

BTC-RNN-Deep-Learning

September 29, 2021

1 Recurrent Neural Network - LSTM - BTC

1.0.1 Importing Libraries

```
[1]: import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from sklearn.preprocessing import MinMaxScaler
plt.style.use("ggplot")

from keras.models import Sequential
from keras.layers import LSTM, Dense, Dropout
```

Using TensorFlow backend.

1.0.2 Loading the Data

```
[19]: df = pd.read_csv("BTC-USD.csv")
```

1.1 Preprocessing Data

```
[20]: # Setting the datetime index as the date, only selecting the 'Close' column,
      ↪ then only the last 1000 closing prices.
df = df.set_index("Date")[['Close']].tail(1000)
df = df.set_index(pd.to_datetime(df.index))

# Normalizing/Scaling the Data
scaler = MinMaxScaler()
df = pd.DataFrame(scaler.fit_transform(df), columns=df.columns, index=df.index)
```

```
[21]: # Checking the newly formatted DataFrame
df.head()
```

```
[21]:          Close
Date
2017-03-08  0.011448
2017-03-09  0.013522
```

```
2017-03-10  0.009655
2017-03-11  0.012840
2017-03-12  0.015294
```

```
[22]: # Plotting the Closing Prices
df.plot(figsize=(14,8))
plt.title("BTC Closing Prices")
plt.ylabel("Price (Normalized)")
plt.show()
```



1.1.1 Functions to prepare the data for LSTM

```
[23]: def split_sequence(seq, n_steps_in, n_steps_out):
      """
      Splits the univariate time sequence
      """
      X, y = [], []

      for i in range(len(seq)):
          end = i + n_steps_in
          out_end = end + n_steps_out

          if out_end > len(seq):
              break
```

```

    seq_x, seq_y = seq[i:end], seq[end:out_end]

    X.append(seq_x)
    y.append(seq_y)

    return np.array(X), np.array(y)

```

```

[24]: def visualize_training_results(results):
    """
    Plots the loss and accuracy for the training and testing data
    """
    history = results.history
    plt.figure(figsize=(12,4))
    plt.plot(history['val_loss'])
    plt.plot(history['loss'])
    plt.legend(['val_loss', 'loss'])
    plt.title('Loss')
    plt.xlabel('Epochs')
    plt.ylabel('Loss')
    plt.show()

    plt.figure(figsize=(12,4))
    plt.plot(history['val_accuracy'])
    plt.plot(history['accuracy'])
    plt.legend(['val_accuracy', 'accuracy'])
    plt.title('Accuracy')
    plt.xlabel('Epochs')
    plt.ylabel('Accuracy')
    plt.show()

```

```

[25]: def layer_maker(n_layers, n_nodes, activation, drop=None, d_rate=.5):
    """
    Creates a specified number of hidden layers for an RNN
    Optional: Adds regularization option - the dropout layer to prevent
    ↪ potential overfitting (if necessary)
    """

    # Creating the specified number of hidden layers with the specified number
    ↪ of nodes
    for x in range(1,n_layers+1):
        model.add(LSTM(n_nodes, activation=activation, return_sequences=True))

        # Adds a Dropout layer after every Nth hidden layer (the 'drop'
        ↪ variable)
        try:
            if x % drop == 0:
                model.add(Dropout(d_rate))

```

```
except:
    pass
```

1.1.2 Splitting the Data

```
[26]: # How many periods looking back to learn
n_per_in = 30

# How many periods to predict
n_per_out = 10

# Features (in this case it's 1 because there is only one feature: price)
n_features = 1

# Splitting the data into appropriate sequences
X, y = split_sequence(list(df.Close), n_per_in, n_per_out)

# Reshaping the X variable from 2D to 3D
X = X.reshape((X.shape[0], X.shape[1], n_features))
```

1.2 Modeling - LSTM (RNN)

1.2.1 Creating the Neural Network

```
[62]: # Instatiating the model
model = Sequential()

# Activation
activ = "softsign"

# Input layer
model.add(LSTM(30, activation=activ, return_sequences=True,
    ↪input_shape=(n_per_in, n_features)))

# Hidden layers
layer_maker(n_layers=6, n_nodes=12, activation=activ)

# Final Hidden layer
model.add(LSTM(10, activation=activ))

# Output layer
model.add(Dense(n_per_out))

# Model summary
model.summary()
```

Model: "sequential_13"

Layer (type)	Output Shape	Param #
lstm_68 (LSTM)	(None, 30, 30)	3840
lstm_69 (LSTM)	(None, 30, 12)	2064
lstm_70 (LSTM)	(None, 30, 12)	1200
lstm_71 (LSTM)	(None, 30, 12)	1200
lstm_72 (LSTM)	(None, 30, 12)	1200
lstm_73 (LSTM)	(None, 30, 12)	1200
lstm_74 (LSTM)	(None, 30, 12)	1200
lstm_75 (LSTM)	(None, 10)	920
dense_13 (Dense)	(None, 10)	110
Total params: 12,934		
Trainable params: 12,934		
Non-trainable params: 0		

```
[63]: # Compiling the data with selected specifications
model.compile(optimizer='adam', loss='mse', metrics=['accuracy'])
```

1.2.2 Fitting and Training the RNN

```
[64]: res = model.fit(X, y, epochs=800, batch_size=32, validation_split=0.1)
```

```
Train on 864 samples, validate on 97 samples
Epoch 1/800
864/864 [=====] - 6s 7ms/step - loss: 0.0907 -
accuracy: 0.0671 - val_loss: 0.0835 - val_accuracy: 0.0515
Epoch 2/800
864/864 [=====] - 3s 4ms/step - loss: 0.0474 -
accuracy: 0.0660 - val_loss: 0.0283 - val_accuracy: 0.0515
Epoch 3/800
864/864 [=====] - 2s 3ms/step - loss: 0.0353 -
accuracy: 0.0764 - val_loss: 0.0188 - val_accuracy: 0.0722
Epoch 4/800
864/864 [=====] - 2s 3ms/step - loss: 0.0293 -
accuracy: 0.0752 - val_loss: 0.0072 - val_accuracy: 0.0515
Epoch 5/800
```

864/864 [=====] - 2s 3ms/step - loss: 0.0163 -
accuracy: 0.1123 - val_loss: 0.0030 - val_accuracy: 0.0722
Epoch 6/800
864/864 [=====] - 2s 3ms/step - loss: 0.0142 -
accuracy: 0.0833 - val_loss: 0.0029 - val_accuracy: 0.0515
Epoch 7/800
864/864 [=====] - 2s 3ms/step - loss: 0.0125 -
accuracy: 0.0914 - val_loss: 0.0028 - val_accuracy: 0.0619
Epoch 8/800
864/864 [=====] - 2s 3ms/step - loss: 0.0115 -
accuracy: 0.0903 - val_loss: 0.0038 - val_accuracy: 0.0515
Epoch 9/800
864/864 [=====] - 3s 3ms/step - loss: 0.0112 -
accuracy: 0.0984 - val_loss: 0.0032 - val_accuracy: 0.0722
Epoch 10/800
864/864 [=====] - 2s 3ms/step - loss: 0.0107 -
accuracy: 0.0984 - val_loss: 0.0033 - val_accuracy: 0.0722
Epoch 11/800
864/864 [=====] - 2s 3ms/step - loss: 0.0101 -
accuracy: 0.0868 - val_loss: 0.0040 - val_accuracy: 0.0722
Epoch 12/800
864/864 [=====] - 2s 3ms/step - loss: 0.0093 -
accuracy: 0.1065 - val_loss: 0.0026 - val_accuracy: 0.0722
Epoch 13/800
864/864 [=====] - 3s 3ms/step - loss: 0.0087 -
accuracy: 0.0972 - val_loss: 0.0025 - val_accuracy: 0.0722
Epoch 14/800
864/864 [=====] - 3s 3ms/step - loss: 0.0075 -
accuracy: 0.0914 - val_loss: 0.0030 - val_accuracy: 0.0722
Epoch 15/800
864/864 [=====] - 3s 4ms/step - loss: 0.0075 -
accuracy: 0.1134 - val_loss: 0.0030 - val_accuracy: 0.0515
Epoch 16/800
864/864 [=====] - 3s 4ms/step - loss: 0.0069 -
accuracy: 0.1007 - val_loss: 0.0030 - val_accuracy: 0.0722
Epoch 17/800
864/864 [=====] - 4s 4ms/step - loss: 0.0061 -
accuracy: 0.0891 - val_loss: 0.0032 - val_accuracy: 0.0825
Epoch 18/800
864/864 [=====] - 3s 3ms/step - loss: 0.0059 -
accuracy: 0.0914 - val_loss: 0.0033 - val_accuracy: 0.0722
Epoch 19/800
864/864 [=====] - 4s 5ms/step - loss: 0.0058 -
accuracy: 0.1053 - val_loss: 0.0026 - val_accuracy: 0.0515
Epoch 20/800
864/864 [=====] - 3s 4ms/step - loss: 0.0053 -
accuracy: 0.0926 - val_loss: 0.0028 - val_accuracy: 0.0619
Epoch 21/800

864/864 [=====] - 2s 3ms/step - loss: 0.0055 -
accuracy: 0.0972 - val_loss: 0.0055 - val_accuracy: 0.0515
Epoch 22/800
864/864 [=====] - 2s 3ms/step - loss: 0.0057 -
accuracy: 0.0961 - val_loss: 0.0030 - val_accuracy: 0.0515
Epoch 23/800
864/864 [=====] - 2s 3ms/step - loss: 0.0050 -
accuracy: 0.0903 - val_loss: 0.0029 - val_accuracy: 0.0722
Epoch 24/800
864/864 [=====] - 3s 3ms/step - loss: 0.0050 -
accuracy: 0.0914 - val_loss: 0.0029 - val_accuracy: 0.0722
Epoch 25/800
864/864 [=====] - 3s 3ms/step - loss: 0.0048 -
accuracy: 0.0961 - val_loss: 0.0032 - val_accuracy: 0.0722
Epoch 26/800
864/864 [=====] - 3s 3ms/step - loss: 0.0047 -
accuracy: 0.1053 - val_loss: 0.0030 - val_accuracy: 0.0619
Epoch 27/800
864/864 [=====] - 2s 3ms/step - loss: 0.0051 -
accuracy: 0.1030 - val_loss: 0.0042 - val_accuracy: 0.0722
Epoch 28/800
864/864 [=====] - 2s 3ms/step - loss: 0.0049 -
accuracy: 0.1169 - val_loss: 0.0028 - val_accuracy: 0.0619
Epoch 29/800
864/864 [=====] - 2s 3ms/step - loss: 0.0047 -
accuracy: 0.1100 - val_loss: 0.0047 - val_accuracy: 0.0825
Epoch 30/800
864/864 [=====] - 3s 3ms/step - loss: 0.0048 -
accuracy: 0.1539 - val_loss: 0.0030 - val_accuracy: 0.0515
Epoch 31/800
864/864 [=====] - 3s 3ms/step - loss: 0.0046 -
accuracy: 0.1076 - val_loss: 0.0031 - val_accuracy: 0.0722
Epoch 32/800
864/864 [=====] - 2s 3ms/step - loss: 0.0045 -
accuracy: 0.1331 - val_loss: 0.0028 - val_accuracy: 0.0619
Epoch 33/800
864/864 [=====] - 3s 3ms/step - loss: 0.0043 -
accuracy: 0.1366 - val_loss: 0.0029 - val_accuracy: 0.0515
Epoch 34/800
864/864 [=====] - 3s 3ms/step - loss: 0.0042 -
accuracy: 0.1192 - val_loss: 0.0027 - val_accuracy: 0.0619
Epoch 35/800
864/864 [=====] - 2s 3ms/step - loss: 0.0042 -
accuracy: 0.1192 - val_loss: 0.0030 - val_accuracy: 0.0515
Epoch 36/800
864/864 [=====] - 3s 3ms/step - loss: 0.0045 -
accuracy: 0.1400 - val_loss: 0.0036 - val_accuracy: 0.0309
Epoch 37/800

864/864 [=====] - 2s 3ms/step - loss: 0.0041 -
accuracy: 0.1331 - val_loss: 0.0032 - val_accuracy: 0.0515
Epoch 38/800
864/864 [=====] - 3s 3ms/step - loss: 0.0040 -
accuracy: 0.1227 - val_loss: 0.0028 - val_accuracy: 0.0412
Epoch 39/800
864/864 [=====] - 3s 3ms/step - loss: 0.0039 -
accuracy: 0.1019 - val_loss: 0.0026 - val_accuracy: 0.0412
Epoch 40/800
864/864 [=====] - 3s 3ms/step - loss: 0.0039 -
accuracy: 0.1273 - val_loss: 0.0034 - val_accuracy: 0.0309
Epoch 41/800
864/864 [=====] - 2s 3ms/step - loss: 0.0039 -
accuracy: 0.1181 - val_loss: 0.0026 - val_accuracy: 0.0515
Epoch 42/800
864/864 [=====] - 2s 3ms/step - loss: 0.0037 -
accuracy: 0.1296 - val_loss: 0.0030 - val_accuracy: 0.0515
Epoch 43/800
864/864 [=====] - 3s 3ms/step - loss: 0.0043 -
accuracy: 0.1088 - val_loss: 0.0034 - val_accuracy: 0.0619
Epoch 44/800
864/864 [=====] - 3s 3ms/step - loss: 0.0041 -
accuracy: 0.1435 - val_loss: 0.0026 - val_accuracy: 0.1443
Epoch 45/800
864/864 [=====] - 2s 3ms/step - loss: 0.0038 -
accuracy: 0.1273 - val_loss: 0.0031 - val_accuracy: 0.0722
Epoch 46/800
864/864 [=====] - 2s 3ms/step - loss: 0.0038 -
accuracy: 0.1215 - val_loss: 0.0027 - val_accuracy: 0.0515
Epoch 47/800
864/864 [=====] - 2s 3ms/step - loss: 0.0035 -
accuracy: 0.1250 - val_loss: 0.0028 - val_accuracy: 0.0515
Epoch 48/800
864/864 [=====] - 2s 3ms/step - loss: 0.0033 -
accuracy: 0.1331 - val_loss: 0.0028 - val_accuracy: 0.0515
Epoch 49/800
864/864 [=====] - 3s 3ms/step - loss: 0.0032 -
accuracy: 0.1285 - val_loss: 0.0027 - val_accuracy: 0.0309
Epoch 50/800
864/864 [=====] - 3s 3ms/step - loss: 0.0034 -
accuracy: 0.1435 - val_loss: 0.0028 - val_accuracy: 0.0412
Epoch 51/800
864/864 [=====] - 2s 3ms/step - loss: 0.0032 -
accuracy: 0.1181 - val_loss: 0.0029 - val_accuracy: 0.0412
Epoch 52/800
864/864 [=====] - 2s 3ms/step - loss: 0.0033 -
accuracy: 0.1424 - val_loss: 0.0029 - val_accuracy: 0.0309
Epoch 53/800

864/864 [=====] - 2s 3ms/step - loss: 0.0035 -
accuracy: 0.1296 - val_loss: 0.0029 - val_accuracy: 0.0722
Epoch 54/800
864/864 [=====] - 2s 3ms/step - loss: 0.0030 -
accuracy: 0.1516 - val_loss: 0.0027 - val_accuracy: 0.0619
Epoch 55/800
864/864 [=====] - 2s 3ms/step - loss: 0.0029 -
accuracy: 0.1296 - val_loss: 0.0028 - val_accuracy: 0.0619
Epoch 56/800
864/864 [=====] - 2s 3ms/step - loss: 0.0028 -
accuracy: 0.1354 - val_loss: 0.0028 - val_accuracy: 0.0412
Epoch 57/800
864/864 [=====] - 2s 3ms/step - loss: 0.0028 -
accuracy: 0.1343 - val_loss: 0.0045 - val_accuracy: 0.0825
Epoch 58/800
864/864 [=====] - 3s 3ms/step - loss: 0.0029 -
accuracy: 0.1412 - val_loss: 0.0029 - val_accuracy: 0.0722
Epoch 59/800
864/864 [=====] - 3s 3ms/step - loss: 0.0027 -
accuracy: 0.1574 - val_loss: 0.0028 - val_accuracy: 0.0825
Epoch 60/800
864/864 [=====] - 2s 3ms/step - loss: 0.0026 -
accuracy: 0.1296 - val_loss: 0.0029 - val_accuracy: 0.0619
Epoch 61/800
864/864 [=====] - 2s 3ms/step - loss: 0.0027 -
accuracy: 0.1574 - val_loss: 0.0031 - val_accuracy: 0.1443
Epoch 62/800
864/864 [=====] - 2s 3ms/step - loss: 0.0025 -
accuracy: 0.1678 - val_loss: 0.0033 - val_accuracy: 0.0412
Epoch 63/800
864/864 [=====] - 2s 3ms/step - loss: 0.0027 -
accuracy: 0.1400 - val_loss: 0.0029 - val_accuracy: 0.0928
Epoch 64/800
864/864 [=====] - 2s 3ms/step - loss: 0.0026 -
accuracy: 0.1562 - val_loss: 0.0034 - val_accuracy: 0.1031
Epoch 65/800
864/864 [=====] - 3s 3ms/step - loss: 0.0025 -
accuracy: 0.1493 - val_loss: 0.0028 - val_accuracy: 0.1237
Epoch 66/800
864/864 [=====] - 3s 3ms/step - loss: 0.0025 -
accuracy: 0.1262 - val_loss: 0.0039 - val_accuracy: 0.0515
Epoch 67/800
864/864 [=====] - 4s 5ms/step - loss: 0.0024 -
accuracy: 0.1632 - val_loss: 0.0030 - val_accuracy: 0.2062
Epoch 68/800
864/864 [=====] - 3s 3ms/step - loss: 0.0024 -
accuracy: 0.1447 - val_loss: 0.0025 - val_accuracy: 0.1753
Epoch 69/800

