0577e-04
Epoch 467: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 159ms/step - loss: 3.0577e-04 - val_loss: 0.0176
Epoch 468/700
3/3 [==============================] - ETA: 0s - loss: 3.7723e-04
Epoch 468: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 185ms/step - loss: 3.7723e-04 - val_loss: 0.0178
Epoch 469/700
3/3 [==============================] - ETA: 0s - loss: 3.7184e-04
Epoch 469: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 3.7184e-04 - val_loss: 0.0177
Epoch 470/700
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3/3 [==============================] - ETA: 0s - loss: 3.3554e-04
Epoch 470: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 3.3554e-04 - val_loss: 0.0175
Epoch 471/700
3/3 [==============================] - ETA: 0s - loss: 2.9388e-04
Epoch 471: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 2.9388e-04 - val_loss: 0.0170
Epoch 472/700
3/3 [==============================] - ETA: 0s - loss: 4.1593e-04
Epoch 472: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 170ms/step - loss: 4.1593e-04 - val_loss: 0.0174
Epoch 473/700
3/3 [==============================] - ETA: 0s - loss: 3.1417e-04
Epoch 473: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 161ms/step - loss: 3.1417e-04 - val_loss: 0.0176
Epoch 474/700
3/3 [==============================] - ETA: 0s - loss: 3.1703e-04
Epoch 474: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 166ms/step - loss: 3.1703e-04 - val_loss: 0.0176
Epoch 475/700
3/3 [==============================] - ETA: 0s - loss: 2.7600e-04
Epoch 475: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 161ms/step - loss: 2.7600e-04 - val_loss: 0.0176
Epoch 476/700
3/3 [==============================] - ETA: 0s - loss: 3.7508e-04
Epoch 476: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 174ms/step - loss: 3.7508e-04 - val_loss: 0.0175
Epoch 477/700
3/3 [==============================] - ETA: 0s - loss: 3.3938e-04
Epoch 477: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 162ms/step - loss: 3.3938e-04 - val_loss: 0.0175
Epoch 478/700
3/3 [==============================] - ETA: 0s - loss: 3.4370e-04
Epoch 478: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 174ms/step - loss: 3.4370e-04 - val_loss: 0.0171
Epoch 479/700
3/3 [==============================] - ETA: 0s - loss: 3.3863e-04
Epoch 479: val_loss did not improve from 0.01659
3/3 [==============================] - 1s 169ms/step - loss: 3.3863e-04 - val_loss: 0.0176
Epoch 480/700
3/3 [==============================] - ETA: 0s - loss: 2.8291e-04
Epoch 480: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 160ms/step - loss: 2.8291e-04 - val_loss: 0.0175
Epoch 481/700
3/3 [==============================] - ETA: 0s - loss: 3.3954e-04
Epoch 481: val_loss did not improve from 0.01659
3/3 [==============================] - 0s 172ms/step - loss: 3.3954e-04 - val_loss: 0.0167
Epoch 482/700
3/3 [==============================] - ETA: 0s - loss: 3.3253e-04
Epoch 482: val_loss improved from 0.01659 to 0.01650, saving model to /content/weights.best.hdf5
3/3 [==============================] - 1s 178ms/step - loss: 3.3253e-04 - val_loss: 0.0165
Epoch 483/700
3/3 [==============================] - ETA: 0s - loss: 2.8264e-04
Epoch 483: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 2.8264e-04 - val_loss: 0.0166
Epoch 484/700
3/3 [==============================] - ETA: 0s - loss: 2.7657e-04
Epoch 484: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 2.7657e-04 - val_loss: 0.0168
Epoch 485/700
3/3 [==============================] - ETA: 0s - loss: 3.0147e-04
Epoch 485: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 174ms/step - loss: 3.0147e-04 - val_loss: 0.0171
Epoch 486/700
3/3 [==============================] - ETA: 0s - loss: 3.2807e-04
Epoch 486: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 172ms/step - loss: 3.2807e-04 - val_loss: 0.0172
Epoch 487/700
3/3 [==============================] - ETA: 0s - loss: 3.2305e-04
Epoch 487: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 182ms/step - loss: 3.2305e-04 - val_loss: 0.0169
Epoch 488/700
3/3 [==============================] - ETA: 0s - loss: 3.5873e-04
Epoch 488: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 3.5873e-04 - val_loss: 0.0170
Epoch 489/700
3/3 [==============================] - ETA: 0s - loss: 2.8173e-04
Epoch 489: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 171ms/step - loss: 2.8173e-04 - val_loss: 0.0173
Epoch 490/700
3/3 [==============================] - ETA: 0s - loss: 3.5222e-04
Epoch 490: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 3.5222e-04 - val_loss: 0.0171
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Epoch 491/700
3/3 [==============================] - ETA: 0s - loss: 2.6609e-04
Epoch 491: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.6609e-04 - val_loss: 0.0170
Epoch 492/700
3/3 [==============================] - ETA: 0s - loss: 2.6430e-04
Epoch 492: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.6430e-04 - val_loss: 0.0172
Epoch 493/700
3/3 [==============================] - ETA: 0s - loss: 3.3504e-04
Epoch 493: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 3.3504e-04 - val_loss: 0.0174
Epoch 494/700
3/3 [==============================] - ETA: 0s - loss: 3.5983e-04
Epoch 494: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 3.5983e-04 - val_loss: 0.0170
Epoch 495/700
3/3 [==============================] - ETA: 0s - loss: 3.2615e-04
Epoch 495: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 3.2615e-04 - val_loss: 0.0168
Epoch 496/700
3/3 [==============================] - ETA: 0s - loss: 4.0576e-04
Epoch 496: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 4.0576e-04 - val_loss: 0.0170
Epoch 497/700
3/3 [==============================] - ETA: 0s - loss: 3.2156e-04
Epoch 497: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 156ms/step - loss: 3.2156e-04 - val_loss: 0.0173
Epoch 498/700
3/3 [==============================] - ETA: 0s - loss: 3.4944e-04