864/864 [=====] - 2s 3ms/step - loss: 0.0023 -
accuracy: 0.1655 - val_loss: 0.0027 - val_accuracy: 0.0515
Epoch 70/800
864/864 [=====] - 3s 3ms/step - loss: 0.0023 -
accuracy: 0.1493 - val_loss: 0.0033 - val_accuracy: 0.0825
Epoch 71/800
864/864 [=====] - 3s 3ms/step - loss: 0.0022 -
accuracy: 0.1701 - val_loss: 0.0036 - val_accuracy: 0.1753
Epoch 72/800
864/864 [=====] - 2s 3ms/step - loss: 0.0023 -
accuracy: 0.1736 - val_loss: 0.0032 - val_accuracy: 0.1031
Epoch 73/800
864/864 [=====] - 2s 3ms/step - loss: 0.0023 -
accuracy: 0.1493 - val_loss: 0.0035 - val_accuracy: 0.1340
Epoch 74/800
864/864 [=====] - 2s 3ms/step - loss: 0.0021 -
accuracy: 0.1574 - val_loss: 0.0038 - val_accuracy: 0.0206
Epoch 75/800
864/864 [=====] - 2s 3ms/step - loss: 0.0023 -
accuracy: 0.1644 - val_loss: 0.0030 - val_accuracy: 0.1237
Epoch 76/800
864/864 [=====] - 2s 3ms/step - loss: 0.0023 -
accuracy: 0.1620 - val_loss: 0.0032 - val_accuracy: 0.0619
Epoch 77/800
864/864 [=====] - 2s 3ms/step - loss: 0.0022 -
accuracy: 0.1458 - val_loss: 0.0031 - val_accuracy: 0.0619
Epoch 78/800
864/864 [=====] - 2s 3ms/step - loss: 0.0022 -
accuracy: 0.1748 - val_loss: 0.0033 - val_accuracy: 0.0619
Epoch 79/800
864/864 [=====] - 3s 3ms/step - loss: 0.0020 -
accuracy: 0.1644 - val_loss: 0.0032 - val_accuracy: 0.0515
Epoch 80/800
864/864 [=====] - 2s 3ms/step - loss: 0.0021 -
accuracy: 0.1655 - val_loss: 0.0030 - val_accuracy: 0.0515
Epoch 81/800
864/864 [=====] - 2s 3ms/step - loss: 0.0021 -
accuracy: 0.1539 - val_loss: 0.0035 - val_accuracy: 0.0515
Epoch 82/800
864/864 [=====] - 2s 3ms/step - loss: 0.0019 -
accuracy: 0.1632 - val_loss: 0.0040 - val_accuracy: 0.0928
Epoch 83/800
864/864 [=====] - 2s 3ms/step - loss: 0.0021 -
accuracy: 0.1470 - val_loss: 0.0042 - val_accuracy: 0.1031
Epoch 84/800
864/864 [=====] - 2s 3ms/step - loss: 0.0023 -
accuracy: 0.1701 - val_loss: 0.0035 - val_accuracy: 0.0515
Epoch 85/800

864/864 [=====] - 2s 3ms/step - loss: 0.0022 -
 accuracy: 0.1782 - val_loss: 0.0038 - val_accuracy: 0.1546
 Epoch 86/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0019 -
 accuracy: 0.1597 - val_loss: 0.0039 - val_accuracy: 0.2268
 Epoch 87/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0020 -
 accuracy: 0.1736 - val_loss: 0.0041 - val_accuracy: 0.0619
 Epoch 88/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0022 -
 accuracy: 0.1678 - val_loss: 0.0037 - val_accuracy: 0.0722
 Epoch 89/800
 864/864 [=====] - 3s 3ms/step - loss: 0.0022 -
 accuracy: 0.1470 - val_loss: 0.0039 - val_accuracy: 0.0722
 Epoch 90/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0019 -
 accuracy: 0.1667 - val_loss: 0.0035 - val_accuracy: 0.1340
 Epoch 91/800
 864/864 [=====] - 3s 3ms/step - loss: 0.0019 -
 accuracy: 0.1678 - val_loss: 0.0029 - val_accuracy: 0.0206
 Epoch 92/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0019 -
 accuracy: 0.1493 - val_loss: 0.0037 - val_accuracy: 0.0722
 Epoch 93/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0018 -
 accuracy: 0.1748 - val_loss: 0.0033 - val_accuracy: 0.0722
 Epoch 94/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0018 -
 accuracy: 0.1632 - val_loss: 0.0044 - val_accuracy: 0.2577
 Epoch 95/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0018 -
 accuracy: 0.1655 - val_loss: 0.0037 - val_accuracy: 0.1959
 Epoch 96/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0018 -
 accuracy: 0.1713 - val_loss: 0.0031 - val_accuracy: 0.1134
 Epoch 97/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0018 -
 accuracy: 0.1632 - val_loss: 0.0033 - val_accuracy: 0.0619
 Epoch 98/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0017 -
 accuracy: 0.1470 - val_loss: 0.0035 - val_accuracy: 0.1649
 Epoch 99/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
 accuracy: 0.1863 - val_loss: 0.0034 - val_accuracy: 0.0825
 Epoch 100/800
 864/864 [=====] - 2s 3ms/step - loss: 0.0017 -
 accuracy: 0.1528 - val_loss: 0.0032 - val_accuracy: 0.0825
 Epoch 101/800

864/864 [=====] - 2s 3ms/step - loss: 0.0017 -
accuracy: 0.1817 - val_loss: 0.0031 - val_accuracy: 0.1649
Epoch 102/800
864/864 [=====] - 2s 3ms/step - loss: 0.0020 -
accuracy: 0.1644 - val_loss: 0.0039 - val_accuracy: 0.1753
Epoch 103/800
864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
accuracy: 0.1794 - val_loss: 0.0037 - val_accuracy: 0.0619
Epoch 104/800
864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
accuracy: 0.1551 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 105/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1771 - val_loss: 0.0044 - val_accuracy: 0.2062
Epoch 106/800
864/864 [=====] - 3s 3ms/step - loss: 0.0016 -
accuracy: 0.1933 - val_loss: 0.0041 - val_accuracy: 0.1031
Epoch 107/800
864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
accuracy: 0.1632 - val_loss: 0.0037 - val_accuracy: 0.2371
Epoch 108/800
864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
accuracy: 0.1968 - val_loss: 0.0033 - val_accuracy: 0.1443
Epoch 109/800
864/864 [=====] - 3s 3ms/step - loss: 0.0017 -
accuracy: 0.1701 - val_loss: 0.0034 - val_accuracy: 0.0619
Epoch 110/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1551 - val_loss: 0.0042 - val_accuracy: 0.2784
Epoch 111/800
864/864 [=====] - 2s 3ms/step - loss: 0.0017 -
accuracy: 0.2060 - val_loss: 0.0035 - val_accuracy: 0.0825
Epoch 112/800
864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
accuracy: 0.1574 - val_loss: 0.0042 - val_accuracy: 0.1856
Epoch 113/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1690 - val_loss: 0.0037 - val_accuracy: 0.1856
Epoch 114/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.2106 - val_loss: 0.0034 - val_accuracy: 0.0309
Epoch 115/800
864/864 [=====] - 3s 3ms/step - loss: 0.0016 -
accuracy: 0.1736 - val_loss: 0.0034 - val_accuracy: 0.2680
Epoch 116/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1806 - val_loss: 0.0038 - val_accuracy: 0.1237
Epoch 117/800

864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1968 - val_loss: 0.0033 - val_accuracy: 0.1340
Epoch 118/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.1910 - val_loss: 0.0039 - val_accuracy: 0.2680
Epoch 119/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.1968 - val_loss: 0.0042 - val_accuracy: 0.2474
Epoch 120/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.1736 - val_loss: 0.0039 - val_accuracy: 0.1340
Epoch 121/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.2002 - val_loss: 0.0039 - val_accuracy: 0.2990
Epoch 122/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1933 - val_loss: 0.0040 - val_accuracy: 0.1959
Epoch 123/800
864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
accuracy: 0.1817 - val_loss: 0.0030 - val_accuracy: 0.3299
Epoch 124/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1690 - val_loss: 0.0040 - val_accuracy: 0.2680
Epoch 125/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.2072 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 126/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.1921 - val_loss: 0.0041 - val_accuracy: 0.1753
Epoch 127/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.1748 - val_loss: 0.0036 - val_accuracy: 0.2680
Epoch 128/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.1898 - val_loss: 0.0033 - val_accuracy: 0.1340
Epoch 129/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.2106 - val_loss: 0.0035 - val_accuracy: 0.1237
Epoch 130/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.2211 - val_loss: 0.0035 - val_accuracy: 0.0619
Epoch 131/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.1736 - val_loss: 0.0043 - val_accuracy: 0.2990
Epoch 132/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.1910 - val_loss: 0.0050 - val_accuracy: 0.2268
Epoch 133/800

864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.1956 - val_loss: 0.0038 - val_accuracy: 0.2784
Epoch 134/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.2257 - val_loss: 0.0033 - val_accuracy: 0.2062
Epoch 135/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1875 - val_loss: 0.0042 - val_accuracy: 0.2577
Epoch 136/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.1968 - val_loss: 0.0039 - val_accuracy: 0.1031
Epoch 137/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.2037 - val_loss: 0.0043 - val_accuracy: 0.1959
Epoch 138/800
864/864 [=====] - 2s 3ms/step - loss: 0.0018 -
accuracy: 0.1840 - val_loss: 0.0082 - val_accuracy: 0.2577
Epoch 139/800
864/864 [=====] - 2s 3ms/step - loss: 0.0016 -
accuracy: 0.2049 - val_loss: 0.0043 - val_accuracy: 0.2268
Epoch 140/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.1794 - val_loss: 0.0047 - val_accuracy: 0.2680
Epoch 141/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.2106 - val_loss: 0.0046 - val_accuracy: 0.2577
Epoch 142/800
864/864 [=====] - 3s 3ms/step - loss: 0.0013 -
accuracy: 0.2164 - val_loss: 0.0038 - val_accuracy: 0.2268
Epoch 143/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.1887 - val_loss: 0.0035 - val_accuracy: 0.1649
Epoch 144/800
864/864 [=====] - 3s 3ms/step - loss: 0.0012 -
accuracy: 0.2118 - val_loss: 0.0034 - val_accuracy: 0.2371
Epoch 145/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2106 - val_loss: 0.0054 - val_accuracy: 0.2577
Epoch 146/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.1944 - val_loss: 0.0036 - val_accuracy: 0.1959
Epoch 147/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2141 - val_loss: 0.0061 - val_accuracy: 0.2474
Epoch 148/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.1887 - val_loss: 0.0039 - val_accuracy: 0.1753
Epoch 149/800

864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.2002 - val_loss: 0.0030 - val_accuracy: 0.2165
Epoch 150/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.2049 - val_loss: 0.0034 - val_accuracy: 0.2784
Epoch 151/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2176 - val_loss: 0.0031 - val_accuracy: 0.2165
Epoch 152/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.1863 - val_loss: 0.0031 - val_accuracy: 0.2577
Epoch 153/800
864/864 [=====] - 2s 3ms/step - loss: 0.0014 -
accuracy: 0.2106 - val_loss: 0.0036 - val_accuracy: 0.2577
Epoch 154/800
864/864 [=====] - 2s 3ms/step - loss: 0.0018 -
accuracy: 0.1782 - val_loss: 0.0028 - val_accuracy: 0.2474
Epoch 155/800
864/864 [=====] - 2s 3ms/step - loss: 0.0017 -
accuracy: 0.1921 - val_loss: 0.0027 - val_accuracy: 0.2165
Epoch 156/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.1956 - val_loss: 0.0032 - val_accuracy: 0.2784
Epoch 157/800
864/864 [=====] - 2s 3ms/step - loss: 0.0013 -
accuracy: 0.2176 - val_loss: 0.0034 - val_accuracy: 0.2577
Epoch 158/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.1782 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 159/800
864/864 [=====] - 3s 3ms/step - loss: 0.0011 -
accuracy: 0.2118 - val_loss: 0.0045 - val_accuracy: 0.3093
Epoch 160/800
864/864 [=====] - 3s 3ms/step - loss: 0.0011 -
accuracy: 0.2164 - val_loss: 0.0035 - val_accuracy: 0.2577
Epoch 161/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.1991 - val_loss: 0.0041 - val_accuracy: 0.2268
Epoch 162/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.1956 - val_loss: 0.0033 - val_accuracy: 0.2371
Epoch 163/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2095 - val_loss: 0.0035 - val_accuracy: 0.2474
Epoch 164/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.1979 - val_loss: 0.0039 - val_accuracy: 0.2474
Epoch 165/800

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864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.1979 - val_loss: 0.0035 - val_accuracy: 0.2062
Epoch 166/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.1944 - val_loss: 0.0030 - val_accuracy: 0.2474
Epoch 167/800
864/864 [=====] - 3s 3ms/step - loss: 0.0013 -
accuracy: 0.2072 - val_loss: 0.0051 - val_accuracy: 0.1340
Epoch 168/800
864/864 [=====] - 3s 3ms/step - loss: 0.0014 -
accuracy: 0.1736 - val_loss: 0.0028 - val_accuracy: 0.2268
Epoch 169/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2153 - val_loss: 0.0029 - val_accuracy: 0.2784
Epoch 170/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2164 - val_loss: 0.0036 - val_accuracy: 0.2577
Epoch 171/800
864/864 [=====] - 3s 3ms/step - loss: 0.0011 -
accuracy: 0.2188 - val_loss: 0.0035 - val_accuracy: 0.2784
Epoch 172/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.1829 - val_loss: 0.0033 - val_accuracy: 0.2887
Epoch 173/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2245 - val_loss: 0.0030 - val_accuracy: 0.2680
Epoch 174/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.1968 - val_loss: 0.0029 - val_accuracy: 0.3196
Epoch 175/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2164 - val_loss: 0.0032 - val_accuracy: 0.2784
Epoch 176/800
864/864 [=====] - 3s 3ms/step - loss: 0.0010 -
accuracy: 0.2106 - val_loss: 0.0037 - val_accuracy: 0.2165
Epoch 177/800
864/864 [=====] - 2s 3ms/step - loss: 0.0010 -
accuracy: 0.1991 - val_loss: 0.0030 - val_accuracy: 0.2165
Epoch 178/800
864/864 [=====] - 3s 3ms/step - loss: 0.0011 -
accuracy: 0.2083 - val_loss: 0.0033 - val_accuracy: 0.2165
Epoch 179/800
864/864 [=====] - 2s 3ms/step - loss: 0.0010 -
accuracy: 0.2176 - val_loss: 0.0030 - val_accuracy: 0.2062
Epoch 180/800
864/864 [=====] - 2s 3ms/step - loss: 0.0010 -
accuracy: 0.1933 - val_loss: 0.0030 - val_accuracy: 0.2062
Epoch 181/800

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864/864 [=====] - 3s 3ms/step - loss: 9.7486e-04 -
accuracy: 0.1852 - val_loss: 0.0031 - val_accuracy: 0.2577
Epoch 182/800
864/864 [=====] - 3s 3ms/step - loss: 9.9327e-04 -
accuracy: 0.2176 - val_loss: 0.0035 - val_accuracy: 0.2784
Epoch 183/800
864/864 [=====] - 2s 3ms/step - loss: 9.9449e-04 -
accuracy: 0.2222 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 184/800
864/864 [=====] - 2s 3ms/step - loss: 9.3915e-04 -
accuracy: 0.2153 - val_loss: 0.0031 - val_accuracy: 0.3196
Epoch 185/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2141 - val_loss: 0.0055 - val_accuracy: 0.2474
Epoch 186/800
864/864 [=====] - 2s 3ms/step - loss: 0.0015 -
accuracy: 0.2025 - val_loss: 0.0023 - val_accuracy: 0.2474
Epoch 187/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2222 - val_loss: 0.0032 - val_accuracy: 0.3196
Epoch 188/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2153 - val_loss: 0.0025 - val_accuracy: 0.3196
Epoch 189/800
864/864 [=====] - 2s 3ms/step - loss: 9.6520e-04 -
accuracy: 0.2338 - val_loss: 0.0031 - val_accuracy: 0.3196
Epoch 190/800
864/864 [=====] - 2s 3ms/step - loss: 9.8436e-04 -
accuracy: 0.1863 - val_loss: 0.0035 - val_accuracy: 0.3299
Epoch 191/800
864/864 [=====] - 2s 3ms/step - loss: 9.8362e-04 -
accuracy: 0.2106 - val_loss: 0.0029 - val_accuracy: 0.3093
Epoch 192/800
864/864 [=====] - 2s 3ms/step - loss: 9.5760e-04 -
accuracy: 0.2442 - val_loss: 0.0032 - val_accuracy: 0.2784
Epoch 193/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.1933 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 194/800
864/864 [=====] - 2s 3ms/step - loss: 9.9285e-04 -
accuracy: 0.2211 - val_loss: 0.0032 - val_accuracy: 0.2577
Epoch 195/800
864/864 [=====] - 2s 3ms/step - loss: 9.4669e-04 -
accuracy: 0.2130 - val_loss: 0.0029 - val_accuracy: 0.2474
Epoch 196/800
864/864 [=====] - 2s 3ms/step - loss: 0.0010 -
accuracy: 0.1921 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 197/800

864/864 [=====] - 2s 3ms/step - loss: 9.4855e-04 -
accuracy: 0.2326 - val_loss: 0.0028 - val_accuracy: 0.2577
Epoch 198/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2396 - val_loss: 0.0045 - val_accuracy: 0.2165
Epoch 199/800
864/864 [=====] - 3s 3ms/step - loss: 0.0011 -
accuracy: 0.2280 - val_loss: 0.0037 - val_accuracy: 0.2784
Epoch 200/800
864/864 [=====] - 2s 3ms/step - loss: 9.9761e-04 -
accuracy: 0.2095 - val_loss: 0.0030 - val_accuracy: 0.3299
Epoch 201/800
864/864 [=====] - 3s 3ms/step - loss: 9.7464e-04 -
accuracy: 0.2072 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 202/800
864/864 [=====] - 2s 3ms/step - loss: 9.5458e-04 -
accuracy: 0.2095 - val_loss: 0.0035 - val_accuracy: 0.2062
Epoch 203/800
864/864 [=====] - 2s 3ms/step - loss: 9.3166e-04 -
accuracy: 0.2303 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 204/800
864/864 [=====] - 2s 3ms/step - loss: 9.9721e-04 -
accuracy: 0.2338 - val_loss: 0.0035 - val_accuracy: 0.2887
Epoch 205/800
864/864 [=====] - 2s 3ms/step - loss: 8.8234e-04 -
accuracy: 0.2326 - val_loss: 0.0035 - val_accuracy: 0.1856
Epoch 206/800
864/864 [=====] - 2s 3ms/step - loss: 9.0097e-04 -
accuracy: 0.1910 - val_loss: 0.0032 - val_accuracy: 0.2784
Epoch 207/800
864/864 [=====] - 2s 3ms/step - loss: 8.8516e-04 -
accuracy: 0.2396 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 208/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2488 - val_loss: 0.0024 - val_accuracy: 0.1753
Epoch 209/800
864/864 [=====] - 2s 3ms/step - loss: 0.0010 -
accuracy: 0.1944 - val_loss: 0.0025 - val_accuracy: 0.3196
Epoch 210/800
864/864 [=====] - 2s 3ms/step - loss: 9.7196e-04 -
accuracy: 0.1991 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 211/800
864/864 [=====] - 2s 3ms/step - loss: 9.1276e-04 -
accuracy: 0.2188 - val_loss: 0.0032 - val_accuracy: 0.3196
Epoch 212/800
864/864 [=====] - 2s 3ms/step - loss: 9.5389e-04 -
accuracy: 0.2581 - val_loss: 0.0033 - val_accuracy: 0.2887
Epoch 213/800

864/864 [=====] - 2s 3ms/step - loss: 9.2216e-04 -
accuracy: 0.2384 - val_loss: 0.0029 - val_accuracy: 0.2474
Epoch 214/800
864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2338 - val_loss: 0.0030 - val_accuracy: 0.2680
Epoch 215/800
864/864 [=====] - 2s 3ms/step - loss: 9.5951e-04 -
accuracy: 0.2523 - val_loss: 0.0033 - val_accuracy: 0.2268
Epoch 216/800
864/864 [=====] - 2s 3ms/step - loss: 8.5604e-04 -
accuracy: 0.2211 - val_loss: 0.0035 - val_accuracy: 0.2165
Epoch 217/800
864/864 [=====] - 2s 3ms/step - loss: 8.6408e-04 -
accuracy: 0.2303 - val_loss: 0.0031 - val_accuracy: 0.2268
Epoch 218/800
864/864 [=====] - 3s 3ms/step - loss: 9.0955e-04 -
accuracy: 0.2292 - val_loss: 0.0037 - val_accuracy: 0.2371
Epoch 219/800
864/864 [=====] - 2s 3ms/step - loss: 9.2585e-04 -
accuracy: 0.2454 - val_loss: 0.0032 - val_accuracy: 0.2680
Epoch 220/800
864/864 [=====] - 2s 3ms/step - loss: 8.3806e-04 -
accuracy: 0.2442 - val_loss: 0.0031 - val_accuracy: 0.3196
Epoch 221/800
864/864 [=====] - 3s 3ms/step - loss: 8.4507e-04 -
accuracy: 0.2662 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 222/800
864/864 [=====] - 3s 3ms/step - loss: 8.5512e-04 -
accuracy: 0.2292 - val_loss: 0.0035 - val_accuracy: 0.3299
Epoch 223/800
864/864 [=====] - 2s 3ms/step - loss: 8.6927e-04 -
accuracy: 0.2431 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 224/800
864/864 [=====] - 3s 3ms/step - loss: 8.2996e-04 -
accuracy: 0.2280 - val_loss: 0.0035 - val_accuracy: 0.2577
Epoch 225/800
864/864 [=====] - 3s 3ms/step - loss: 7.8978e-04 -
accuracy: 0.2477 - val_loss: 0.0034 - val_accuracy: 0.2784
Epoch 226/800
864/864 [=====] - 3s 3ms/step - loss: 9.6018e-04 -
accuracy: 0.2546 - val_loss: 0.0035 - val_accuracy: 0.2474
Epoch 227/800
864/864 [=====] - 3s 4ms/step - loss: 0.0011 -
accuracy: 0.2674 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 228/800
864/864 [=====] - 3s 3ms/step - loss: 0.0012 -
accuracy: 0.2396 - val_loss: 0.0031 - val_accuracy: 0.3402
Epoch 229/800

864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2593 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 230/800

864/864 [=====] - 2s 3ms/step - loss: 9.9190e-04 -
accuracy: 0.2431 - val_loss: 0.0029 - val_accuracy: 0.2680
Epoch 231/800

864/864 [=====] - 2s 3ms/step - loss: 9.5123e-04 -
accuracy: 0.2465 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 232/800

864/864 [=====] - 2s 3ms/step - loss: 0.0010 -
accuracy: 0.2627 - val_loss: 0.0032 - val_accuracy: 0.2268
Epoch 233/800

864/864 [=====] - 2s 3ms/step - loss: 8.6919e-04 -
accuracy: 0.2396 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 234/800

864/864 [=====] - 3s 3ms/step - loss: 8.2840e-04 -
accuracy: 0.2697 - val_loss: 0.0034 - val_accuracy: 0.3196
Epoch 235/800

864/864 [=====] - 2s 3ms/step - loss: 8.0177e-04 -
accuracy: 0.2697 - val_loss: 0.0033 - val_accuracy: 0.3299
Epoch 236/800

864/864 [=====] - 2s 3ms/step - loss: 7.8744e-04 -
accuracy: 0.2558 - val_loss: 0.0034 - val_accuracy: 0.2990
Epoch 237/800

864/864 [=====] - 2s 3ms/step - loss: 7.5329e-04 -
accuracy: 0.2662 - val_loss: 0.0030 - val_accuracy: 0.3402
Epoch 238/800

864/864 [=====] - 2s 3ms/step - loss: 8.2290e-04 -
accuracy: 0.2546 - val_loss: 0.0032 - val_accuracy: 0.3299
Epoch 239/800

864/864 [=====] - 2s 3ms/step - loss: 8.6151e-04 -
accuracy: 0.2396 - val_loss: 0.0029 - val_accuracy: 0.2784
Epoch 240/800

864/864 [=====] - 2s 3ms/step - loss: 8.6304e-04 -
accuracy: 0.2454 - val_loss: 0.0029 - val_accuracy: 0.3196
Epoch 241/800

864/864 [=====] - 3s 3ms/step - loss: 8.6011e-04 -
accuracy: 0.2755 - val_loss: 0.0030 - val_accuracy: 0.2577
Epoch 242/800

864/864 [=====] - 3s 3ms/step - loss: 8.1014e-04 -
accuracy: 0.2627 - val_loss: 0.0030 - val_accuracy: 0.2680
Epoch 243/800

864/864 [=====] - 3s 3ms/step - loss: 8.2561e-04 -
accuracy: 0.2593 - val_loss: 0.0027 - val_accuracy: 0.2577
Epoch 244/800

864/864 [=====] - 2s 3ms/step - loss: 7.8158e-04 -
accuracy: 0.2882 - val_loss: 0.0035 - val_accuracy: 0.2268
Epoch 245/800

864/864 [=====] - 2s 3ms/step - loss: 7.6924e-04 -
accuracy: 0.2546 - val_loss: 0.0029 - val_accuracy: 0.3505
Epoch 246/800

864/864 [=====] - 2s 3ms/step - loss: 7.8329e-04 -
accuracy: 0.2697 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 247/800

864/864 [=====] - 2s 3ms/step - loss: 7.9679e-04 -
accuracy: 0.2674 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 248/800

864/864 [=====] - 2s 3ms/step - loss: 7.7207e-04 -
accuracy: 0.2755 - val_loss: 0.0030 - val_accuracy: 0.3402
Epoch 249/800

864/864 [=====] - 2s 3ms/step - loss: 7.7947e-04 -
accuracy: 0.2512 - val_loss: 0.0034 - val_accuracy: 0.3505
Epoch 250/800

864/864 [=====] - 2s 3ms/step - loss: 7.4722e-04 -
accuracy: 0.2917 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 251/800

864/864 [=====] - 3s 3ms/step - loss: 7.6212e-04 -
accuracy: 0.2743 - val_loss: 0.0033 - val_accuracy: 0.3196
Epoch 252/800

864/864 [=====] - 3s 3ms/step - loss: 8.4834e-04 -
accuracy: 0.2697 - val_loss: 0.0036 - val_accuracy: 0.3299
Epoch 253/800

864/864 [=====] - 2s 3ms/step - loss: 8.9709e-04 -
accuracy: 0.2338 - val_loss: 0.0025 - val_accuracy: 0.3299
Epoch 254/800

864/864 [=====] - 2s 3ms/step - loss: 8.7469e-04 -
accuracy: 0.2604 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 255/800

864/864 [=====] - 3s 3ms/step - loss: 8.0000e-04 -
accuracy: 0.2454 - val_loss: 0.0028 - val_accuracy: 0.2268
Epoch 256/800

864/864 [=====] - 3s 3ms/step - loss: 8.1304e-04 -
accuracy: 0.2535 - val_loss: 0.0030 - val_accuracy: 0.2990
Epoch 257/800

864/864 [=====] - 2s 3ms/step - loss: 7.9657e-04 -
accuracy: 0.2731 - val_loss: 0.0029 - val_accuracy: 0.2990
Epoch 258/800

864/864 [=====] - 2s 3ms/step - loss: 7.5629e-04 -
accuracy: 0.2697 - val_loss: 0.0033 - val_accuracy: 0.3196
Epoch 259/800

864/864 [=====] - 2s 3ms/step - loss: 7.3828e-04 -
accuracy: 0.2558 - val_loss: 0.0032 - val_accuracy: 0.2268
Epoch 260/800

864/864 [=====] - 2s 3ms/step - loss: 7.0237e-04 -
accuracy: 0.2766 - val_loss: 0.0034 - val_accuracy: 0.2990
Epoch 261/800

864/864 [=====] - 2s 3ms/step - loss: 9.0266e-04 -
accuracy: 0.2569 - val_loss: 0.0031 - val_accuracy: 0.2474
Epoch 262/800
864/864 [=====] - 2s 3ms/step - loss: 9.7052e-04 -
accuracy: 0.2859 - val_loss: 0.0028 - val_accuracy: 0.2784
Epoch 263/800
864/864 [=====] - 2s 3ms/step - loss: 8.8839e-04 -
accuracy: 0.2604 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 264/800
864/864 [=====] - 2s 3ms/step - loss: 7.6002e-04 -
accuracy: 0.2755 - val_loss: 0.0036 - val_accuracy: 0.3402
Epoch 265/800
864/864 [=====] - 2s 3ms/step - loss: 7.3447e-04 -
accuracy: 0.2894 - val_loss: 0.0032 - val_accuracy: 0.3299
Epoch 266/800
864/864 [=====] - 2s 3ms/step - loss: 7.1526e-04 -
accuracy: 0.2535 - val_loss: 0.0034 - val_accuracy: 0.3402
Epoch 267/800
864/864 [=====] - 2s 3ms/step - loss: 6.9813e-04 -
accuracy: 0.2778 - val_loss: 0.0032 - val_accuracy: 0.3196
Epoch 268/800
864/864 [=====] - 2s 3ms/step - loss: 7.2816e-04 -
accuracy: 0.2650 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 269/800
864/864 [=====] - 2s 3ms/step - loss: 7.0866e-04 -
accuracy: 0.2778 - val_loss: 0.0036 - val_accuracy: 0.3402
Epoch 270/800
864/864 [=====] - 2s 3ms/step - loss: 6.9509e-04 -
accuracy: 0.2836 - val_loss: 0.0037 - val_accuracy: 0.2474
Epoch 271/800
864/864 [=====] - 2s 3ms/step - loss: 6.8982e-04 -
accuracy: 0.2766 - val_loss: 0.0032 - val_accuracy: 0.3505
Epoch 272/800
864/864 [=====] - 2s 3ms/step - loss: 7.1776e-04 -
accuracy: 0.2697 - val_loss: 0.0037 - val_accuracy: 0.2680
Epoch 273/800
864/864 [=====] - 3s 3ms/step - loss: 7.4064e-04 -
accuracy: 0.2650 - val_loss: 0.0031 - val_accuracy: 0.2577
Epoch 274/800
864/864 [=====] - 3s 3ms/step - loss: 7.2141e-04 -
accuracy: 0.2836 - val_loss: 0.0035 - val_accuracy: 0.2680
Epoch 275/800
864/864 [=====] - 2s 3ms/step - loss: 7.7154e-04 -
accuracy: 0.2616 - val_loss: 0.0032 - val_accuracy: 0.2165
Epoch 276/800
864/864 [=====] - 2s 3ms/step - loss: 7.6681e-04 -
accuracy: 0.2639 - val_loss: 0.0033 - val_accuracy: 0.3196
Epoch 277/800

864/864 [=====] - 4s 5ms/step - loss: 7.6642e-04 -
accuracy: 0.2894 - val_loss: 0.0032 - val_accuracy: 0.3093
Epoch 278/800

864/864 [=====] - 3s 3ms/step - loss: 7.7358e-04 -
accuracy: 0.2708 - val_loss: 0.0030 - val_accuracy: 0.3196
Epoch 279/800

864/864 [=====] - 2s 3ms/step - loss: 6.9462e-04 -
accuracy: 0.2801 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 280/800

864/864 [=====] - 2s 3ms/step - loss: 7.2977e-04 -
accuracy: 0.2720 - val_loss: 0.0036 - val_accuracy: 0.2268
Epoch 281/800

864/864 [=====] - 2s 3ms/step - loss: 9.3227e-04 -
accuracy: 0.2477 - val_loss: 0.0034 - val_accuracy: 0.2474
Epoch 282/800

864/864 [=====] - 2s 3ms/step - loss: 8.9619e-04 -
accuracy: 0.2894 - val_loss: 0.0034 - val_accuracy: 0.2371
Epoch 283/800

864/864 [=====] - 3s 3ms/step - loss: 8.3995e-04 -
accuracy: 0.2755 - val_loss: 0.0027 - val_accuracy: 0.2887
Epoch 284/800

864/864 [=====] - 2s 3ms/step - loss: 8.2801e-04 -
accuracy: 0.2928 - val_loss: 0.0024 - val_accuracy: 0.2680
Epoch 285/800

864/864 [=====] - 2s 3ms/step - loss: 7.6229e-04 -
accuracy: 0.2859 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 286/800

864/864 [=====] - 2s 3ms/step - loss: 6.9833e-04 -
accuracy: 0.2697 - val_loss: 0.0031 - val_accuracy: 0.2990
Epoch 287/800

864/864 [=====] - 2s 3ms/step - loss: 6.7640e-04 -
accuracy: 0.2500 - val_loss: 0.0030 - val_accuracy: 0.3299
Epoch 288/800

864/864 [=====] - 2s 3ms/step - loss: 6.9276e-04 -
accuracy: 0.2963 - val_loss: 0.0030 - val_accuracy: 0.2165
Epoch 289/800

864/864 [=====] - 2s 3ms/step - loss: 7.7630e-04 -
accuracy: 0.2755 - val_loss: 0.0027 - val_accuracy: 0.2887
Epoch 290/800

864/864 [=====] - 3s 3ms/step - loss: 8.4498e-04 -
accuracy: 0.2523 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 291/800

864/864 [=====] - 3s 3ms/step - loss: 7.9946e-04 -
accuracy: 0.2731 - val_loss: 0.0033 - val_accuracy: 0.2577
Epoch 292/800

864/864 [=====] - 3s 4ms/step - loss: 6.9294e-04 -
accuracy: 0.2870 - val_loss: 0.0031 - val_accuracy: 0.2887
Epoch 293/800