Epoch 498: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 175ms/step - loss: 3.4944e-04 - val_loss: 0.0170
Epoch 499/700
3/3 [==============================] - ETA: 0s - loss: 3.3246e-04
Epoch 499: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 3.3246e-04 - val_loss: 0.0167
Epoch 500/700
3/3 [==============================] - ETA: 0s - loss: 3.0056e-04
Epoch 500: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 169ms/step - loss: 3.0056e-04 - val_loss: 0.0170
Epoch 501/700
3/3 [==============================] - ETA: 0s - loss: 2.8279e-04
Epoch 501: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 161ms/step - loss: 2.8279e-04 - val_loss: 0.0175
Epoch 502/700
3/3 [==============================] - ETA: 0s - loss: 3.3339e-04
Epoch 502: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 3.3339e-04 - val_loss: 0.0174
Epoch 503/700
3/3 [==============================] - ETA: 0s - loss: 3.1022e-04
Epoch 503: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 169ms/step - loss: 3.1022e-04 - val_loss: 0.0173
Epoch 504/700
3/3 [==============================] - ETA: 0s - loss: 2.6593e-04
Epoch 504: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 192ms/step - loss: 2.6593e-04 - val_loss: 0.0177
Epoch 505/700
3/3 [==============================] - ETA: 0s - loss: 3.7089e-04
Epoch 505: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 158ms/step - loss: 3.7089e-04 - val_loss: 0.0175
Epoch 506/700
3/3 [==============================] - ETA: 0s - loss: 3.2210e-04
Epoch 506: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 170ms/step - loss: 3.2210e-04 - val_loss: 0.0171
Epoch 507/700
3/3 [==============================] - ETA: 0s - loss: 2.9290e-04
Epoch 507: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 169ms/step - loss: 2.9290e-04 - val_loss: 0.0169
Epoch 508/700
3/3 [==============================] - ETA: 0s - loss: 3.1878e-04
Epoch 508: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 177ms/step - loss: 3.1878e-04 - val_loss: 0.0169
Epoch 509/700
3/3 [==============================] - ETA: 0s - loss: 3.1797e-04
Epoch 509: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 157ms/step - loss: 3.1797e-04 - val_loss: 0.0172
Epoch 510/700
3/3 [==============================] - ETA: 0s - loss: 2.7131e-04
Epoch 510: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 182ms/step - loss: 2.7131e-04 - val_loss: 0.0173
Epoch 511/700
3/3 [==============================] - ETA: 0s - loss: 3.4791e-04
Epoch 511: val_loss did not improve from 0.01650
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3/3 [==============================] - 0s 166ms/step - loss: 3.4791e-04 - val_loss: 0.0172
Epoch 512/700
3/3 [==============================] - ETA: 0s - loss: 3.6066e-04
Epoch 512: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 170ms/step - loss: 3.6066e-04 - val_loss: 0.0170
Epoch 513/700
3/3 [==============================] - ETA: 0s - loss: 3.2547e-04
Epoch 513: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 159ms/step - loss: 3.2547e-04 - val_loss: 0.0169
Epoch 514/700
3/3 [==============================] - ETA: 0s - loss: 2.8390e-04
Epoch 514: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 190ms/step - loss: 2.8390e-04 - val_loss: 0.0168
Epoch 515/700
3/3 [==============================] - ETA: 0s - loss: 2.6380e-04
Epoch 515: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 2.6380e-04 - val_loss: 0.0167
Epoch 516/700
3/3 [==============================] - ETA: 0s - loss: 3.0818e-04
Epoch 516: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 178ms/step - loss: 3.0818e-04 - val_loss: 0.0170
Epoch 517/700
3/3 [==============================] - ETA: 0s - loss: 3.0270e-04
Epoch 517: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 3.0270e-04 - val_loss: 0.0174
Epoch 518/700
3/3 [==============================] - ETA: 0s - loss: 2.9722e-04
Epoch 518: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 172ms/step - loss: 2.9722e-04 - val_loss: 0.0171
Epoch 519/700
3/3 [==============================] - ETA: 0s - loss: 3.0267e-04
Epoch 519: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 3.0267e-04 - val_loss: 0.0169
Epoch 520/700
3/3 [==============================] - ETA: 0s - loss: 2.9176e-04
Epoch 520: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 171ms/step - loss: 2.9176e-04 - val_loss: 0.0173
Epoch 521/700
3/3 [==============================] - ETA: 0s - loss: 2.8533e-04
Epoch 521: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 184ms/step - loss: 2.8533e-04 - val_loss: 0.0174
Epoch 522/700
3/3 [==============================] - ETA: 0s - loss: 2.5356e-04
Epoch 522: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 172ms/step - loss: 2.5356e-04 - val_loss: 0.0173
Epoch 523/700
3/3 [==============================] - ETA: 0s - loss: 2.8637e-04
Epoch 523: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 2.8637e-04 - val_loss: 0.0174
Epoch 524/700
3/3 [==============================] - ETA: 0s - loss: 3.0147e-04
Epoch 524: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 180ms/step - loss: 3.0147e-04 - val_loss: 0.0175
Epoch 525/700
3/3 [==============================] - ETA: 0s - loss: 3.1973e-04
Epoch 525: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 269ms/step - loss: 3.1973e-04 - val_loss: 0.0174
Epoch 526/700
3/3 [==============================] - ETA: 0s - loss: 3.1829e-04
Epoch 526: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 309ms/step - loss: 3.1829e-04 - val_loss: 0.0173
Epoch 527/700
3/3 [==============================] - ETA: 0s - loss: 3.0262e-04
Epoch 527: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 248ms/step - loss: 3.0262e-04 - val_loss: 0.0173
Epoch 528/700
3/3 [==============================] - ETA: 0s - loss: 2.5532e-04
Epoch 528: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 208ms/step - loss: 2.5532e-04 - val_loss: 0.0173
Epoch 529/700
3/3 [==============================] - ETA: 0s - loss: 2.7540e-04
Epoch 529: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 282ms/step - loss: 2.7540e-04 - val_loss: 0.0170