864/864 [=====] - 3s 3ms/step - loss: 7.0103e-04 -
accuracy: 0.2847 - val_loss: 0.0030 - val_accuracy: 0.2784
Epoch 294/800
864/864 [=====] - 3s 3ms/step - loss: 6.9339e-04 -
accuracy: 0.2685 - val_loss: 0.0040 - val_accuracy: 0.2680
Epoch 295/800
864/864 [=====] - 3s 3ms/step - loss: 7.1000e-04 -
accuracy: 0.2685 - val_loss: 0.0034 - val_accuracy: 0.2474
Epoch 296/800
864/864 [=====] - 3s 3ms/step - loss: 7.2282e-04 -
accuracy: 0.2778 - val_loss: 0.0031 - val_accuracy: 0.3402
Epoch 297/800
864/864 [=====] - 3s 3ms/step - loss: 6.7065e-04 -
accuracy: 0.2755 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 298/800
864/864 [=====] - 3s 3ms/step - loss: 6.8986e-04 -
accuracy: 0.2662 - val_loss: 0.0029 - val_accuracy: 0.3299
Epoch 299/800
864/864 [=====] - 2s 3ms/step - loss: 6.5274e-04 -
accuracy: 0.2789 - val_loss: 0.0032 - val_accuracy: 0.2474
Epoch 300/800
864/864 [=====] - 2s 3ms/step - loss: 7.2300e-04 -
accuracy: 0.2755 - val_loss: 0.0033 - val_accuracy: 0.1856
Epoch 301/800
864/864 [=====] - 2s 3ms/step - loss: 6.6559e-04 -
accuracy: 0.2743 - val_loss: 0.0033 - val_accuracy: 0.2577
Epoch 302/800
864/864 [=====] - 3s 3ms/step - loss: 6.6679e-04 -
accuracy: 0.2986 - val_loss: 0.0035 - val_accuracy: 0.2784
Epoch 303/800
864/864 [=====] - 2s 3ms/step - loss: 7.2281e-04 -
accuracy: 0.2512 - val_loss: 0.0030 - val_accuracy: 0.2268
Epoch 304/800
864/864 [=====] - 2s 3ms/step - loss: 7.8784e-04 -
accuracy: 0.2836 - val_loss: 0.0030 - val_accuracy: 0.2784
Epoch 305/800
864/864 [=====] - 3s 3ms/step - loss: 0.0015 -
accuracy: 0.2488 - val_loss: 0.0025 - val_accuracy: 0.3093
Epoch 306/800
864/864 [=====] - 3s 3ms/step - loss: 0.0013 -
accuracy: 0.2569 - val_loss: 0.0021 - val_accuracy: 0.3093
Epoch 307/800
864/864 [=====] - 3s 3ms/step - loss: 8.8395e-04 -
accuracy: 0.2720 - val_loss: 0.0025 - val_accuracy: 0.3093
Epoch 308/800
864/864 [=====] - 3s 3ms/step - loss: 7.7154e-04 -
accuracy: 0.2812 - val_loss: 0.0030 - val_accuracy: 0.3299
Epoch 309/800

864/864 [=====] - 3s 3ms/step - loss: 7.0191e-04 -
accuracy: 0.2847 - val_loss: 0.0031 - val_accuracy: 0.2474
Epoch 310/800
864/864 [=====] - 3s 3ms/step - loss: 7.1565e-04 -
accuracy: 0.2812 - val_loss: 0.0030 - val_accuracy: 0.3402
Epoch 311/800
864/864 [=====] - 3s 3ms/step - loss: 6.8558e-04 -
accuracy: 0.2882 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 312/800
864/864 [=====] - 2s 3ms/step - loss: 6.4891e-04 -
accuracy: 0.2882 - val_loss: 0.0032 - val_accuracy: 0.3093
Epoch 313/800
864/864 [=====] - 2s 3ms/step - loss: 6.4257e-04 -
accuracy: 0.2650 - val_loss: 0.0033 - val_accuracy: 0.3505
Epoch 314/800
864/864 [=====] - 2s 3ms/step - loss: 6.5440e-04 -
accuracy: 0.2824 - val_loss: 0.0034 - val_accuracy: 0.3402
Epoch 315/800
864/864 [=====] - 2s 3ms/step - loss: 6.6806e-04 -
accuracy: 0.2859 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 316/800
864/864 [=====] - 2s 3ms/step - loss: 6.7053e-04 -
accuracy: 0.2685 - val_loss: 0.0032 - val_accuracy: 0.3299
Epoch 317/800
864/864 [=====] - 2s 3ms/step - loss: 6.3526e-04 -
accuracy: 0.2766 - val_loss: 0.0033 - val_accuracy: 0.2474
Epoch 318/800
864/864 [=====] - 2s 3ms/step - loss: 6.4852e-04 -
accuracy: 0.2951 - val_loss: 0.0034 - val_accuracy: 0.3299
Epoch 319/800
864/864 [=====] - 2s 3ms/step - loss: 6.6101e-04 -
accuracy: 0.2650 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 320/800
864/864 [=====] - 2s 3ms/step - loss: 6.6190e-04 -
accuracy: 0.2824 - val_loss: 0.0032 - val_accuracy: 0.2474
Epoch 321/800
864/864 [=====] - 2s 3ms/step - loss: 6.7773e-04 -
accuracy: 0.2778 - val_loss: 0.0033 - val_accuracy: 0.3196
Epoch 322/800
864/864 [=====] - 2s 3ms/step - loss: 6.4948e-04 -
accuracy: 0.2708 - val_loss: 0.0029 - val_accuracy: 0.2887
Epoch 323/800
864/864 [=====] - 2s 3ms/step - loss: 6.3685e-04 -
accuracy: 0.2685 - val_loss: 0.0031 - val_accuracy: 0.2577
Epoch 324/800
864/864 [=====] - 2s 3ms/step - loss: 6.2373e-04 -
accuracy: 0.3032 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 325/800

864/864 [=====] - 2s 3ms/step - loss: 6.4448e-04 - accuracy: 0.2894 - val_loss: 0.0030 - val_accuracy: 0.3402
Epoch 326/800
864/864 [=====] - 2s 3ms/step - loss: 6.6057e-04 - accuracy: 0.2743 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 327/800
864/864 [=====] - 2s 3ms/step - loss: 6.6801e-04 - accuracy: 0.2685 - val_loss: 0.0030 - val_accuracy: 0.3299
Epoch 328/800
864/864 [=====] - 2s 3ms/step - loss: 6.7283e-04 - accuracy: 0.2812 - val_loss: 0.0028 - val_accuracy: 0.2990
Epoch 329/800
864/864 [=====] - 3s 3ms/step - loss: 6.9200e-04 - accuracy: 0.2789 - val_loss: 0.0030 - val_accuracy: 0.2165
Epoch 330/800
864/864 [=====] - 3s 4ms/step - loss: 6.3513e-04 - accuracy: 0.2731 - val_loss: 0.0033 - val_accuracy: 0.2062
Epoch 331/800
864/864 [=====] - 2s 3ms/step - loss: 6.7794e-04 - accuracy: 0.2720 - val_loss: 0.0029 - val_accuracy: 0.2577
Epoch 332/800
864/864 [=====] - 2s 3ms/step - loss: 7.6520e-04 - accuracy: 0.2905 - val_loss: 0.0030 - val_accuracy: 0.2268
Epoch 333/800
864/864 [=====] - 2s 3ms/step - loss: 6.5718e-04 - accuracy: 0.2639 - val_loss: 0.0033 - val_accuracy: 0.3402
Epoch 334/800
864/864 [=====] - 2s 3ms/step - loss: 6.2015e-04 - accuracy: 0.2847 - val_loss: 0.0033 - val_accuracy: 0.2371
Epoch 335/800
864/864 [=====] - 3s 3ms/step - loss: 6.0720e-04 - accuracy: 0.2882 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 336/800
864/864 [=====] - 3s 3ms/step - loss: 6.5680e-04 - accuracy: 0.2755 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 337/800
864/864 [=====] - 3s 3ms/step - loss: 6.4309e-04 - accuracy: 0.2801 - val_loss: 0.0029 - val_accuracy: 0.2680
Epoch 338/800
864/864 [=====] - 3s 3ms/step - loss: 6.5283e-04 - accuracy: 0.2720 - val_loss: 0.0030 - val_accuracy: 0.2887
Epoch 339/800
864/864 [=====] - 3s 3ms/step - loss: 6.0114e-04 - accuracy: 0.2662 - val_loss: 0.0030 - val_accuracy: 0.2577
Epoch 340/800
864/864 [=====] - 2s 3ms/step - loss: 7.8362e-04 - accuracy: 0.2697 - val_loss: 0.0051 - val_accuracy: 0.2577
Epoch 341/800

864/864 [=====] - 2s 3ms/step - loss: 0.0011 -
accuracy: 0.2500 - val_loss: 0.0028 - val_accuracy: 0.2268
Epoch 342/800
864/864 [=====] - 2s 3ms/step - loss: 9.2489e-04 -
accuracy: 0.2512 - val_loss: 0.0027 - val_accuracy: 0.1546
Epoch 343/800
864/864 [=====] - 2s 3ms/step - loss: 7.8011e-04 -
accuracy: 0.2639 - val_loss: 0.0031 - val_accuracy: 0.2268
Epoch 344/800
864/864 [=====] - 3s 3ms/step - loss: 7.3043e-04 -
accuracy: 0.2743 - val_loss: 0.0028 - val_accuracy: 0.2165
Epoch 345/800
864/864 [=====] - 2s 3ms/step - loss: 6.6131e-04 -
accuracy: 0.2859 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 346/800
864/864 [=====] - 2s 3ms/step - loss: 6.3565e-04 -
accuracy: 0.2812 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 347/800
864/864 [=====] - 2s 3ms/step - loss: 6.1887e-04 -
accuracy: 0.2951 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 348/800
864/864 [=====] - 2s 3ms/step - loss: 6.5540e-04 -
accuracy: 0.2755 - val_loss: 0.0031 - val_accuracy: 0.3196
Epoch 349/800
864/864 [=====] - 3s 3ms/step - loss: 6.1370e-04 -
accuracy: 0.2824 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 350/800
864/864 [=====] - 2s 3ms/step - loss: 6.1015e-04 -
accuracy: 0.2917 - val_loss: 0.0034 - val_accuracy: 0.3505
Epoch 351/800
864/864 [=====] - 3s 3ms/step - loss: 6.0792e-04 -
accuracy: 0.2789 - val_loss: 0.0032 - val_accuracy: 0.2474
Epoch 352/800
864/864 [=====] - 3s 3ms/step - loss: 5.9545e-04 -
accuracy: 0.2766 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 353/800
864/864 [=====] - 3s 3ms/step - loss: 5.9852e-04 -
accuracy: 0.2778 - val_loss: 0.0034 - val_accuracy: 0.2990
Epoch 354/800
864/864 [=====] - 3s 4ms/step - loss: 5.8650e-04 -
accuracy: 0.2847 - val_loss: 0.0030 - val_accuracy: 0.2784
Epoch 355/800
864/864 [=====] - 4s 4ms/step - loss: 5.8695e-04 -
accuracy: 0.2778 - val_loss: 0.0031 - val_accuracy: 0.3093
Epoch 356/800
864/864 [=====] - 3s 4ms/step - loss: 6.0901e-04 -
accuracy: 0.2801 - val_loss: 0.0031 - val_accuracy: 0.1753
Epoch 357/800

864/864 [=====] - 3s 3ms/step - loss: 7.3003e-04 - accuracy: 0.2523 - val_loss: 0.0025 - val_accuracy: 0.2268
Epoch 358/800
864/864 [=====] - 2s 3ms/step - loss: 6.3596e-04 - accuracy: 0.2731 - val_loss: 0.0030 - val_accuracy: 0.3093
Epoch 359/800
864/864 [=====] - 2s 3ms/step - loss: 6.1649e-04 - accuracy: 0.2674 - val_loss: 0.0030 - val_accuracy: 0.2784
Epoch 360/800
864/864 [=====] - 3s 3ms/step - loss: 6.0977e-04 - accuracy: 0.2998 - val_loss: 0.0036 - val_accuracy: 0.3608
Epoch 361/800
864/864 [=====] - 3s 3ms/step - loss: 6.1170e-04 - accuracy: 0.2801 - val_loss: 0.0032 - val_accuracy: 0.2165
Epoch 362/800
864/864 [=====] - 3s 3ms/step - loss: 6.2162e-04 - accuracy: 0.2801 - val_loss: 0.0029 - val_accuracy: 0.2990
Epoch 363/800
864/864 [=====] - 3s 3ms/step - loss: 5.7885e-04 - accuracy: 0.2859 - val_loss: 0.0031 - val_accuracy: 0.3093
Epoch 364/800
864/864 [=====] - 2s 3ms/step - loss: 6.0632e-04 - accuracy: 0.2766 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 365/800
864/864 [=====] - 2s 3ms/step - loss: 6.0683e-04 - accuracy: 0.2859 - val_loss: 0.0030 - val_accuracy: 0.2990
Epoch 366/800
864/864 [=====] - 2s 3ms/step - loss: 6.4015e-04 - accuracy: 0.2870 - val_loss: 0.0040 - val_accuracy: 0.2371
Epoch 367/800
864/864 [=====] - 2s 3ms/step - loss: 7.4164e-04 - accuracy: 0.2847 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 368/800
864/864 [=====] - 2s 3ms/step - loss: 8.2237e-04 - accuracy: 0.2743 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 369/800
864/864 [=====] - 2s 3ms/step - loss: 6.7744e-04 - accuracy: 0.2674 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 370/800
864/864 [=====] - 2s 3ms/step - loss: 6.2543e-04 - accuracy: 0.2766 - val_loss: 0.0031 - val_accuracy: 0.2990
Epoch 371/800
864/864 [=====] - 2s 3ms/step - loss: 6.2620e-04 - accuracy: 0.2824 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 372/800
864/864 [=====] - 2s 3ms/step - loss: 5.9841e-04 - accuracy: 0.2824 - val_loss: 0.0035 - val_accuracy: 0.2474
Epoch 373/800

864/864 [=====] - 3s 3ms/step - loss: 6.3867e-04 - accuracy: 0.2755 - val_loss: 0.0034 - val_accuracy: 0.2474
Epoch 374/800
864/864 [=====] - 3s 3ms/step - loss: 5.9167e-04 - accuracy: 0.2801 - val_loss: 0.0034 - val_accuracy: 0.2784
Epoch 375/800
864/864 [=====] - 2s 3ms/step - loss: 5.8128e-04 - accuracy: 0.2847 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 376/800
864/864 [=====] - 2s 3ms/step - loss: 5.8949e-04 - accuracy: 0.2593 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 377/800
864/864 [=====] - 2s 3ms/step - loss: 6.9887e-04 - accuracy: 0.2743 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 378/800
864/864 [=====] - 2s 3ms/step - loss: 9.1864e-04 - accuracy: 0.2593 - val_loss: 0.0028 - val_accuracy: 0.2784
Epoch 379/800
864/864 [=====] - 2s 3ms/step - loss: 6.5849e-04 - accuracy: 0.2812 - val_loss: 0.0030 - val_accuracy: 0.2784
Epoch 380/800
864/864 [=====] - 2s 3ms/step - loss: 6.0248e-04 - accuracy: 0.2604 - val_loss: 0.0034 - val_accuracy: 0.2990
Epoch 381/800
864/864 [=====] - 3s 3ms/step - loss: 5.8092e-04 - accuracy: 0.2836 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 382/800
864/864 [=====] - 3s 3ms/step - loss: 5.7129e-04 - accuracy: 0.2928 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 383/800
864/864 [=====] - 3s 3ms/step - loss: 5.7003e-04 - accuracy: 0.2720 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 384/800
864/864 [=====] - 4s 4ms/step - loss: 6.0684e-04 - accuracy: 0.2789 - val_loss: 0.0034 - val_accuracy: 0.2474
Epoch 385/800
864/864 [=====] - 3s 3ms/step - loss: 6.2431e-04 - accuracy: 0.2558 - val_loss: 0.0036 - val_accuracy: 0.3299
Epoch 386/800
864/864 [=====] - 2s 3ms/step - loss: 6.9479e-04 - accuracy: 0.2905 - val_loss: 0.0036 - val_accuracy: 0.2165
Epoch 387/800
864/864 [=====] - 2s 3ms/step - loss: 6.0901e-04 - accuracy: 0.2986 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 388/800
864/864 [=====] - 2s 3ms/step - loss: 5.7874e-04 - accuracy: 0.2708 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 389/800

864/864 [=====] - 2s 3ms/step - loss: 5.7724e-04 -
accuracy: 0.2963 - val_loss: 0.0032 - val_accuracy: 0.2680
Epoch 390/800
864/864 [=====] - 3s 3ms/step - loss: 6.7145e-04 -
accuracy: 0.2917 - val_loss: 0.0027 - val_accuracy: 0.2165
Epoch 391/800
864/864 [=====] - 3s 3ms/step - loss: 7.4311e-04 -
accuracy: 0.2731 - val_loss: 0.0044 - val_accuracy: 0.2474
Epoch 392/800
864/864 [=====] - 3s 3ms/step - loss: 9.4822e-04 -
accuracy: 0.2812 - val_loss: 0.0031 - val_accuracy: 0.2887
Epoch 393/800
864/864 [=====] - 2s 3ms/step - loss: 6.2901e-04 -
accuracy: 0.2905 - val_loss: 0.0032 - val_accuracy: 0.2784
Epoch 394/800
864/864 [=====] - 3s 3ms/step - loss: 5.9385e-04 -
accuracy: 0.2998 - val_loss: 0.0031 - val_accuracy: 0.2887
Epoch 395/800
864/864 [=====] - 2s 3ms/step - loss: 5.6821e-04 -
accuracy: 0.2951 - val_loss: 0.0030 - val_accuracy: 0.3299
Epoch 396/800
864/864 [=====] - 2s 3ms/step - loss: 5.6364e-04 -
accuracy: 0.2812 - val_loss: 0.0033 - val_accuracy: 0.3299
Epoch 397/800
864/864 [=====] - 3s 3ms/step - loss: 5.7238e-04 -
accuracy: 0.2650 - val_loss: 0.0034 - val_accuracy: 0.2990
Epoch 398/800
864/864 [=====] - 2s 3ms/step - loss: 5.7043e-04 -
accuracy: 0.2801 - val_loss: 0.0032 - val_accuracy: 0.2680
Epoch 399/800
864/864 [=====] - 2s 3ms/step - loss: 6.0252e-04 -
accuracy: 0.2685 - val_loss: 0.0032 - val_accuracy: 0.2371
Epoch 400/800
864/864 [=====] - 3s 3ms/step - loss: 7.6429e-04 -
accuracy: 0.2755 - val_loss: 0.0029 - val_accuracy: 0.2887
Epoch 401/800
864/864 [=====] - 3s 3ms/step - loss: 6.2534e-04 -
accuracy: 0.2778 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 402/800
864/864 [=====] - 3s 3ms/step - loss: 5.5664e-04 -
accuracy: 0.2963 - val_loss: 0.0031 - val_accuracy: 0.3402
Epoch 403/800
864/864 [=====] - 3s 3ms/step - loss: 5.6343e-04 -
accuracy: 0.2708 - val_loss: 0.0033 - val_accuracy: 0.2887
Epoch 404/800
864/864 [=====] - 3s 3ms/step - loss: 5.8454e-04 -
accuracy: 0.2708 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 405/800