Epoch 530/700
3/3 [==============================] - ETA: 0s - loss: 3.2364e-04
Epoch 530: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 342ms/step - loss: 3.2364e-04 - val_loss: 0.0171
Epoch 531/700
3/3 [==============================] - ETA: 0s - loss: 2.7290e-04
Epoch 531: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 266ms/step - loss: 2.7290e-04 - val_loss: 0.0175
Epoch 532/700
3/3 [==============================] - ETA: 0s - loss: 2.7832e-04
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Epoch 532: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 177ms/step - loss: 2.7832e-04 - val_loss: 0.0174
Epoch 533/700
3/3 [==============================] - ETA: 0s - loss: 3.2036e-04
Epoch 533: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 3.2036e-04 - val_loss: 0.0172
Epoch 534/700
3/3 [==============================] - ETA: 0s - loss: 2.1954e-04
Epoch 534: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 182ms/step - loss: 2.1954e-04 - val_loss: 0.0173
Epoch 535/700
3/3 [==============================] - ETA: 0s - loss: 3.1347e-04
Epoch 535: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 3.1347e-04 - val_loss: 0.0171
Epoch 536/700
3/3 [==============================] - ETA: 0s - loss: 3.0829e-04
Epoch 536: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 173ms/step - loss: 3.0829e-04 - val_loss: 0.0172
Epoch 537/700
3/3 [==============================] - ETA: 0s - loss: 3.2608e-04
Epoch 537: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 3.2608e-04 - val_loss: 0.0172
Epoch 538/700
3/3 [==============================] - ETA: 0s - loss: 2.8147e-04
Epoch 538: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 194ms/step - loss: 2.8147e-04 - val_loss: 0.0168
Epoch 539/700
3/3 [==============================] - ETA: 0s - loss: 2.9660e-04
Epoch 539: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 178ms/step - loss: 2.9660e-04 - val_loss: 0.0169
Epoch 540/700
3/3 [==============================] - ETA: 0s - loss: 3.2522e-04
Epoch 540: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 170ms/step - loss: 3.2522e-04 - val_loss: 0.0171
Epoch 541/700
3/3 [==============================] - ETA: 0s - loss: 2.8970e-04
Epoch 541: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 157ms/step - loss: 2.8970e-04 - val_loss: 0.0170
Epoch 542/700
3/3 [==============================] - ETA: 0s - loss: 3.3473e-04
Epoch 542: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 165ms/step - loss: 3.3473e-04 - val_loss: 0.0172
Epoch 543/700
3/3 [==============================] - ETA: 0s - loss: 2.8054e-04
Epoch 543: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 2.8054e-04 - val_loss: 0.0175
Epoch 544/700
3/3 [==============================] - ETA: 0s - loss: 2.6121e-04
Epoch 544: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 171ms/step - loss: 2.6121e-04 - val_loss: 0.0173
Epoch 545/700
3/3 [==============================] - ETA: 0s - loss: 2.4051e-04
Epoch 545: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 2.4051e-04 - val_loss: 0.0172
Epoch 546/700
3/3 [==============================] - ETA: 0s - loss: 2.3864e-04
Epoch 546: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 177ms/step - loss: 2.3864e-04 - val_loss: 0.0173
Epoch 547/700
3/3 [==============================] - ETA: 0s - loss: 2.3815e-04
Epoch 547: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 158ms/step - loss: 2.3815e-04 - val_loss: 0.0174
Epoch 548/700
3/3 [==============================] - ETA: 0s - loss: 3.1634e-04
Epoch 548: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 3.1634e-04 - val_loss: 0.0172
Epoch 549/700
3/3 [==============================] - ETA: 0s - loss: 2.8287e-04
Epoch 549: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 2.8287e-04 - val_loss: 0.0170
Epoch 550/700
3/3 [==============================] - ETA: 0s - loss: 2.9350e-04
Epoch 550: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 170ms/step - loss: 2.9350e-04 - val_loss: 0.0171
Epoch 551/700
3/3 [==============================] - ETA: 0s - loss: 2.3761e-04
Epoch 551: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 171ms/step - loss: 2.3761e-04 - val_loss: 0.0173
Epoch 552/700
3/3 [==============================] - ETA: 0s - loss: 2.4480e-04
Epoch 552: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 162ms/step - loss: 2.4480e-04 - val_loss: 0.0172
Epoch 553/700
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3/3 [==============================] - ETA: 0s - loss: 2.5940e-04
Epoch 553: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 161ms/step - loss: 2.5940e-04 - val_loss: 0.0171
Epoch 554/700
3/3 [==============================] - ETA: 0s - loss: 2.8672e-04
Epoch 554: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 172ms/step - loss: 2.8672e-04 - val_loss: 0.0169
Epoch 555/700
3/3 [==============================] - ETA: 0s - loss: 2.8405e-04
Epoch 555: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.8405e-04 - val_loss: 0.0170
Epoch 556/700
3/3 [==============================] - ETA: 0s - loss: 2.8288e-04
Epoch 556: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 161ms/step - loss: 2.8288e-04 - val_loss: 0.0170
Epoch 557/700
3/3 [==============================] - ETA: 0s - loss: 2.6537e-04
Epoch 557: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 173ms/step - loss: 2.6537e-04 - val_loss: 0.0172
Epoch 558/700
3/3 [==============================] - ETA: 0s - loss: 2.4109e-04
Epoch 558: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 2.4109e-04 - val_loss: 0.0174
Epoch 559/700
3/3 [==============================] - ETA: 0s - loss: 2.3417e-04
Epoch 559: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 2.3417e-04 - val_loss: 0.0172
Epoch 560/700
3/3 [==============================] - ETA: 0s - loss: 2.8087e-04
Epoch 560: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 179ms/step - loss: 2.8087e-04 - val_loss: 0.0174
Epoch 561/700
3/3 [==============================] - ETA: 0s - loss: 2.5327e-04