864/864 [=====] - 3s 4ms/step - loss: 5.5613e-04 -
accuracy: 0.3032 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 406/800
864/864 [=====] - 3s 3ms/step - loss: 5.6922e-04 -
accuracy: 0.2731 - val_loss: 0.0031 - val_accuracy: 0.2680
Epoch 407/800
864/864 [=====] - 2s 3ms/step - loss: 5.7342e-04 -
accuracy: 0.2951 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 408/800
864/864 [=====] - 2s 3ms/step - loss: 5.4636e-04 -
accuracy: 0.2870 - val_loss: 0.0033 - val_accuracy: 0.2577
Epoch 409/800
864/864 [=====] - 3s 3ms/step - loss: 5.8300e-04 -
accuracy: 0.2951 - val_loss: 0.0032 - val_accuracy: 0.3402
Epoch 410/800
864/864 [=====] - 2s 3ms/step - loss: 6.2095e-04 -
accuracy: 0.2755 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 411/800
864/864 [=====] - 3s 3ms/step - loss: 5.9032e-04 -
accuracy: 0.2940 - val_loss: 0.0031 - val_accuracy: 0.3299
Epoch 412/800
864/864 [=====] - 3s 3ms/step - loss: 5.4954e-04 -
accuracy: 0.2847 - val_loss: 0.0034 - val_accuracy: 0.2577
Epoch 413/800
864/864 [=====] - 2s 3ms/step - loss: 5.6074e-04 -
accuracy: 0.2870 - val_loss: 0.0031 - val_accuracy: 0.2680
Epoch 414/800
864/864 [=====] - 2s 3ms/step - loss: 5.7459e-04 -
accuracy: 0.2766 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 415/800
864/864 [=====] - 2s 3ms/step - loss: 5.8296e-04 -
accuracy: 0.3009 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 416/800
864/864 [=====] - 2s 3ms/step - loss: 5.8018e-04 -
accuracy: 0.2766 - val_loss: 0.0033 - val_accuracy: 0.2577
Epoch 417/800
864/864 [=====] - 2s 3ms/step - loss: 5.5796e-04 -
accuracy: 0.2917 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 418/800
864/864 [=====] - 2s 3ms/step - loss: 5.6592e-04 -
accuracy: 0.2778 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 419/800
864/864 [=====] - 2s 3ms/step - loss: 7.6030e-04 -
accuracy: 0.2512 - val_loss: 0.0044 - val_accuracy: 0.3505
Epoch 420/800
864/864 [=====] - 2s 3ms/step - loss: 8.5035e-04 -
accuracy: 0.2674 - val_loss: 0.0029 - val_accuracy: 0.2887
Epoch 421/800

864/864 [=====] - 2s 3ms/step - loss: 6.2083e-04 -
accuracy: 0.2685 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 422/800

864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2604 - val_loss: 0.0023 - val_accuracy: 0.3093
Epoch 423/800

864/864 [=====] - 2s 3ms/step - loss: 7.7193e-04 -
accuracy: 0.2708 - val_loss: 0.0029 - val_accuracy: 0.2371
Epoch 424/800

864/864 [=====] - 2s 3ms/step - loss: 6.0576e-04 -
accuracy: 0.2928 - val_loss: 0.0029 - val_accuracy: 0.2887
Epoch 425/800

864/864 [=====] - 3s 3ms/step - loss: 5.7945e-04 -
accuracy: 0.2894 - val_loss: 0.0029 - val_accuracy: 0.2990
Epoch 426/800

864/864 [=====] - 2s 3ms/step - loss: 5.4691e-04 -
accuracy: 0.2812 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 427/800

864/864 [=====] - 2s 3ms/step - loss: 5.4234e-04 -
accuracy: 0.2847 - val_loss: 0.0032 - val_accuracy: 0.2680
Epoch 428/800

864/864 [=====] - 3s 3ms/step - loss: 5.4950e-04 -
accuracy: 0.2720 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 429/800

864/864 [=====] - 2s 3ms/step - loss: 5.8086e-04 -
accuracy: 0.2963 - val_loss: 0.0031 - val_accuracy: 0.2680
Epoch 430/800

864/864 [=====] - 3s 3ms/step - loss: 5.5390e-04 -
accuracy: 0.2639 - val_loss: 0.0031 - val_accuracy: 0.2990
Epoch 431/800

864/864 [=====] - 2s 3ms/step - loss: 5.7242e-04 -
accuracy: 0.3021 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 432/800

864/864 [=====] - 2s 3ms/step - loss: 5.3488e-04 -
accuracy: 0.2569 - val_loss: 0.0032 - val_accuracy: 0.3093
Epoch 433/800

864/864 [=====] - 2s 3ms/step - loss: 5.3651e-04 -
accuracy: 0.2928 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 434/800

864/864 [=====] - 2s 3ms/step - loss: 5.4506e-04 -
accuracy: 0.2963 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 435/800

864/864 [=====] - 2s 3ms/step - loss: 5.7285e-04 -
accuracy: 0.2870 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 436/800

864/864 [=====] - 2s 3ms/step - loss: 5.4056e-04 -
accuracy: 0.2616 - val_loss: 0.0030 - val_accuracy: 0.2887
Epoch 437/800

864/864 [=====] - 2s 3ms/step - loss: 5.5896e-04 -
accuracy: 0.2697 - val_loss: 0.0032 - val_accuracy: 0.3093
Epoch 438/800
864/864 [=====] - 2s 3ms/step - loss: 5.3001e-04 -
accuracy: 0.2824 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 439/800
864/864 [=====] - 2s 3ms/step - loss: 5.6919e-04 -
accuracy: 0.2812 - val_loss: 0.0031 - val_accuracy: 0.2887
Epoch 440/800
864/864 [=====] - 2s 3ms/step - loss: 5.4788e-04 -
accuracy: 0.3067 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 441/800
864/864 [=====] - 2s 3ms/step - loss: 5.2984e-04 -
accuracy: 0.2836 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 442/800
864/864 [=====] - 2s 3ms/step - loss: 5.4164e-04 -
accuracy: 0.2639 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 443/800
864/864 [=====] - 2s 3ms/step - loss: 5.3823e-04 -
accuracy: 0.2998 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 444/800
864/864 [=====] - 2s 3ms/step - loss: 5.5637e-04 -
accuracy: 0.2685 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 445/800
864/864 [=====] - 2s 3ms/step - loss: 5.5690e-04 -
accuracy: 0.2894 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 446/800
864/864 [=====] - 2s 3ms/step - loss: 5.6304e-04 -
accuracy: 0.2789 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 447/800
864/864 [=====] - 2s 3ms/step - loss: 5.3126e-04 -
accuracy: 0.2812 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 448/800
864/864 [=====] - 2s 3ms/step - loss: 5.2968e-04 -
accuracy: 0.2917 - val_loss: 0.0031 - val_accuracy: 0.2990
Epoch 449/800
864/864 [=====] - 2s 3ms/step - loss: 5.2533e-04 -
accuracy: 0.2870 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 450/800
864/864 [=====] - 2s 3ms/step - loss: 5.4695e-04 -
accuracy: 0.2546 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 451/800
864/864 [=====] - 2s 3ms/step - loss: 5.7358e-04 -
accuracy: 0.2963 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 452/800
864/864 [=====] - 2s 3ms/step - loss: 6.7234e-04 -
accuracy: 0.2558 - val_loss: 0.0033 - val_accuracy: 0.3402
Epoch 453/800

864/864 [=====] - 2s 3ms/step - loss: 5.9633e-04 -
accuracy: 0.2789 - val_loss: 0.0031 - val_accuracy: 0.2990
Epoch 454/800
864/864 [=====] - 2s 3ms/step - loss: 9.2979e-04 -
accuracy: 0.2951 - val_loss: 0.0042 - val_accuracy: 0.3299
Epoch 455/800
864/864 [=====] - 2s 3ms/step - loss: 6.7592e-04 -
accuracy: 0.2743 - val_loss: 0.0031 - val_accuracy: 0.2784
Epoch 456/800
864/864 [=====] - 2s 3ms/step - loss: 5.6516e-04 -
accuracy: 0.2731 - val_loss: 0.0034 - val_accuracy: 0.2784
Epoch 457/800
864/864 [=====] - 2s 3ms/step - loss: 5.3211e-04 -
accuracy: 0.2778 - val_loss: 0.0033 - val_accuracy: 0.2062
Epoch 458/800
864/864 [=====] - 2s 3ms/step - loss: 5.3760e-04 -
accuracy: 0.3090 - val_loss: 0.0035 - val_accuracy: 0.2268
Epoch 459/800
864/864 [=====] - 2s 3ms/step - loss: 5.6077e-04 -
accuracy: 0.2720 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 460/800
864/864 [=====] - 2s 3ms/step - loss: 5.0678e-04 -
accuracy: 0.2975 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 461/800
864/864 [=====] - 2s 3ms/step - loss: 5.1640e-04 -
accuracy: 0.2801 - val_loss: 0.0034 - val_accuracy: 0.2990
Epoch 462/800
864/864 [=====] - 2s 3ms/step - loss: 5.2741e-04 -
accuracy: 0.2778 - val_loss: 0.0034 - val_accuracy: 0.3196
Epoch 463/800
864/864 [=====] - 2s 3ms/step - loss: 5.3316e-04 -
accuracy: 0.2986 - val_loss: 0.0033 - val_accuracy: 0.2887
Epoch 464/800
864/864 [=====] - 2s 3ms/step - loss: 5.2141e-04 -
accuracy: 0.3021 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 465/800
864/864 [=====] - 2s 3ms/step - loss: 5.2551e-04 -
accuracy: 0.2894 - val_loss: 0.0037 - val_accuracy: 0.2887
Epoch 466/800
864/864 [=====] - 2s 3ms/step - loss: 5.3375e-04 -
accuracy: 0.2894 - val_loss: 0.0034 - val_accuracy: 0.2784
Epoch 467/800
864/864 [=====] - 2s 3ms/step - loss: 5.6735e-04 -
accuracy: 0.3009 - val_loss: 0.0032 - val_accuracy: 0.3196
Epoch 468/800
864/864 [=====] - 2s 3ms/step - loss: 5.1861e-04 -
accuracy: 0.2859 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 469/800

864/864 [=====] - 2s 3ms/step - loss: 5.3050e-04 -
accuracy: 0.3032 - val_loss: 0.0034 - val_accuracy: 0.2577
Epoch 470/800
864/864 [=====] - 2s 3ms/step - loss: 5.1252e-04 -
accuracy: 0.2824 - val_loss: 0.0033 - val_accuracy: 0.2887
Epoch 471/800
864/864 [=====] - 2s 3ms/step - loss: 5.1480e-04 -
accuracy: 0.2917 - val_loss: 0.0033 - val_accuracy: 0.2784
Epoch 472/800
864/864 [=====] - 2s 3ms/step - loss: 5.1150e-04 -
accuracy: 0.2766 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 473/800
864/864 [=====] - 2s 3ms/step - loss: 5.1965e-04 -
accuracy: 0.2593 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 474/800
864/864 [=====] - 2s 3ms/step - loss: 5.0907e-04 -
accuracy: 0.2882 - val_loss: 0.0034 - val_accuracy: 0.2577
Epoch 475/800
864/864 [=====] - 2s 3ms/step - loss: 5.0727e-04 -
accuracy: 0.2905 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 476/800
864/864 [=====] - 2s 3ms/step - loss: 4.9903e-04 -
accuracy: 0.2951 - val_loss: 0.0034 - val_accuracy: 0.3505
Epoch 477/800
864/864 [=====] - 2s 3ms/step - loss: 5.0764e-04 -
accuracy: 0.3009 - val_loss: 0.0034 - val_accuracy: 0.2784
Epoch 478/800
864/864 [=====] - 2s 3ms/step - loss: 5.0838e-04 -
accuracy: 0.3079 - val_loss: 0.0035 - val_accuracy: 0.2577
Epoch 479/800
864/864 [=====] - 2s 3ms/step - loss: 5.2361e-04 -
accuracy: 0.2477 - val_loss: 0.0034 - val_accuracy: 0.2577
Epoch 480/800
864/864 [=====] - 2s 3ms/step - loss: 6.4488e-04 -
accuracy: 0.2963 - val_loss: 0.0035 - val_accuracy: 0.2887
Epoch 481/800
864/864 [=====] - 2s 3ms/step - loss: 7.6932e-04 -
accuracy: 0.2523 - val_loss: 0.0037 - val_accuracy: 0.2784
Epoch 482/800
864/864 [=====] - 2s 3ms/step - loss: 0.0021 -
accuracy: 0.2535 - val_loss: 0.0078 - val_accuracy: 0.3608
Epoch 483/800
864/864 [=====] - 2s 3ms/step - loss: 0.0027 -
accuracy: 0.2083 - val_loss: 0.0028 - val_accuracy: 0.2474
Epoch 484/800
864/864 [=====] - 2s 3ms/step - loss: 0.0012 -
accuracy: 0.2280 - val_loss: 0.0030 - val_accuracy: 0.3093
Epoch 485/800

864/864 [=====] - 2s 3ms/step - loss: 8.1927e-04 -
accuracy: 0.2697 - val_loss: 0.0028 - val_accuracy: 0.2887
Epoch 486/800

864/864 [=====] - 2s 3ms/step - loss: 6.4913e-04 -
accuracy: 0.2512 - val_loss: 0.0028 - val_accuracy: 0.3093
Epoch 487/800

864/864 [=====] - 3s 3ms/step - loss: 5.6950e-04 -
accuracy: 0.2720 - val_loss: 0.0032 - val_accuracy: 0.3093
Epoch 488/800

864/864 [=====] - 3s 3ms/step - loss: 5.4703e-04 -
accuracy: 0.2870 - val_loss: 0.0033 - val_accuracy: 0.3299
Epoch 489/800

864/864 [=====] - 3s 3ms/step - loss: 5.3056e-04 -
accuracy: 0.2627 - val_loss: 0.0032 - val_accuracy: 0.3196
Epoch 490/800

864/864 [=====] - 4s 4ms/step - loss: 5.4225e-04 -
accuracy: 0.2801 - val_loss: 0.0033 - val_accuracy: 0.3196
Epoch 491/800

864/864 [=====] - 2s 3ms/step - loss: 5.2734e-04 -
accuracy: 0.2859 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 492/800

864/864 [=====] - 2s 3ms/step - loss: 5.1573e-04 -
accuracy: 0.2812 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 493/800

864/864 [=====] - 2s 3ms/step - loss: 5.2277e-04 -
accuracy: 0.2685 - val_loss: 0.0032 - val_accuracy: 0.2990
Epoch 494/800

864/864 [=====] - 3s 3ms/step - loss: 5.1386e-04 -
accuracy: 0.2986 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 495/800

864/864 [=====] - 3s 3ms/step - loss: 5.0416e-04 -
accuracy: 0.2685 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 496/800

864/864 [=====] - 2s 3ms/step - loss: 4.9129e-04 -
accuracy: 0.2917 - val_loss: 0.0033 - val_accuracy: 0.3196
Epoch 497/800

864/864 [=====] - 2s 3ms/step - loss: 5.1278e-04 -
accuracy: 0.2778 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 498/800

864/864 [=====] - 2s 3ms/step - loss: 5.1239e-04 -
accuracy: 0.2685 - val_loss: 0.0032 - val_accuracy: 0.2887
Epoch 499/800

864/864 [=====] - 2s 3ms/step - loss: 4.9323e-04 -
accuracy: 0.2685 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 500/800

864/864 [=====] - 2s 3ms/step - loss: 5.1982e-04 -
accuracy: 0.2975 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 501/800

864/864 [=====] - 3s 3ms/step - loss: 5.1167e-04 - accuracy: 0.3125 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 502/800
864/864 [=====] - 2s 3ms/step - loss: 4.8696e-04 - accuracy: 0.2581 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 503/800
864/864 [=====] - 3s 3ms/step - loss: 4.8783e-04 - accuracy: 0.2847 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 504/800
864/864 [=====] - 2s 3ms/step - loss: 4.9872e-04 - accuracy: 0.2986 - val_loss: 0.0034 - val_accuracy: 0.2577
Epoch 505/800
864/864 [=====] - 3s 3ms/step - loss: 5.0440e-04 - accuracy: 0.2720 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 506/800
864/864 [=====] - 2s 3ms/step - loss: 4.8086e-04 - accuracy: 0.2882 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 507/800
864/864 [=====] - 2s 3ms/step - loss: 4.8212e-04 - accuracy: 0.2650 - val_loss: 0.0034 - val_accuracy: 0.3402
Epoch 508/800
864/864 [=====] - 3s 3ms/step - loss: 5.1087e-04 - accuracy: 0.2836 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 509/800
864/864 [=====] - 3s 4ms/step - loss: 5.0652e-04 - accuracy: 0.2674 - val_loss: 0.0035 - val_accuracy: 0.2784
Epoch 510/800
864/864 [=====] - 3s 3ms/step - loss: 5.3666e-04 - accuracy: 0.2812 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 511/800
864/864 [=====] - 2s 3ms/step - loss: 5.0538e-04 - accuracy: 0.2743 - val_loss: 0.0037 - val_accuracy: 0.2680
Epoch 512/800
864/864 [=====] - 2s 3ms/step - loss: 4.8198e-04 - accuracy: 0.2743 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 513/800
864/864 [=====] - 2s 3ms/step - loss: 4.8860e-04 - accuracy: 0.2708 - val_loss: 0.0035 - val_accuracy: 0.3196
Epoch 514/800
864/864 [=====] - 2s 3ms/step - loss: 4.8892e-04 - accuracy: 0.2616 - val_loss: 0.0033 - val_accuracy: 0.2577
Epoch 515/800
864/864 [=====] - 2s 3ms/step - loss: 4.9997e-04 - accuracy: 0.3009 - val_loss: 0.0033 - val_accuracy: 0.2887
Epoch 516/800
864/864 [=====] - 2s 3ms/step - loss: 5.3224e-04 - accuracy: 0.2697 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 517/800

864/864 [=====] - 2s 3ms/step - loss: 5.3430e-04 -
accuracy: 0.2743 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 518/800
864/864 [=====] - 2s 3ms/step - loss: 5.1762e-04 -
accuracy: 0.2755 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 519/800
864/864 [=====] - 2s 3ms/step - loss: 4.9066e-04 -
accuracy: 0.2917 - val_loss: 0.0035 - val_accuracy: 0.3402
Epoch 520/800
864/864 [=====] - 2s 3ms/step - loss: 4.8486e-04 -
accuracy: 0.2731 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 521/800
864/864 [=====] - 2s 3ms/step - loss: 4.9206e-04 -
accuracy: 0.2975 - val_loss: 0.0034 - val_accuracy: 0.2680
Epoch 522/800
864/864 [=====] - 3s 3ms/step - loss: 4.9453e-04 -
accuracy: 0.2650 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 523/800
864/864 [=====] - 2s 3ms/step - loss: 4.9087e-04 -
accuracy: 0.3009 - val_loss: 0.0037 - val_accuracy: 0.3196
Epoch 524/800
864/864 [=====] - 3s 3ms/step - loss: 5.0940e-04 -
accuracy: 0.3009 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 525/800
864/864 [=====] - 2s 3ms/step - loss: 4.9564e-04 -
accuracy: 0.2940 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 526/800
864/864 [=====] - 3s 3ms/step - loss: 4.7602e-04 -
accuracy: 0.2639 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 527/800
864/864 [=====] - 3s 3ms/step - loss: 4.9214e-04 -
accuracy: 0.2940 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 528/800
864/864 [=====] - 3s 3ms/step - loss: 4.7887e-04 -
accuracy: 0.2743 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 529/800
864/864 [=====] - 3s 3ms/step - loss: 4.9581e-04 -
accuracy: 0.2894 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 530/800
864/864 [=====] - 3s 3ms/step - loss: 5.1528e-04 -
accuracy: 0.2859 - val_loss: 0.0033 - val_accuracy: 0.2577
Epoch 531/800
864/864 [=====] - 2s 3ms/step - loss: 6.2649e-04 -
accuracy: 0.2720 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 532/800
864/864 [=====] - 2s 3ms/step - loss: 5.0633e-04 -
accuracy: 0.2951 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 533/800

864/864 [=====] - 2s 3ms/step - loss: 5.3624e-04 - accuracy: 0.2639 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 534/800
864/864 [=====] - 2s 3ms/step - loss: 5.0965e-04 - accuracy: 0.2755 - val_loss: 0.0040 - val_accuracy: 0.3402
Epoch 535/800
864/864 [=====] - 2s 3ms/step - loss: 6.0022e-04 - accuracy: 0.2535 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 536/800
864/864 [=====] - 3s 3ms/step - loss: 5.2652e-04 - accuracy: 0.2870 - val_loss: 0.0037 - val_accuracy: 0.2784
Epoch 537/800
864/864 [=====] - 2s 3ms/step - loss: 5.7325e-04 - accuracy: 0.2650 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 538/800
864/864 [=====] - 2s 3ms/step - loss: 5.1529e-04 - accuracy: 0.2905 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 539/800
864/864 [=====] - 2s 3ms/step - loss: 4.7959e-04 - accuracy: 0.2477 - val_loss: 0.0035 - val_accuracy: 0.2474
Epoch 540/800
864/864 [=====] - 3s 3ms/step - loss: 4.7354e-04 - accuracy: 0.2986 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 541/800
864/864 [=====] - 3s 3ms/step - loss: 4.7564e-04 - accuracy: 0.2708 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 542/800
864/864 [=====] - 2s 3ms/step - loss: 4.8089e-04 - accuracy: 0.2998 - val_loss: 0.0037 - val_accuracy: 0.2680
Epoch 543/800
864/864 [=====] - 2s 3ms/step - loss: 4.7990e-04 - accuracy: 0.2824 - val_loss: 0.0034 - val_accuracy: 0.2784
Epoch 544/800
864/864 [=====] - 2s 3ms/step - loss: 4.6289e-04 - accuracy: 0.3102 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 545/800
864/864 [=====] - 2s 3ms/step - loss: 4.8358e-04 - accuracy: 0.2720 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 546/800
864/864 [=====] - 2s 3ms/step - loss: 5.2747e-04 - accuracy: 0.2755 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 547/800
864/864 [=====] - 2s 3ms/step - loss: 5.3839e-04 - accuracy: 0.2882 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 548/800
864/864 [=====] - 2s 3ms/step - loss: 4.9070e-04 - accuracy: 0.2859 - val_loss: 0.0037 - val_accuracy: 0.3196
Epoch 549/800

864/864 [=====] - 2s 3ms/step - loss: 4.6913e-04 -
accuracy: 0.2812 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 550/800
864/864 [=====] - 2s 3ms/step - loss: 4.6854e-04 -
accuracy: 0.2940 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 551/800
864/864 [=====] - 2s 3ms/step - loss: 4.6744e-04 -
accuracy: 0.3032 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 552/800
864/864 [=====] - 2s 3ms/step - loss: 4.8193e-04 -
accuracy: 0.2859 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 553/800
864/864 [=====] - 2s 3ms/step - loss: 7.7170e-04 -
accuracy: 0.2708 - val_loss: 0.0035 - val_accuracy: 0.2371
Epoch 554/800
864/864 [=====] - 2s 3ms/step - loss: 7.8486e-04 -
accuracy: 0.2789 - val_loss: 0.0031 - val_accuracy: 0.2577
Epoch 555/800
864/864 [=====] - 2s 3ms/step - loss: 6.2833e-04 -
accuracy: 0.2674 - val_loss: 0.0035 - val_accuracy: 0.3608
Epoch 556/800
864/864 [=====] - 2s 3ms/step - loss: 5.5313e-04 -
accuracy: 0.2593 - val_loss: 0.0035 - val_accuracy: 0.3608
Epoch 557/800
864/864 [=====] - 2s 3ms/step - loss: 4.7656e-04 -
accuracy: 0.2847 - val_loss: 0.0032 - val_accuracy: 0.2784
Epoch 558/800
864/864 [=====] - 2s 3ms/step - loss: 4.6196e-04 -
accuracy: 0.2662 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 559/800
864/864 [=====] - 2s 3ms/step - loss: 4.6357e-04 -
accuracy: 0.2928 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 560/800
864/864 [=====] - 2s 3ms/step - loss: 4.7299e-04 -
accuracy: 0.2789 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 561/800
864/864 [=====] - 2s 3ms/step - loss: 4.6938e-04 -
accuracy: 0.3009 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 562/800
864/864 [=====] - 2s 3ms/step - loss: 4.7315e-04 -
accuracy: 0.2905 - val_loss: 0.0039 - val_accuracy: 0.3196
Epoch 563/800
864/864 [=====] - 2s 3ms/step - loss: 5.0107e-04 -
accuracy: 0.2755 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 564/800
864/864 [=====] - 2s 3ms/step - loss: 4.5928e-04 -
accuracy: 0.2882 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 565/800

864/864 [=====] - 3s 3ms/step - loss: 4.5514e-04 -
accuracy: 0.2685 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 566/800
864/864 [=====] - 2s 3ms/step - loss: 4.5384e-04 -
accuracy: 0.3148 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 567/800
864/864 [=====] - 3s 3ms/step - loss: 4.5518e-04 -
accuracy: 0.2905 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 568/800
864/864 [=====] - 2s 3ms/step - loss: 4.5466e-04 -
accuracy: 0.2593 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 569/800
864/864 [=====] - 3s 3ms/step - loss: 4.6443e-04 -
accuracy: 0.2836 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 570/800
864/864 [=====] - 3s 3ms/step - loss: 4.6805e-04 -
accuracy: 0.2743 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 571/800
864/864 [=====] - 2s 3ms/step - loss: 4.9146e-04 -
accuracy: 0.2998 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 572/800
864/864 [=====] - 2s 3ms/step - loss: 4.7735e-04 -
accuracy: 0.3067 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 573/800
864/864 [=====] - 3s 3ms/step - loss: 4.7686e-04 -
accuracy: 0.2789 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 574/800
864/864 [=====] - 2s 3ms/step - loss: 4.7355e-04 -
accuracy: 0.2963 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 575/800
864/864 [=====] - 2s 3ms/step - loss: 5.0679e-04 -
accuracy: 0.2940 - val_loss: 0.0036 - val_accuracy: 0.2680
Epoch 576/800
864/864 [=====] - 3s 3ms/step - loss: 5.7619e-04 -
accuracy: 0.2639 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 577/800
864/864 [=====] - 2s 3ms/step - loss: 6.6769e-04 -
accuracy: 0.2674 - val_loss: 0.0035 - val_accuracy: 0.3196
Epoch 578/800
864/864 [=====] - 3s 4ms/step - loss: 5.6374e-04 -
accuracy: 0.2639 - val_loss: 0.0033 - val_accuracy: 0.2990
Epoch 579/800
864/864 [=====] - 3s 3ms/step - loss: 4.8180e-04 -
accuracy: 0.2847 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 580/800
864/864 [=====] - 2s 3ms/step - loss: 4.7345e-04 -
accuracy: 0.2593 - val_loss: 0.0035 - val_accuracy: 0.2680
Epoch 581/800

864/864 [=====] - 2s 3ms/step - loss: 4.5635e-04 -
accuracy: 0.2882 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 582/800
864/864 [=====] - 3s 4ms/step - loss: 4.6314e-04 -
accuracy: 0.2627 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 583/800
864/864 [=====] - 3s 3ms/step - loss: 4.6103e-04 -
accuracy: 0.2940 - val_loss: 0.0035 - val_accuracy: 0.3196
Epoch 584/800
864/864 [=====] - 2s 3ms/step - loss: 4.6912e-04 -
accuracy: 0.2801 - val_loss: 0.0035 - val_accuracy: 0.2577
Epoch 585/800
864/864 [=====] - 3s 3ms/step - loss: 4.8071e-04 -
accuracy: 0.2963 - val_loss: 0.0043 - val_accuracy: 0.3299
Epoch 586/800
864/864 [=====] - 2s 3ms/step - loss: 4.7994e-04 -
accuracy: 0.2870 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 587/800
864/864 [=====] - 3s 3ms/step - loss: 4.7294e-04 -
accuracy: 0.2928 - val_loss: 0.0038 - val_accuracy: 0.3196
Epoch 588/800
864/864 [=====] - 2s 3ms/step - loss: 4.8410e-04 -
accuracy: 0.2882 - val_loss: 0.0037 - val_accuracy: 0.2268
Epoch 589/800
864/864 [=====] - 3s 3ms/step - loss: 4.6574e-04 -
accuracy: 0.2870 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 590/800
864/864 [=====] - 2s 3ms/step - loss: 4.6298e-04 -
accuracy: 0.2812 - val_loss: 0.0039 - val_accuracy: 0.3196
Epoch 591/800
864/864 [=====] - 2s 3ms/step - loss: 4.9415e-04 -
accuracy: 0.2986 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 592/800
864/864 [=====] - 2s 3ms/step - loss: 4.5568e-04 -
accuracy: 0.2928 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 593/800
864/864 [=====] - 2s 3ms/step - loss: 4.8156e-04 -
accuracy: 0.2986 - val_loss: 0.0037 - val_accuracy: 0.2680
Epoch 594/800
864/864 [=====] - 2s 3ms/step - loss: 5.7316e-04 -
accuracy: 0.2975 - val_loss: 0.0033 - val_accuracy: 0.2680
Epoch 595/800
864/864 [=====] - 2s 3ms/step - loss: 5.0656e-04 -
accuracy: 0.2963 - val_loss: 0.0035 - val_accuracy: 0.2784
Epoch 596/800
864/864 [=====] - 2s 3ms/step - loss: 4.9483e-04 -
accuracy: 0.2789 - val_loss: 0.0039 - val_accuracy: 0.2165
Epoch 597/800

864/864 [=====] - 2s 3ms/step - loss: 4.9024e-04 -
accuracy: 0.2766 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 598/800
864/864 [=====] - 2s 3ms/step - loss: 4.7253e-04 -
accuracy: 0.2674 - val_loss: 0.0037 - val_accuracy: 0.3196
Epoch 599/800
864/864 [=====] - 2s 3ms/step - loss: 4.6047e-04 -
accuracy: 0.2986 - val_loss: 0.0038 - val_accuracy: 0.3196
Epoch 600/800
864/864 [=====] - 2s 3ms/step - loss: 4.9221e-04 -
accuracy: 0.3067 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 601/800
864/864 [=====] - 2s 3ms/step - loss: 4.5692e-04 -
accuracy: 0.2870 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 602/800
864/864 [=====] - 2s 3ms/step - loss: 4.5522e-04 -
accuracy: 0.2951 - val_loss: 0.0036 - val_accuracy: 0.2577
Epoch 603/800
864/864 [=====] - 2s 3ms/step - loss: 4.7727e-04 -
accuracy: 0.2789 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 604/800
864/864 [=====] - 3s 3ms/step - loss: 5.1182e-04 -
accuracy: 0.3079 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 605/800
864/864 [=====] - 2s 3ms/step - loss: 4.6544e-04 -
accuracy: 0.2917 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 606/800
864/864 [=====] - 2s 3ms/step - loss: 4.4829e-04 -
accuracy: 0.2836 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 607/800
864/864 [=====] - 2s 3ms/step - loss: 4.4081e-04 -
accuracy: 0.3009 - val_loss: 0.0038 - val_accuracy: 0.2577
Epoch 608/800
864/864 [=====] - 2s 3ms/step - loss: 4.4035e-04 -
accuracy: 0.2847 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 609/800
864/864 [=====] - 2s 3ms/step - loss: 4.4528e-04 -
accuracy: 0.2766 - val_loss: 0.0037 - val_accuracy: 0.3196
Epoch 610/800
864/864 [=====] - 2s 3ms/step - loss: 4.5630e-04 -
accuracy: 0.2859 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 611/800
864/864 [=====] - 2s 3ms/step - loss: 4.4383e-04 -
accuracy: 0.2986 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 612/800
864/864 [=====] - 2s 3ms/step - loss: 4.4331e-04 -
accuracy: 0.2616 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 613/800

864/864 [=====] - 2s 3ms/step - loss: 4.5045e-04 -
accuracy: 0.2859 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 614/800
864/864 [=====] - 2s 3ms/step - loss: 5.5378e-04 -
accuracy: 0.2975 - val_loss: 0.0033 - val_accuracy: 0.3196
Epoch 615/800
864/864 [=====] - 3s 3ms/step - loss: 4.9361e-04 -
accuracy: 0.2604 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 616/800
864/864 [=====] - 3s 3ms/step - loss: 4.5471e-04 -
accuracy: 0.3102 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 617/800
864/864 [=====] - 2s 3ms/step - loss: 4.3559e-04 -
accuracy: 0.2975 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 618/800
864/864 [=====] - 2s 3ms/step - loss: 4.4747e-04 -
accuracy: 0.2998 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 619/800
864/864 [=====] - 3s 3ms/step - loss: 4.3420e-04 -
accuracy: 0.2812 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 620/800
864/864 [=====] - 2s 3ms/step - loss: 4.6781e-04 -
accuracy: 0.2963 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 621/800
864/864 [=====] - 2s 3ms/step - loss: 4.4505e-04 -
accuracy: 0.2859 - val_loss: 0.0040 - val_accuracy: 0.3093
Epoch 622/800
864/864 [=====] - 2s 3ms/step - loss: 4.5329e-04 -
accuracy: 0.3032 - val_loss: 0.0039 - val_accuracy: 0.3299
Epoch 623/800
864/864 [=====] - 2s 3ms/step - loss: 4.9429e-04 -
accuracy: 0.2940 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 624/800
864/864 [=====] - 2s 3ms/step - loss: 4.7912e-04 -
accuracy: 0.2975 - val_loss: 0.0034 - val_accuracy: 0.3093
Epoch 625/800
864/864 [=====] - 2s 3ms/step - loss: 4.4023e-04 -
accuracy: 0.2720 - val_loss: 0.0036 - val_accuracy: 0.2577
Epoch 626/800
864/864 [=====] - 2s 3ms/step - loss: 4.3724e-04 -
accuracy: 0.2986 - val_loss: 0.0038 - val_accuracy: 0.2784
Epoch 627/800
864/864 [=====] - 2s 3ms/step - loss: 4.4473e-04 -
accuracy: 0.2940 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 628/800
864/864 [=====] - 2s 3ms/step - loss: 4.5230e-04 -
accuracy: 0.2951 - val_loss: 0.0038 - val_accuracy: 0.2474
Epoch 629/800