Epoch 561: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 161ms/step - loss: 2.5327e-04 - val_loss: 0.0175
Epoch 562/700
3/3 [==============================] - ETA: 0s - loss: 3.0661e-04
Epoch 562: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 178ms/step - loss: 3.0661e-04 - val_loss: 0.0176
Epoch 563/700
3/3 [==============================] - ETA: 0s - loss: 2.7392e-04
Epoch 563: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 172ms/step - loss: 2.7392e-04 - val_loss: 0.0176
Epoch 564/700
3/3 [==============================] - ETA: 0s - loss: 2.4995e-04
Epoch 564: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 172ms/step - loss: 2.4995e-04 - val_loss: 0.0176
Epoch 565/700
3/3 [==============================] - ETA: 0s - loss: 2.6997e-04
Epoch 565: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 177ms/step - loss: 2.6997e-04 - val_loss: 0.0175
Epoch 566/700
3/3 [==============================] - ETA: 0s - loss: 2.9851e-04
Epoch 566: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 333ms/step - loss: 2.9851e-04 - val_loss: 0.0172
Epoch 567/700
3/3 [==============================] - ETA: 0s - loss: 3.2114e-04
Epoch 567: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 398ms/step - loss: 3.2114e-04 - val_loss: 0.0174
Epoch 568/700
3/3 [==============================] - ETA: 0s - loss: 2.2684e-04
Epoch 568: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 345ms/step - loss: 2.2684e-04 - val_loss: 0.0176
Epoch 569/700
3/3 [==============================] - ETA: 0s - loss: 2.5143e-04
Epoch 569: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 414ms/step - loss: 2.5143e-04 - val_loss: 0.0174
Epoch 570/700
3/3 [==============================] - ETA: 0s - loss: 2.9899e-04
Epoch 570: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 374ms/step - loss: 2.9899e-04 - val_loss: 0.0175
Epoch 571/700
3/3 [==============================] - ETA: 0s - loss: 2.2097e-04
Epoch 571: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 196ms/step - loss: 2.2097e-04 - val_loss: 0.0176
Epoch 572/700
3/3 [==============================] - ETA: 0s - loss: 2.3737e-04
Epoch 572: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 352ms/step - loss: 2.3737e-04 - val_loss: 0.0174
Epoch 573/700
3/3 [==============================] - ETA: 0s - loss: 2.9484e-04
Epoch 573: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 264ms/step - loss: 2.9484e-04 - val_loss: 0.0177
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Epoch 574/700
3/3 [==============================] - ETA: 0s - loss: 2.6888e-04
Epoch 574: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 310ms/step - loss: 2.6888e-04 - val_loss: 0.0176
Epoch 575/700
3/3 [==============================] - ETA: 0s - loss: 2.8340e-04
Epoch 575: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 208ms/step - loss: 2.8340e-04 - val_loss: 0.0173
Epoch 576/700
3/3 [==============================] - ETA: 0s - loss: 2.4112e-04
Epoch 576: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 309ms/step - loss: 2.4112e-04 - val_loss: 0.0172
Epoch 577/700
3/3 [==============================] - ETA: 0s - loss: 2.1884e-04
Epoch 577: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 323ms/step - loss: 2.1884e-04 - val_loss: 0.0173
Epoch 578/700
3/3 [==============================] - ETA: 0s - loss: 2.4279e-04
Epoch 578: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 172ms/step - loss: 2.4279e-04 - val_loss: 0.0172
Epoch 579/700
3/3 [==============================] - ETA: 0s - loss: 2.8503e-04
Epoch 579: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 268ms/step - loss: 2.8503e-04 - val_loss: 0.0173
Epoch 580/700
3/3 [==============================] - ETA: 0s - loss: 1.9882e-04
Epoch 580: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 249ms/step - loss: 1.9882e-04 - val_loss: 0.0175
Epoch 581/700
3/3 [==============================] - ETA: 0s - loss: 3.1912e-04
Epoch 581: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 309ms/step - loss: 3.1912e-04 - val_loss: 0.0175
Epoch 582/700
3/3 [==============================] - ETA: 0s - loss: 2.7725e-04
Epoch 582: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 206ms/step - loss: 2.7725e-04 - val_loss: 0.0171
Epoch 583/700
3/3 [==============================] - ETA: 0s - loss: 3.0991e-04
Epoch 583: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 339ms/step - loss: 3.0991e-04 - val_loss: 0.0170
Epoch 584/700
3/3 [==============================] - ETA: 0s - loss: 2.4543e-04
Epoch 584: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 229ms/step - loss: 2.4543e-04 - val_loss: 0.0172
Epoch 585/700
3/3 [==============================] - ETA: 0s - loss: 2.7464e-04
Epoch 585: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 162ms/step - loss: 2.7464e-04 - val_loss: 0.0170
Epoch 586/700
3/3 [==============================] - ETA: 0s - loss: 2.4268e-04
Epoch 586: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 172ms/step - loss: 2.4268e-04 - val_loss: 0.0167
Epoch 587/700
3/3 [==============================] - ETA: 0s - loss: 3.0800e-04
Epoch 587: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 171ms/step - loss: 3.0800e-04 - val_loss: 0.0169
Epoch 588/700
3/3 [==============================] - ETA: 0s - loss: 2.8376e-04
Epoch 588: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 2.8376e-04 - val_loss: 0.0172
Epoch 589/700
3/3 [==============================] - ETA: 0s - loss: 2.3463e-04
Epoch 589: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 173ms/step - loss: 2.3463e-04 - val_loss: 0.0173
Epoch 590/700
3/3 [==============================] - ETA: 0s - loss: 2.5074e-04
Epoch 590: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 186ms/step - loss: 2.5074e-04 - val_loss: 0.0173
Epoch 591/700
3/3 [==============================] - ETA: 0s - loss: 2.6678e-04
Epoch 591: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 271ms/step - loss: 2.6678e-04 - val_loss: 0.0173
Epoch 592/700