864/864 [=====] - 2s 3ms/step - loss: 4.4404e-04 -
accuracy: 0.2604 - val_loss: 0.0035 - val_accuracy: 0.2887
Epoch 630/800
864/864 [=====] - 2s 3ms/step - loss: 4.2625e-04 -
accuracy: 0.2801 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 631/800
864/864 [=====] - 2s 3ms/step - loss: 4.3100e-04 -
accuracy: 0.3160 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 632/800
864/864 [=====] - 3s 3ms/step - loss: 4.2980e-04 -
accuracy: 0.2697 - val_loss: 0.0037 - val_accuracy: 0.2062
Epoch 633/800
864/864 [=====] - 3s 3ms/step - loss: 4.4058e-04 -
accuracy: 0.2778 - val_loss: 0.0036 - val_accuracy: 0.3402
Epoch 634/800
864/864 [=====] - 3s 3ms/step - loss: 4.6227e-04 -
accuracy: 0.2593 - val_loss: 0.0039 - val_accuracy: 0.2990
Epoch 635/800
864/864 [=====] - 3s 4ms/step - loss: 4.4897e-04 -
accuracy: 0.2928 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 636/800
864/864 [=====] - 3s 4ms/step - loss: 4.6994e-04 -
accuracy: 0.3032 - val_loss: 0.0038 - val_accuracy: 0.2784
Epoch 637/800
864/864 [=====] - 3s 4ms/step - loss: 4.4430e-04 -
accuracy: 0.3125 - val_loss: 0.0037 - val_accuracy: 0.3402
Epoch 638/800
864/864 [=====] - 3s 3ms/step - loss: 4.3081e-04 -
accuracy: 0.2766 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 639/800
864/864 [=====] - 3s 3ms/step - loss: 4.2438e-04 -
accuracy: 0.2581 - val_loss: 0.0037 - val_accuracy: 0.2887
Epoch 640/800
864/864 [=====] - 3s 3ms/step - loss: 4.3874e-04 -
accuracy: 0.2928 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 641/800
864/864 [=====] - 3s 3ms/step - loss: 4.2261e-04 -
accuracy: 0.2882 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 642/800
864/864 [=====] - 3s 3ms/step - loss: 4.2411e-04 -
accuracy: 0.2847 - val_loss: 0.0038 - val_accuracy: 0.2371
Epoch 643/800
864/864 [=====] - 3s 3ms/step - loss: 4.2410e-04 -
accuracy: 0.2708 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 644/800
864/864 [=====] - 3s 3ms/step - loss: 5.1976e-04 -
accuracy: 0.2870 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 645/800

864/864 [=====] - 3s 3ms/step - loss: 4.9284e-04 -
accuracy: 0.3113 - val_loss: 0.0039 - val_accuracy: 0.2990
Epoch 646/800
864/864 [=====] - 3s 3ms/step - loss: 4.3771e-04 -
accuracy: 0.2882 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 647/800
864/864 [=====] - 3s 3ms/step - loss: 4.4617e-04 -
accuracy: 0.3194 - val_loss: 0.0036 - val_accuracy: 0.2371
Epoch 648/800
864/864 [=====] - 3s 3ms/step - loss: 4.2071e-04 -
accuracy: 0.2940 - val_loss: 0.0037 - val_accuracy: 0.2887
Epoch 649/800
864/864 [=====] - 3s 3ms/step - loss: 5.2017e-04 -
accuracy: 0.2917 - val_loss: 0.0034 - val_accuracy: 0.2990
Epoch 650/800
864/864 [=====] - 3s 3ms/step - loss: 4.3481e-04 -
accuracy: 0.2639 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 651/800
864/864 [=====] - 3s 3ms/step - loss: 4.2506e-04 -
accuracy: 0.3021 - val_loss: 0.0038 - val_accuracy: 0.2474
Epoch 652/800
864/864 [=====] - 3s 3ms/step - loss: 4.4661e-04 -
accuracy: 0.2870 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 653/800
864/864 [=====] - 3s 4ms/step - loss: 4.9720e-04 -
accuracy: 0.2963 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 654/800
864/864 [=====] - 3s 4ms/step - loss: 4.9394e-04 -
accuracy: 0.2882 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 655/800
864/864 [=====] - 4s 4ms/step - loss: 4.8723e-04 -
accuracy: 0.2650 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 656/800
864/864 [=====] - 3s 3ms/step - loss: 4.3607e-04 -
accuracy: 0.3079 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 657/800
864/864 [=====] - 3s 3ms/step - loss: 4.3466e-04 -
accuracy: 0.2905 - val_loss: 0.0035 - val_accuracy: 0.2887
Epoch 658/800
864/864 [=====] - 3s 3ms/step - loss: 4.1875e-04 -
accuracy: 0.2870 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 659/800
864/864 [=====] - 4s 5ms/step - loss: 4.1596e-04 -
accuracy: 0.3113 - val_loss: 0.0035 - val_accuracy: 0.2887
Epoch 660/800
864/864 [=====] - 3s 3ms/step - loss: 4.2212e-04 -
accuracy: 0.2697 - val_loss: 0.0037 - val_accuracy: 0.2062
Epoch 661/800

864/864 [=====] - 2s 3ms/step - loss: 4.2727e-04 -
accuracy: 0.3044 - val_loss: 0.0040 - val_accuracy: 0.2990
Epoch 662/800
864/864 [=====] - 2s 3ms/step - loss: 4.1491e-04 -
accuracy: 0.2847 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 663/800
864/864 [=====] - 2s 3ms/step - loss: 6.0653e-04 -
accuracy: 0.2894 - val_loss: 0.0048 - val_accuracy: 0.2268
Epoch 664/800
864/864 [=====] - 2s 3ms/step - loss: 9.8719e-04 -
accuracy: 0.2801 - val_loss: 0.0032 - val_accuracy: 0.3093
Epoch 665/800
864/864 [=====] - 2s 3ms/step - loss: 5.3990e-04 -
accuracy: 0.2801 - val_loss: 0.0036 - val_accuracy: 0.2371
Epoch 666/800
864/864 [=====] - 2s 3ms/step - loss: 4.6940e-04 -
accuracy: 0.2928 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 667/800
864/864 [=====] - 2s 3ms/step - loss: 4.4019e-04 -
accuracy: 0.2847 - val_loss: 0.0040 - val_accuracy: 0.2680
Epoch 668/800
864/864 [=====] - 2s 3ms/step - loss: 4.4406e-04 -
accuracy: 0.2963 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 669/800
864/864 [=====] - 2s 3ms/step - loss: 4.2016e-04 -
accuracy: 0.2847 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 670/800
864/864 [=====] - 2s 3ms/step - loss: 4.2103e-04 -
accuracy: 0.2743 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 671/800
864/864 [=====] - 2s 3ms/step - loss: 4.1375e-04 -
accuracy: 0.3252 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 672/800
864/864 [=====] - 2s 3ms/step - loss: 4.0469e-04 -
accuracy: 0.3067 - val_loss: 0.0037 - val_accuracy: 0.2887
Epoch 673/800
864/864 [=====] - 2s 3ms/step - loss: 4.0949e-04 -
accuracy: 0.2905 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 674/800
864/864 [=====] - 2s 3ms/step - loss: 4.1411e-04 -
accuracy: 0.2731 - val_loss: 0.0033 - val_accuracy: 0.3093
Epoch 675/800
864/864 [=====] - 2s 3ms/step - loss: 4.2367e-04 -
accuracy: 0.2940 - val_loss: 0.0034 - val_accuracy: 0.2887
Epoch 676/800
864/864 [=====] - 2s 3ms/step - loss: 4.6034e-04 -
accuracy: 0.3102 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 677/800

864/864 [=====] - 2s 3ms/step - loss: 4.2753e-04 -
accuracy: 0.2986 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 678/800
864/864 [=====] - 2s 3ms/step - loss: 4.1671e-04 -
accuracy: 0.2755 - val_loss: 0.0040 - val_accuracy: 0.2165
Epoch 679/800
864/864 [=====] - 2s 3ms/step - loss: 4.2154e-04 -
accuracy: 0.3148 - val_loss: 0.0041 - val_accuracy: 0.2268
Epoch 680/800
864/864 [=====] - 2s 3ms/step - loss: 4.0193e-04 -
accuracy: 0.2743 - val_loss: 0.0035 - val_accuracy: 0.3093
Epoch 681/800
864/864 [=====] - 2s 3ms/step - loss: 4.0751e-04 -
accuracy: 0.2894 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 682/800
864/864 [=====] - 2s 3ms/step - loss: 4.0902e-04 -
accuracy: 0.2870 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 683/800
864/864 [=====] - 2s 3ms/step - loss: 3.9393e-04 -
accuracy: 0.3102 - val_loss: 0.0037 - val_accuracy: 0.2165
Epoch 684/800
864/864 [=====] - 2s 3ms/step - loss: 4.0619e-04 -
accuracy: 0.2928 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 685/800
864/864 [=====] - 2s 3ms/step - loss: 3.9963e-04 -
accuracy: 0.3079 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 686/800
864/864 [=====] - 2s 3ms/step - loss: 4.0841e-04 -
accuracy: 0.3090 - val_loss: 0.0040 - val_accuracy: 0.3402
Epoch 687/800
864/864 [=====] - 2s 3ms/step - loss: 3.8833e-04 -
accuracy: 0.2928 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 688/800
864/864 [=====] - 3s 3ms/step - loss: 3.9121e-04 -
accuracy: 0.2882 - val_loss: 0.0039 - val_accuracy: 0.3196
Epoch 689/800
864/864 [=====] - 2s 3ms/step - loss: 3.9130e-04 -
accuracy: 0.2998 - val_loss: 0.0038 - val_accuracy: 0.2577
Epoch 690/800
864/864 [=====] - 3s 3ms/step - loss: 4.1291e-04 -
accuracy: 0.2836 - val_loss: 0.0039 - val_accuracy: 0.2165
Epoch 691/800
864/864 [=====] - 3s 3ms/step - loss: 3.9726e-04 -
accuracy: 0.3032 - val_loss: 0.0037 - val_accuracy: 0.2474
Epoch 692/800
864/864 [=====] - 2s 3ms/step - loss: 4.0953e-04 -
accuracy: 0.3056 - val_loss: 0.0037 - val_accuracy: 0.2165
Epoch 693/800

864/864 [=====] - 2s 3ms/step - loss: 4.3948e-04 -
accuracy: 0.3125 - val_loss: 0.0038 - val_accuracy: 0.2062
Epoch 694/800
864/864 [=====] - 2s 3ms/step - loss: 4.0589e-04 -
accuracy: 0.3183 - val_loss: 0.0039 - val_accuracy: 0.3402
Epoch 695/800
864/864 [=====] - 2s 3ms/step - loss: 4.1748e-04 -
accuracy: 0.2789 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 696/800
864/864 [=====] - 2s 3ms/step - loss: 4.1606e-04 -
accuracy: 0.2998 - val_loss: 0.0035 - val_accuracy: 0.2887
Epoch 697/800
864/864 [=====] - 2s 3ms/step - loss: 5.0774e-04 -
accuracy: 0.2697 - val_loss: 0.0040 - val_accuracy: 0.2990
Epoch 698/800
864/864 [=====] - 2s 3ms/step - loss: 4.4166e-04 -
accuracy: 0.2697 - val_loss: 0.0035 - val_accuracy: 0.3402
Epoch 699/800
864/864 [=====] - 3s 3ms/step - loss: 4.1213e-04 -
accuracy: 0.2859 - val_loss: 0.0040 - val_accuracy: 0.2062
Epoch 700/800
864/864 [=====] - 2s 3ms/step - loss: 4.4022e-04 -
accuracy: 0.3056 - val_loss: 0.0038 - val_accuracy: 0.2474
Epoch 701/800
864/864 [=====] - 2s 3ms/step - loss: 4.1587e-04 -
accuracy: 0.3021 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 702/800
864/864 [=====] - 2s 3ms/step - loss: 4.0036e-04 -
accuracy: 0.2685 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 703/800
864/864 [=====] - 2s 3ms/step - loss: 3.9709e-04 -
accuracy: 0.2824 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 704/800
864/864 [=====] - 2s 3ms/step - loss: 4.0159e-04 -
accuracy: 0.3125 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 705/800
864/864 [=====] - 2s 3ms/step - loss: 3.7832e-04 -
accuracy: 0.2812 - val_loss: 0.0039 - val_accuracy: 0.3196
Epoch 706/800
864/864 [=====] - 2s 3ms/step - loss: 3.9265e-04 -
accuracy: 0.2824 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 707/800
864/864 [=====] - 2s 3ms/step - loss: 4.0002e-04 -
accuracy: 0.3021 - val_loss: 0.0038 - val_accuracy: 0.2371
Epoch 708/800
864/864 [=====] - 2s 3ms/step - loss: 3.9017e-04 -
accuracy: 0.2882 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 709/800

864/864 [=====] - 2s 3ms/step - loss: 4.1292e-04 -
accuracy: 0.3090 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 710/800
864/864 [=====] - 3s 3ms/step - loss: 4.5457e-04 -
accuracy: 0.2847 - val_loss: 0.0039 - val_accuracy: 0.2680
Epoch 711/800
864/864 [=====] - 2s 3ms/step - loss: 5.2238e-04 -
accuracy: 0.2917 - val_loss: 0.0031 - val_accuracy: 0.2268
Epoch 712/800
864/864 [=====] - 2s 3ms/step - loss: 4.1636e-04 -
accuracy: 0.2859 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 713/800
864/864 [=====] - 2s 3ms/step - loss: 3.8371e-04 -
accuracy: 0.3044 - val_loss: 0.0043 - val_accuracy: 0.2990
Epoch 714/800
864/864 [=====] - 2s 3ms/step - loss: 4.2664e-04 -
accuracy: 0.2905 - val_loss: 0.0037 - val_accuracy: 0.2577
Epoch 715/800
864/864 [=====] - 2s 3ms/step - loss: 6.4815e-04 -
accuracy: 0.2975 - val_loss: 0.0032 - val_accuracy: 0.3196
Epoch 716/800
864/864 [=====] - 2s 3ms/step - loss: 5.3835e-04 -
accuracy: 0.2755 - val_loss: 0.0036 - val_accuracy: 0.3196
Epoch 717/800
864/864 [=====] - 2s 3ms/step - loss: 4.0727e-04 -
accuracy: 0.2755 - val_loss: 0.0034 - val_accuracy: 0.2268
Epoch 718/800
864/864 [=====] - 2s 3ms/step - loss: 4.1398e-04 -
accuracy: 0.2836 - val_loss: 0.0041 - val_accuracy: 0.3299
Epoch 719/800
864/864 [=====] - 2s 3ms/step - loss: 4.4396e-04 -
accuracy: 0.3137 - val_loss: 0.0035 - val_accuracy: 0.2165
Epoch 720/800
864/864 [=====] - 2s 3ms/step - loss: 4.7331e-04 -
accuracy: 0.3067 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 721/800
864/864 [=====] - 2s 3ms/step - loss: 3.9090e-04 -
accuracy: 0.3056 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 722/800
864/864 [=====] - 2s 3ms/step - loss: 3.8165e-04 -
accuracy: 0.3380 - val_loss: 0.0041 - val_accuracy: 0.2990
Epoch 723/800
864/864 [=====] - 2s 3ms/step - loss: 3.7372e-04 -
accuracy: 0.2674 - val_loss: 0.0034 - val_accuracy: 0.2577
Epoch 724/800
864/864 [=====] - 2s 3ms/step - loss: 3.7645e-04 -
accuracy: 0.3252 - val_loss: 0.0037 - val_accuracy: 0.3299
Epoch 725/800

864/864 [=====] - 2s 3ms/step - loss: 3.7543e-04 -
accuracy: 0.3021 - val_loss: 0.0035 - val_accuracy: 0.2990
Epoch 726/800
864/864 [=====] - 2s 3ms/step - loss: 3.9643e-04 -
accuracy: 0.2674 - val_loss: 0.0039 - val_accuracy: 0.3196
Epoch 727/800
864/864 [=====] - 2s 3ms/step - loss: 3.7572e-04 -
accuracy: 0.2951 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 728/800
864/864 [=====] - 2s 3ms/step - loss: 3.8348e-04 -
accuracy: 0.3021 - val_loss: 0.0038 - val_accuracy: 0.2784
Epoch 729/800
864/864 [=====] - 2s 3ms/step - loss: 4.1241e-04 -
accuracy: 0.2928 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 730/800
864/864 [=====] - 2s 3ms/step - loss: 3.9848e-04 -
accuracy: 0.3275 - val_loss: 0.0040 - val_accuracy: 0.2165
Epoch 731/800
864/864 [=====] - 2s 3ms/step - loss: 3.6542e-04 -
accuracy: 0.3067 - val_loss: 0.0039 - val_accuracy: 0.2990
Epoch 732/800
864/864 [=====] - 3s 3ms/step - loss: 3.7188e-04 -
accuracy: 0.3009 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 733/800
864/864 [=====] - 2s 3ms/step - loss: 3.7070e-04 -
accuracy: 0.2951 - val_loss: 0.0039 - val_accuracy: 0.2990
Epoch 734/800
864/864 [=====] - 3s 3ms/step - loss: 3.7179e-04 -
accuracy: 0.3090 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 735/800
864/864 [=====] - 2s 3ms/step - loss: 3.7562e-04 -
accuracy: 0.2917 - val_loss: 0.0037 - val_accuracy: 0.2680
Epoch 736/800
864/864 [=====] - 2s 3ms/step - loss: 3.5154e-04 -
accuracy: 0.3160 - val_loss: 0.0036 - val_accuracy: 0.2474
Epoch 737/800
864/864 [=====] - 2s 3ms/step - loss: 3.9382e-04 -
accuracy: 0.2975 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 738/800
864/864 [=====] - 2s 3ms/step - loss: 3.9332e-04 -
accuracy: 0.3079 - val_loss: 0.0037 - val_accuracy: 0.3093
Epoch 739/800
864/864 [=====] - 2s 2ms/step - loss: 4.3378e-04 -
accuracy: 0.2928 - val_loss: 0.0034 - val_accuracy: 0.2680
Epoch 740/800
864/864 [=====] - 2s 3ms/step - loss: 4.2357e-04 -
accuracy: 0.3079 - val_loss: 0.0039 - val_accuracy: 0.2990
Epoch 741/800