3/3 [==============================] - ETA: 0s - loss: 2.7816e-04
Epoch 592: val_loss did not improve from 0.01650
3/3 [==============================] - 2s 584ms/step - loss: 2.7816e-04 - val_loss: 0.0170
Epoch 593/700
3/3 [==============================] - ETA: 0s - loss: 2.9978e-04
Epoch 593: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 516ms/step - loss: 2.9978e-04 - val_loss: 0.0172
Epoch 594/700
3/3 [==============================] - ETA: 0s - loss: 2.3138e-04
Epoch 594: val_loss did not improve from 0.01650
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3/3 [==============================] - 1s 346ms/step - loss: 2.3138e-04 - val_loss: 0.0177
Epoch 595/700
3/3 [==============================] - ETA: 0s - loss: 3.1090e-04
Epoch 595: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 173ms/step - loss: 3.1090e-04 - val_loss: 0.0177
Epoch 596/700
3/3 [==============================] - ETA: 0s - loss: 2.4670e-04
Epoch 596: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 172ms/step - loss: 2.4670e-04 - val_loss: 0.0173
Epoch 597/700
3/3 [==============================] - ETA: 0s - loss: 2.2412e-04
Epoch 597: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 170ms/step - loss: 2.2412e-04 - val_loss: 0.0175
Epoch 598/700
3/3 [==============================] - ETA: 0s - loss: 2.4117e-04
Epoch 598: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 176ms/step - loss: 2.4117e-04 - val_loss: 0.0176
Epoch 599/700
3/3 [==============================] - ETA: 0s - loss: 2.7551e-04
Epoch 599: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 180ms/step - loss: 2.7551e-04 - val_loss: 0.0172
Epoch 600/700
3/3 [==============================] - ETA: 0s - loss: 2.6972e-04
Epoch 600: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 177ms/step - loss: 2.6972e-04 - val_loss: 0.0173
Epoch 601/700
3/3 [==============================] - ETA: 0s - loss: 2.6154e-04
Epoch 601: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 175ms/step - loss: 2.6154e-04 - val_loss: 0.0178
Epoch 602/700
3/3 [==============================] - ETA: 0s - loss: 2.6493e-04
Epoch 602: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 170ms/step - loss: 2.6493e-04 - val_loss: 0.0176
Epoch 603/700
3/3 [==============================] - ETA: 0s - loss: 2.1710e-04
Epoch 603: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 2.1710e-04 - val_loss: 0.0171
Epoch 604/700
3/3 [==============================] - ETA: 0s - loss: 2.6014e-04
Epoch 604: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 181ms/step - loss: 2.6014e-04 - val_loss: 0.0170
Epoch 605/700
3/3 [==============================] - ETA: 0s - loss: 2.6379e-04
Epoch 605: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 172ms/step - loss: 2.6379e-04 - val_loss: 0.0172
Epoch 606/700
3/3 [==============================] - ETA: 0s - loss: 2.6193e-04
Epoch 606: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 176ms/step - loss: 2.6193e-04 - val_loss: 0.0172
Epoch 607/700
3/3 [==============================] - ETA: 0s - loss: 2.4828e-04
Epoch 607: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 183ms/step - loss: 2.4828e-04 - val_loss: 0.0171
Epoch 608/700
3/3 [==============================] - ETA: 0s - loss: 2.8493e-04
Epoch 608: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 2.8493e-04 - val_loss: 0.0174
Epoch 609/700
3/3 [==============================] - ETA: 0s - loss: 2.1758e-04
Epoch 609: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 2.1758e-04 - val_loss: 0.0178
Epoch 610/700
3/3 [==============================] - ETA: 0s - loss: 3.0845e-04
Epoch 610: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 3.0845e-04 - val_loss: 0.0172
Epoch 611/700
3/3 [==============================] - ETA: 0s - loss: 2.9043e-04
Epoch 611: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 189ms/step - loss: 2.9043e-04 - val_loss: 0.0171
Epoch 612/700
3/3 [==============================] - ETA: 0s - loss: 2.0414e-04
Epoch 612: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 2.0414e-04 - val_loss: 0.0175
Epoch 613/700
3/3 [==============================] - ETA: 0s - loss: 2.8115e-04
Epoch 613: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 171ms/step - loss: 2.8115e-04 - val_loss: 0.0175
Epoch 614/700
3/3 [==============================] - ETA: 0s - loss: 2.6477e-04
Epoch 614: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 2.6477e-04 - val_loss: 0.0169
Epoch 615/700
3/3 [==============================] - ETA: 0s - loss: 2.9431e-04
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Epoch 615: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 175ms/step - loss: 2.9431e-04 - val_loss: 0.0170
Epoch 616/700
3/3 [==============================] - ETA: 0s - loss: 2.6980e-04
Epoch 616: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 177ms/step - loss: 2.6980e-04 - val_loss: 0.0174
Epoch 617/700
3/3 [==============================] - ETA: 0s - loss: 2.9803e-04
Epoch 617: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 169ms/step - loss: 2.9803e-04 - val_loss: 0.0170
Epoch 618/700
3/3 [==============================] - ETA: 0s - loss: 2.3829e-04
Epoch 618: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 162ms/step - loss: 2.3829e-04 - val_loss: 0.0168
Epoch 619/700
3/3 [==============================] - ETA: 0s - loss: 2.5646e-04
Epoch 619: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 2.5646e-04 - val_loss: 0.0173
Epoch 620/700
3/3 [==============================] - ETA: 0s - loss: 2.1452e-04
Epoch 620: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 159ms/step - loss: 2.1452e-04 - val_loss: 0.0177
Epoch 621/700
3/3 [==============================] - ETA: 0s - loss: 2.4391e-04
Epoch 621: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.4391e-04 - val_loss: 0.0177
Epoch 622/700
3/3 [==============================] - ETA: 0s - loss: 2.3013e-04
Epoch 622: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 190ms/step - loss: 2.3013e-04 - val_loss: 0.0175
Epoch 623/700
3/3 [==============================] - ETA: 0s - loss: 2.4752e-04
Epoch 623: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 302ms/step - loss: 2.4752e-04 - val_loss: 0.0176
Epoch 624/700
3/3 [==============================] - ETA: 0s - loss: 2.4721e-04
Epoch 624: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 248ms/step - loss: 2.4721e-04 - val_loss: 0.0176
Epoch 625/700
3/3 [==============================] - ETA: 0s - loss: 2.5075e-04
Epoch 625: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 301ms/step - loss: 2.5075e-04 - val_loss: 0.0172
Epoch 626/700
3/3 [==============================] - ETA: 0s - loss: 2.2337e-04
Epoch 626: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 329ms/step - loss: 2.2337e-04 - val_loss: 0.0171
Epoch 627/700
3/3 [==============================] - ETA: 0s - loss: 2.2936e-04
Epoch 627: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 319ms/step - loss: 2.2936e-04 - val_loss: 0.0171
Epoch 628/700
3/3 [==============================] - ETA: 0s - loss: 2.4427e-04
Epoch 628: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 169ms/step - loss: 2.4427e-04 - val_loss: 0.0172
Epoch 629/700
3/3 [==============================] - ETA: 0s - loss: 2.4637e-04
Epoch 629: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 159ms/step - loss: 2.4637e-04 - val_loss: 0.0171
Epoch 630/700
3/3 [==============================] - ETA: 0s - loss: 2.4348e-04
Epoch 630: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 178ms/step - loss: 2.4348e-04 - val_loss: 0.0168
Epoch 631/700
3/3 [==============================] - ETA: 0s - loss: 2.8303e-04
Epoch 631: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 184ms/step - loss: 2.8303e-04 - val_loss: 0.0168
Epoch 632/700
3/3 [==============================] - ETA: 0s - loss: 2.1725e-04
Epoch 632: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 182ms/step - loss: 2.1725e-04 - val_loss: 0.0170
Epoch 633/700
3/3 [==============================] - ETA: 0s - loss: 2.7925e-04
Epoch 633: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 2.7925e-04 - val_loss: 0.0169
Epoch 634/700
3/3 [==============================] - ETA: 0s - loss: 2.1616e-04
Epoch 634: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 173ms/step - loss: 2.1616e-04 - val_loss: 0.0169
Epoch 635/700
3/3 [==============================] - ETA: 0s - loss: 1.9849e-04
Epoch 635: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 1.9849e-04 - val_loss: 0.0172
Epoch 636/700
```

```
3/3 [==============================] - ETA: 0s - loss: 1.8759e-04
Epoch 636: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 169ms/step - loss: 1.8759e-04 - val_loss: 0.0173
Epoch 637/700
3/3 [==============================] - ETA: 0s - loss: 1.8843e-04
Epoch 637: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 1.8843e-04 - val_loss: 0.0171
Epoch 638/700
3/3 [==============================] - ETA: 0s - loss: 2.2064e-04
Epoch 638: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 182ms/step - loss: 2.2064e-04 - val_loss: 0.0170
Epoch 639/700
3/3 [==============================] - ETA: 0s - loss: 1.9502e-04
Epoch 639: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 1.9502e-04 - val_loss: 0.0171
Epoch 640/700
3/3 [==============================] - ETA: 0s - loss: 2.6629e-04
Epoch 640: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 199ms/step - loss: 2.6629e-04 - val_loss: 0.0171
Epoch 641/700
3/3 [==============================] - ETA: 0s - loss: 2.2700e-04
Epoch 641: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 2.2700e-04 - val_loss: 0.0170
Epoch 642/700
3/3 [==============================] - ETA: 0s - loss: 1.8602e-04
Epoch 642: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 320ms/step - loss: 1.8602e-04 - val_loss: 0.0171
Epoch 643/700
3/3 [==============================] - ETA: 0s - loss: 2.0809e-04
Epoch 643: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 373ms/step - loss: 2.0809e-04 - val_loss: 0.0173
Epoch 644/700
3/3 [==============================] - ETA: 0s - loss: 2.4370e-04
Epoch 644: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 369ms/step - loss: 2.4370e-04 - val_loss: 0.0172
Epoch 645/700
3/3 [==============================] - ETA: 0s - loss: 2.5684e-04
Epoch 645: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 301ms/step - loss: 2.5684e-04 - val_loss: 0.0172
Epoch 646/700
3/3 [==============================] - ETA: 0s - loss: 2.1032e-04
Epoch 646: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 169ms/step - loss: 2.1032e-04 - val_loss: 0.0172
Epoch 647/700
3/3 [==============================] - ETA: 0s - loss: 2.3742e-04
Epoch 647: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 162ms/step - loss: 2.3742e-04 - val_loss: 0.0172
Epoch 648/700
3/3 [==============================] - ETA: 0s - loss: 2.3520e-04
Epoch 648: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 169ms/step - loss: 2.3520e-04 - val_loss: 0.0172
Epoch 649/700
3/3 [==============================] - ETA: 0s - loss: 2.4149e-04
Epoch 649: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 163ms/step - loss: 2.4149e-04 - val_loss: 0.0169
Epoch 650/700
3/3 [==============================] - ETA: 0s - loss: 2.5588e-04
Epoch 650: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 306ms/step - loss: 2.5588e-04 - val_loss: 0.0169
Epoch 651/700
3/3 [==============================] - ETA: 0s - loss: 3.1610e-04
Epoch 651: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 316ms/step - loss: 3.1610e-04 - val_loss: 0.0172
Epoch 652/700
3/3 [==============================] - ETA: 0s - loss: 2.2649e-04
Epoch 652: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 473ms/step - loss: 2.2649e-04 - val_loss: 0.0171
Epoch 653/700
3/3 [==============================] - ETA: 0s - loss: 2.1119e-04
Epoch 653: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 170ms/step - loss: 2.1119e-04 - val_loss: 0.0170
Epoch 654/700
3/3 [==============================] - ETA: 0s - loss: 2.5123e-04
Epoch 654: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 166ms/step - loss: 2.5123e-04 - val_loss: 0.0171
Epoch 655/700
3/3 [==============================] - ETA: 0s - loss: 2.1663e-04
Epoch 655: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 179ms/step - loss: 2.1663e-04 - val_loss: 0.0173
Epoch 656/700
3/3 [==============================] - ETA: 0s - loss: 1.8931e-04
Epoch 656: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 174ms/step - loss: 1.8931e-04 - val_loss: 0.0174
```

```
Epoch 657/700
3/3 [==============================] - ETA: 0s - loss: 2.5171e-04
Epoch 657: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 180ms/step - loss: 2.5171e-04 - val_loss: 0.0173
Epoch 658/700
3/3 [==============================] - ETA: 0s - loss: 2.2678e-04
Epoch 658: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 2.2678e-04 - val_loss: 0.0170
Epoch 659/700
3/3 [==============================] - ETA: 0s - loss: 2.7213e-04
Epoch 659: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.7213e-04 - val_loss: 0.0169
Epoch 660/700
3/3 [==============================] - ETA: 0s - loss: 2.3799e-04
Epoch 660: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 169ms/step - loss: 2.3799e-04 - val_loss: 0.0171
Epoch 661/700
3/3 [==============================] - ETA: 0s - loss: 2.3552e-04
Epoch 661: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 186ms/step - loss: 2.3552e-04 - val_loss: 0.0169
Epoch 662/700
3/3 [==============================] - ETA: 0s - loss: 2.6082e-04
Epoch 662: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 164ms/step - loss: 2.6082e-04 - val_loss: 0.0169
Epoch 663/700
3/3 [==============================] - ETA: 0s - loss: 2.3919e-04
Epoch 663: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 177ms/step - loss: 2.3919e-04 - val_loss: 0.0170
Epoch 664/700
3/3 [==============================] - ETA: 0s - loss: 1.5838e-04
Epoch 664: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 1.5838e-04 - val_loss: 0.0169
Epoch 665/700
3/3 [==============================] - ETA: 0s - loss: 2.2078e-04
Epoch 665: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 173ms/step - loss: 2.2078e-04 - val_loss: 0.0170
Epoch 666/700
3/3 [==============================] - ETA: 0s - loss: 1.6965e-04
Epoch 666: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 175ms/step - loss: 1.6965e-04 - val_loss: 0.0170
Epoch 667/700
3/3 [==============================] - ETA: 0s - loss: 2.1603e-04
Epoch 667: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.1603e-04 - val_loss: 0.0173
Epoch 668/700
3/3 [==============================] - ETA: 0s - loss: 2.7470e-04
Epoch 668: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 160ms/step - loss: 2.7470e-04 - val_loss: 0.0172
Epoch 669/700
3/3 [==============================] - ETA: 0s - loss: 2.6032e-04
Epoch 669: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 166ms/step - loss: 2.6032e-04 - val_loss: 0.0170
Epoch 670/700
3/3 [==============================] - ETA: 0s - loss: 2.2574e-04
Epoch 670: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 162ms/step - loss: 2.2574e-04 - val_loss: 0.0172
Epoch 671/700
3/3 [==============================] - ETA: 0s - loss: 2.3011e-04
Epoch 671: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 161ms/step - loss: 2.3011e-04 - val_loss: 0.0174
Epoch 672/700
3/3 [==============================] - ETA: 0s - loss: 2.7825e-04
Epoch 672: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 175ms/step - loss: 2.7825e-04 - val_loss: 0.0169
Epoch 673/700
3/3 [==============================] - ETA: 0s - loss: 1.9462e-04
Epoch 673: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 1.9462e-04 - val_loss: 0.0169
Epoch 674/700
3/3 [==============================] - ETA: 0s - loss: 2.5548e-04
Epoch 674: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 176ms/step - loss: 2.5548e-04 - val_loss: 0.0171
Epoch 675/700
3/3 [==============================] - ETA: 0s - loss: 2.2661e-04
Epoch 675: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.2661e-04 - val_loss: 0.0171
Epoch 676/700
3/3 [==============================] - ETA: 0s - loss: 2.1495e-04
Epoch 676: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 167ms/step - loss: 2.1495e-04 - val_loss: 0.0169
Epoch 677/700
3/3 [==============================] - ETA: 0s - loss: 2.2479e-04
Epoch 677: val_loss did not improve from 0.01650
```

```
3/3 [==============================] - 1s 178ms/step - loss: 2.2479e-04 - val_loss: 0.0167
Epoch 678/700
3/3 [==============================] - ETA: 0s - loss: 2.3396e-04
Epoch 678: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 177ms/step - loss: 2.3396e-04 - val_loss: 0.0167
Epoch 679/700
3/3 [==============================] - ETA: 0s - loss: 2.0415e-04
Epoch 679: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 170ms/step - loss: 2.0415e-04 - val_loss: 0.0167
Epoch 680/700
3/3 [==============================] - ETA: 0s - loss: 2.3349e-04
Epoch 680: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 162ms/step - loss: 2.3349e-04 - val_loss: 0.0167
Epoch 681/700
3/3 [==============================] - ETA: 0s - loss: 2.2290e-04
Epoch 681: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 2.2290e-04 - val_loss: 0.0166
Epoch 682/700
3/3 [==============================] - ETA: 0s - loss: 2.2143e-04
Epoch 682: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 170ms/step - loss: 2.2143e-04 - val_loss: 0.0167
Epoch 683/700
3/3 [==============================] - ETA: 0s - loss: 2.5317e-04
Epoch 683: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.5317e-04 - val_loss: 0.0170
Epoch 684/700
3/3 [==============================] - ETA: 0s - loss: 2.4869e-04
Epoch 684: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 182ms/step - loss: 2.4869e-04 - val_loss: 0.0172
Epoch 685/700
3/3 [==============================] - ETA: 0s - loss: 2.2678e-04
Epoch 685: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 162ms/step - loss: 2.2678e-04 - val_loss: 0.0173
Epoch 686/700
3/3 [==============================] - ETA: 0s - loss: 2.1302e-04
Epoch 686: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 172ms/step - loss: 2.1302e-04 - val_loss: 0.0170
Epoch 687/700
3/3 [==============================] - ETA: 0s - loss: 2.0873e-04
Epoch 687: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.0873e-04 - val_loss: 0.0169
Epoch 688/700
3/3 [==============================] - ETA: 0s - loss: 2.1667e-04
Epoch 688: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 173ms/step - loss: 2.1667e-04 - val_loss: 0.0172
Epoch 689/700
3/3 [==============================] - ETA: 0s - loss: 2.2148e-04
Epoch 689: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 165ms/step - loss: 2.2148e-04 - val_loss: 0.0173
Epoch 690/700
3/3 [==============================] - ETA: 0s - loss: 2.1154e-04
Epoch 690: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 173ms/step - loss: 2.1154e-04 - val_loss: 0.0170
Epoch 691/700
3/3 [==============================] - ETA: 0s - loss: 2.0169e-04
Epoch 691: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 178ms/step - loss: 2.0169e-04 - val_loss: 0.0169
Epoch 692/700
3/3 [==============================] - ETA: 0s - loss: 2.1063e-04
Epoch 692: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 184ms/step - loss: 2.1063e-04 - val_loss: 0.0173
Epoch 693/700
3/3 [==============================] - ETA: 0s - loss: 2.1357e-04
Epoch 693: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 167ms/step - loss: 2.1357e-04 - val_loss: 0.0172
Epoch 694/700
3/3 [==============================] - ETA: 0s - loss: 2.9004e-04
Epoch 694: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 170ms/step - loss: 2.9004e-04 - val_loss: 0.0169
Epoch 695/700
3/3 [==============================] - ETA: 0s - loss: 2.3985e-04
Epoch 695: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 180ms/step - loss: 2.3985e-04 - val_loss: 0.0168
Epoch 696/700
3/3 [==============================] - ETA: 0s - loss: 1.7920e-04
Epoch 696: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 178ms/step - loss: 1.7920e-04 - val_loss: 0.0168
Epoch 697/700
3/3 [==============================] - ETA: 0s - loss: 2.1255e-04
Epoch 697: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 2.1255e-04 - val_loss: 0.0167
Epoch 698/700
3/3 [==============================] - ETA: 0s - loss: 1.9240e-04
```

```
Epoch 698: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 179ms/step - loss: 1.9240e-04 - val_loss: 0.0167
Epoch 699/700
3/3 [==============================] - ETA: 0s - loss: 2.5806e-04
Epoch 699: val_loss did not improve from 0.01650
3/3 [==============================] - 0s 168ms/step - loss: 2.5806e-04 - val_loss: 0.0170
Epoch 700/700
3/3 [==============================] - ETA: 0s - loss: 2.0731e-04
Epoch 700: val_loss did not improve from 0.01650
3/3 [==============================] - 1s 170ms/step - loss: 2.0731e-04 - val_loss: 0.0173
Created model and loaded weights from file
```

In [325]:

```
results.loc[index,['Architecture','Dropout and pooling','kernel size','Loss Fn', 'LR']] = ['RNN (+ layer)',0.05,'
-', 'Mean-Squared-Error',0.0001]
```

Train & Validation (MSE):

In [326]:

```
train_val_evaluation(model,results,index)
```

```
Train MSE: 0.00012031765800202265
Validation MSE: 0.016495974734425545
```

Prediction:

In [332]:

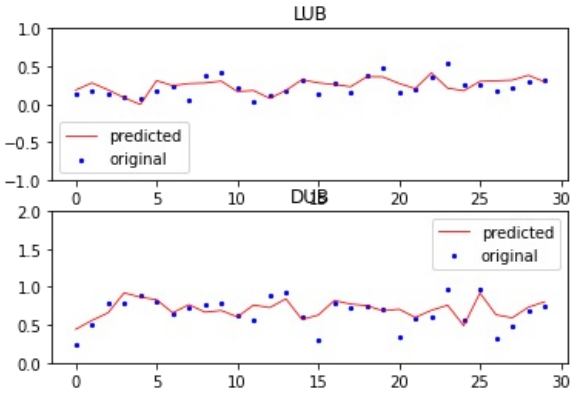
```
y_pred = model.predict(x_test)
print(y_pred)
```

```
1/1 [==============================] - 0s 33ms/step
[[ 0.18801157  0.44042808]
 [ 0.28302908  0.5570276 ]
 [ 0.19176279  0.65696484]
 [ 0.08727171  0.9208747 ]
 [-0.00128169  0.8628109 ]
 [ 0.312382    0.83072466]
 [ 0.24665551  0.65803343]
 [ 0.2745855   0.7649383 ]
 [ 0.2810346   0.6664679 ]
 [ 0.30612522  0.6882643 ]
 [ 0.1693331   0.60395473]
 [ 0.18239643  0.75956386]
 [ 0.0792798   0.7258454 ]
 [ 0.18389995  0.84145   ]
 [ 0.32518804  0.56933373]
 [ 0.28283116  0.6273504 ]
 [ 0.26285353  0.8199408 ]
 [ 0.23243277  0.77256745]
 [ 0.3627173   0.7525556 ]
 [ 0.36075154  0.6836243 ]
 [ 0.2754004   0.704833  ]
 [ 0.20780736  0.59637433]
 [ 0.41555905  0.6902359 ]
 [ 0.21333086  0.7578204 ]
 [ 0.180266    0.48814648]
 [ 0.30254313  0.9184186 ]
 [ 0.3110457   0.63086194]
 [ 0.3187878   0.592292  ]
 [ 0.3826828   0.73173875]
 [ 0.29658782  0.8023546 ]]
```

Plotting the predicted locations of LUB and DUB VS their original locations:

In [328]:

```
plot_LUB_DUB(y_test, y_pred)
```



Evaluation Metrics

Mean Squared Error (MSE), Root Mean Squared Error (RMSE), and Mean Absolute Error (MAE):

In [329]:

```
test_evaluation(model, y_pred,results,index)
```

```
Test MSE: 0.0157378688454628
Test RMSE: 0.1243947387591858
Test MAE: 0.09312031897182987
```

COMMENTS

> Overfitting was **highly** observed.

In [330]:

```
index = index +1
results
```

Out[330]:

	Architecture	LR	Dropout and pooling	kernel size	Loss Fn	Train MSE	Validation MSE	Test MSE	Test RMSE	Test MAE
0	CNN 2D	0.0001	No Dropout Layers, 1 max-pooling layer	1	Mean-Squared-Error	0.021081	0.018341	0.019292	0.138705	0.106015
1	CNN 2D	0.0001	No Dropout Layers, 3 max-pooling layers	2	Mean-Squared-Error	0.006356	0.022953	0.027629	0.152963	0.123263
2	ANN	0.001	1 Dropout	-	Mean-Squared-Error	0.020477	0.018905	0.018616	0.136401	0.106594
3	ANN	0.001	3 Dropout	-	Mean-Squared-Error	0.02091	0.019591	0.018672	0.136528	0.108438
4	RNN	0.0001	0.05	-	Mean-Squared-Error	0.000087	0.018935	0.020014	0.139957	0.10637
5	RNN (+ layer)	0.0001	0.05	-	Mean-Squared-Error	0.00012	0.016496	0.015738	0.124395	0.09312

COMMENTS

> We implemented multiple models and changed a lot in them and in all of our time-consuming trials, we didn't reach an MSE lower than the ones we added in our notebook and tabulated above.
>
> We believe that there might be a chance to get lower MSE but we couldn't reach it or maybe the fault was the regression approach, if we changed it into a classification problem where the labels were `[S1==1, S2==1]` for every location as their index, maybe as an accuracy metric it would be better, but we didn't have time to try it therefore we are not certain.