864/864 [=====] - 2s 3ms/step - loss: 3.7575e-04 -
accuracy: 0.2836 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 742/800
864/864 [=====] - 2s 3ms/step - loss: 3.5486e-04 -
accuracy: 0.3148 - val_loss: 0.0038 - val_accuracy: 0.2990
Epoch 743/800
864/864 [=====] - 2s 3ms/step - loss: 3.4457e-04 -
accuracy: 0.2975 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 744/800
864/864 [=====] - 2s 3ms/step - loss: 3.4584e-04 -
accuracy: 0.2963 - val_loss: 0.0041 - val_accuracy: 0.2990
Epoch 745/800
864/864 [=====] - 2s 3ms/step - loss: 3.5798e-04 -
accuracy: 0.3160 - val_loss: 0.0040 - val_accuracy: 0.2990
Epoch 746/800
864/864 [=====] - 2s 3ms/step - loss: 3.8364e-04 -
accuracy: 0.3067 - val_loss: 0.0041 - val_accuracy: 0.2887
Epoch 747/800
864/864 [=====] - 2s 3ms/step - loss: 3.5867e-04 -
accuracy: 0.3090 - val_loss: 0.0037 - val_accuracy: 0.2887
Epoch 748/800
864/864 [=====] - 2s 3ms/step - loss: 3.8475e-04 -
accuracy: 0.3090 - val_loss: 0.0040 - val_accuracy: 0.2887
Epoch 749/800
864/864 [=====] - 2s 3ms/step - loss: 3.7988e-04 -
accuracy: 0.3044 - val_loss: 0.0038 - val_accuracy: 0.1959
Epoch 750/800
864/864 [=====] - 2s 3ms/step - loss: 3.6304e-04 -
accuracy: 0.3241 - val_loss: 0.0041 - val_accuracy: 0.2887
Epoch 751/800
864/864 [=====] - 2s 3ms/step - loss: 3.4861e-04 -
accuracy: 0.3113 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 752/800
864/864 [=====] - 3s 3ms/step - loss: 3.3538e-04 -
accuracy: 0.3056 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 753/800
864/864 [=====] - 3s 3ms/step - loss: 3.7113e-04 -
accuracy: 0.2917 - val_loss: 0.0041 - val_accuracy: 0.1856
Epoch 754/800
864/864 [=====] - 2s 3ms/step - loss: 3.7467e-04 -
accuracy: 0.3194 - val_loss: 0.0039 - val_accuracy: 0.3093
Epoch 755/800
864/864 [=====] - 2s 3ms/step - loss: 3.8871e-04 -
accuracy: 0.3160 - val_loss: 0.0042 - val_accuracy: 0.2165
Epoch 756/800
864/864 [=====] - 2s 3ms/step - loss: 3.7942e-04 -
accuracy: 0.3044 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 757/800

864/864 [=====] - 2s 3ms/step - loss: 3.6150e-04 - accuracy: 0.2882 - val_loss: 0.0042 - val_accuracy: 0.2990
Epoch 758/800
864/864 [=====] - 2s 3ms/step - loss: 3.4705e-04 - accuracy: 0.2917 - val_loss: 0.0041 - val_accuracy: 0.2990
Epoch 759/800
864/864 [=====] - 3s 4ms/step - loss: 3.7312e-04 - accuracy: 0.3009 - val_loss: 0.0042 - val_accuracy: 0.2680
Epoch 760/800
864/864 [=====] - 2s 3ms/step - loss: 3.6283e-04 - accuracy: 0.2928 - val_loss: 0.0037 - val_accuracy: 0.2990
Epoch 761/800
864/864 [=====] - 2s 3ms/step - loss: 3.4973e-04 - accuracy: 0.3021 - val_loss: 0.0040 - val_accuracy: 0.2990
Epoch 762/800
864/864 [=====] - 3s 3ms/step - loss: 3.4726e-04 - accuracy: 0.3160 - val_loss: 0.0038 - val_accuracy: 0.3093
Epoch 763/800
864/864 [=====] - 2s 3ms/step - loss: 3.8368e-04 - accuracy: 0.2986 - val_loss: 0.0038 - val_accuracy: 0.2887
Epoch 764/800
864/864 [=====] - 3s 3ms/step - loss: 3.8056e-04 - accuracy: 0.3009 - val_loss: 0.0041 - val_accuracy: 0.2887
Epoch 765/800
864/864 [=====] - 3s 3ms/step - loss: 3.6019e-04 - accuracy: 0.3079 - val_loss: 0.0038 - val_accuracy: 0.1134
Epoch 766/800
864/864 [=====] - 3s 3ms/step - loss: 3.7213e-04 - accuracy: 0.2963 - val_loss: 0.0035 - val_accuracy: 0.2680
Epoch 767/800
864/864 [=====] - 2s 3ms/step - loss: 3.9116e-04 - accuracy: 0.3299 - val_loss: 0.0037 - val_accuracy: 0.2887
Epoch 768/800
864/864 [=====] - 2s 3ms/step - loss: 3.5498e-04 - accuracy: 0.2674 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 769/800
864/864 [=====] - 2s 3ms/step - loss: 3.9321e-04 - accuracy: 0.2685 - val_loss: 0.0037 - val_accuracy: 0.1753
Epoch 770/800
864/864 [=====] - 2s 3ms/step - loss: 3.7549e-04 - accuracy: 0.2986 - val_loss: 0.0037 - val_accuracy: 0.2062
Epoch 771/800
864/864 [=====] - 2s 3ms/step - loss: 3.8627e-04 - accuracy: 0.2986 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 772/800
864/864 [=====] - 3s 3ms/step - loss: 4.3300e-04 - accuracy: 0.2755 - val_loss: 0.0042 - val_accuracy: 0.1856
Epoch 773/800

864/864 [=====] - 2s 3ms/step - loss: 4.4002e-04 - accuracy: 0.3125 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 774/800
864/864 [=====] - 2s 3ms/step - loss: 3.6895e-04 - accuracy: 0.2951 - val_loss: 0.0034 - val_accuracy: 0.1753
Epoch 775/800
864/864 [=====] - 2s 3ms/step - loss: 3.4451e-04 - accuracy: 0.2824 - val_loss: 0.0035 - val_accuracy: 0.2784
Epoch 776/800
864/864 [=====] - 2s 3ms/step - loss: 3.3560e-04 - accuracy: 0.3241 - val_loss: 0.0037 - val_accuracy: 0.1546
Epoch 777/800
864/864 [=====] - 2s 3ms/step - loss: 3.3910e-04 - accuracy: 0.3009 - val_loss: 0.0036 - val_accuracy: 0.2990
Epoch 778/800
864/864 [=====] - 3s 3ms/step - loss: 3.6528e-04 - accuracy: 0.2859 - val_loss: 0.0037 - val_accuracy: 0.1959
Epoch 779/800
864/864 [=====] - 2s 3ms/step - loss: 3.4957e-04 - accuracy: 0.3252 - val_loss: 0.0038 - val_accuracy: 0.2165
Epoch 780/800
864/864 [=====] - 2s 3ms/step - loss: 3.5301e-04 - accuracy: 0.3044 - val_loss: 0.0036 - val_accuracy: 0.2887
Epoch 781/800
864/864 [=====] - 2s 3ms/step - loss: 3.7836e-04 - accuracy: 0.2928 - val_loss: 0.0039 - val_accuracy: 0.2784
Epoch 782/800
864/864 [=====] - 2s 3ms/step - loss: 3.5592e-04 - accuracy: 0.2801 - val_loss: 0.0040 - val_accuracy: 0.2680
Epoch 783/800
864/864 [=====] - 2s 3ms/step - loss: 3.5222e-04 - accuracy: 0.2940 - val_loss: 0.0037 - val_accuracy: 0.2062
Epoch 784/800
864/864 [=====] - 2s 3ms/step - loss: 4.1597e-04 - accuracy: 0.2928 - val_loss: 0.0037 - val_accuracy: 0.2784
Epoch 785/800
864/864 [=====] - 2s 3ms/step - loss: 4.1289e-04 - accuracy: 0.3090 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 786/800
864/864 [=====] - 2s 3ms/step - loss: 4.0552e-04 - accuracy: 0.2975 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 787/800
864/864 [=====] - 2s 3ms/step - loss: 3.5105e-04 - accuracy: 0.3275 - val_loss: 0.0037 - val_accuracy: 0.2887
Epoch 788/800
864/864 [=====] - 2s 3ms/step - loss: 3.3556e-04 - accuracy: 0.3079 - val_loss: 0.0037 - val_accuracy: 0.2165
Epoch 789/800

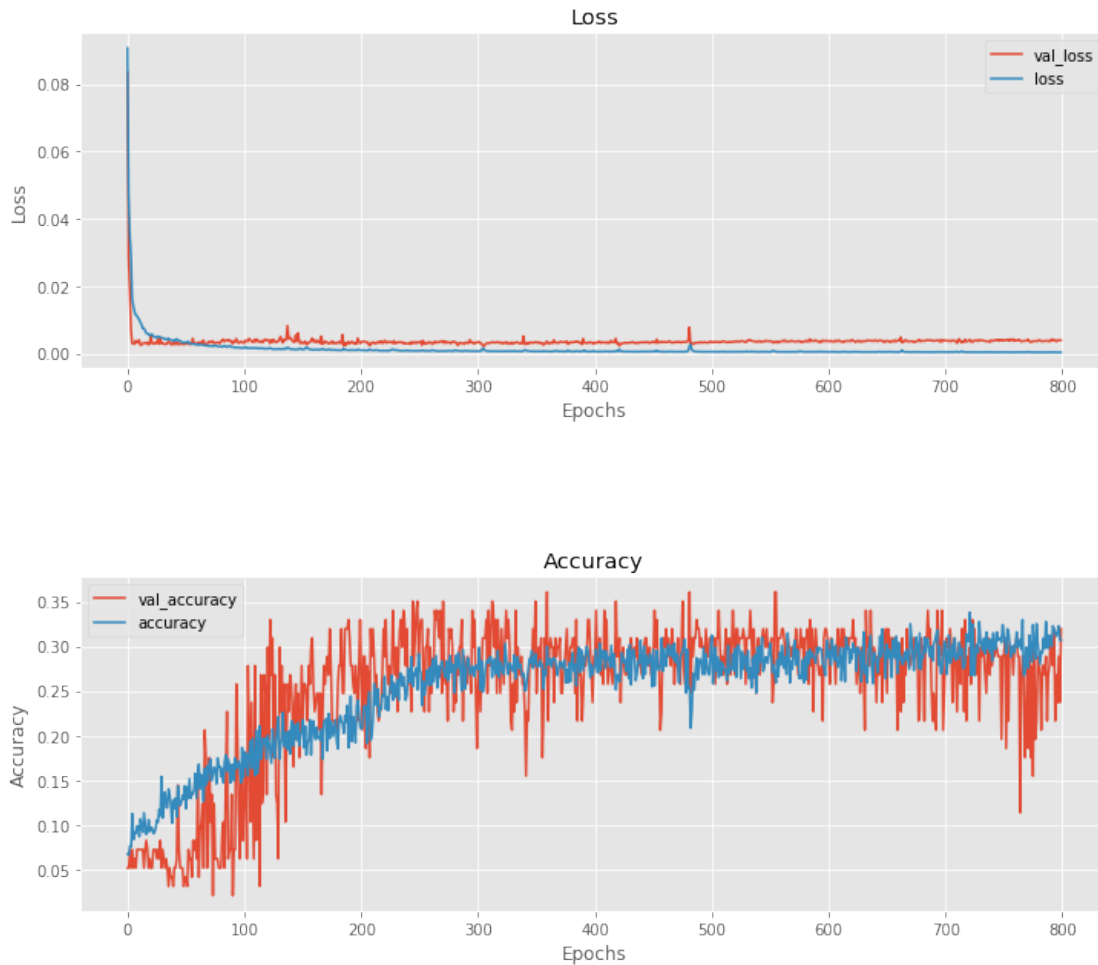
```

864/864 [=====] - 2s 3ms/step - loss: 3.3301e-04 -
accuracy: 0.2975 - val_loss: 0.0038 - val_accuracy: 0.2680
Epoch 790/800
864/864 [=====] - 2s 3ms/step - loss: 3.7840e-04 -
accuracy: 0.3125 - val_loss: 0.0036 - val_accuracy: 0.2784
Epoch 791/800
864/864 [=====] - 2s 3ms/step - loss: 3.8872e-04 -
accuracy: 0.3079 - val_loss: 0.0036 - val_accuracy: 0.3093
Epoch 792/800
864/864 [=====] - 2s 3ms/step - loss: 4.0456e-04 -
accuracy: 0.2998 - val_loss: 0.0042 - val_accuracy: 0.2990
Epoch 793/800
864/864 [=====] - 2s 3ms/step - loss: 3.7175e-04 -
accuracy: 0.3229 - val_loss: 0.0038 - val_accuracy: 0.2784
Epoch 794/800
864/864 [=====] - 2s 3ms/step - loss: 3.3592e-04 -
accuracy: 0.3194 - val_loss: 0.0040 - val_accuracy: 0.3196
Epoch 795/800
864/864 [=====] - 2s 3ms/step - loss: 3.2713e-04 -
accuracy: 0.3148 - val_loss: 0.0039 - val_accuracy: 0.2165
Epoch 796/800
864/864 [=====] - 2s 3ms/step - loss: 3.2316e-04 -
accuracy: 0.3113 - val_loss: 0.0035 - val_accuracy: 0.2680
Epoch 797/800
864/864 [=====] - 2s 3ms/step - loss: 3.2486e-04 -
accuracy: 0.3160 - val_loss: 0.0039 - val_accuracy: 0.2371
Epoch 798/800
864/864 [=====] - 2s 3ms/step - loss: 3.4808e-04 -
accuracy: 0.3229 - val_loss: 0.0039 - val_accuracy: 0.2887
Epoch 799/800
864/864 [=====] - 2s 3ms/step - loss: 3.6907e-04 -
accuracy: 0.3067 - val_loss: 0.0039 - val_accuracy: 0.2371
Epoch 800/800
864/864 [=====] - 2s 3ms/step - loss: 3.4088e-04 -
accuracy: 0.3067 - val_loss: 0.0039 - val_accuracy: 0.3196

```

1.2.3 Plotting the Accuracy and Loss

```
[65]: visualize_training_results(res)
```



1.3 Visualizing the Predictions

1.3.1 Validating the Model

Plotting the difference between the Actual closing prices and the Predicted prices

```
[83]: plt.figure(figsize=(12,5))

# Getting predictions by predicting from the last available X variable
yhat = model.predict(X[-1].reshape(1, n_per_in, n_features)).tolist()[0]

# Transforming values back to their normal prices
yhat = scaler.inverse_transform(np.array(yhat).reshape(-1,1)).tolist()

# Getting the actual values from the last available y variable which correspond
↳ to its respective X variable
actual = scaler.inverse_transform(y[-1].reshape(-1,1))
```



```

# Printing and plotting those predictions
print("Predicted Prices:\n", yhat)
plt.plot(yhat, label='Predicted')

# Printing and plotting the actual values
print("\nActual Prices:\n", actual.tolist())
plt.plot(actual.tolist(), label='Actual')

plt.title(f"Predicted vs Actual Closing Prices")
plt.ylabel("Price")
plt.legend()
plt.savefig("BTC_validation.png")
plt.show()

```

Predicted Prices:

```

[[7400.789307966416], [7241.380163940355], [7106.899924937646],
[7172.888593383611], [7127.823633456216], [7228.137184418529],
[7248.061391475402], [7264.6668333025145], [7504.581478017058],
[7683.578527556711]]

```

Actual Prices:

```

[[7397.796875], [7047.9169919999995], [7146.133789], [7218.371094],
[7531.663573999999], [7463.105956999999], [7761.243651999999], [7569.629883],
[7424.29248], [7321.988281]]

```



1.3.2 Predicting/Forecasting the future prices

```
[94]: # Predicting off of y because it contains the most recent dates
yhat = model.predict(np.array(df.tail(n_per_in)).reshape(1, n_per_in,
    ↪n_features)).tolist()[0]

# Transforming the predicted values back to their original prices
yhat = scaler.inverse_transform(np.array(yhat).reshape(-1,1)).tolist()

# Creating a DF of the predicted prices
preds = pd.DataFrame(yhat, index=pd.date_range(start=df.index[-1],
    ↪periods=len(yhat), freq="D"), columns=df.columns)

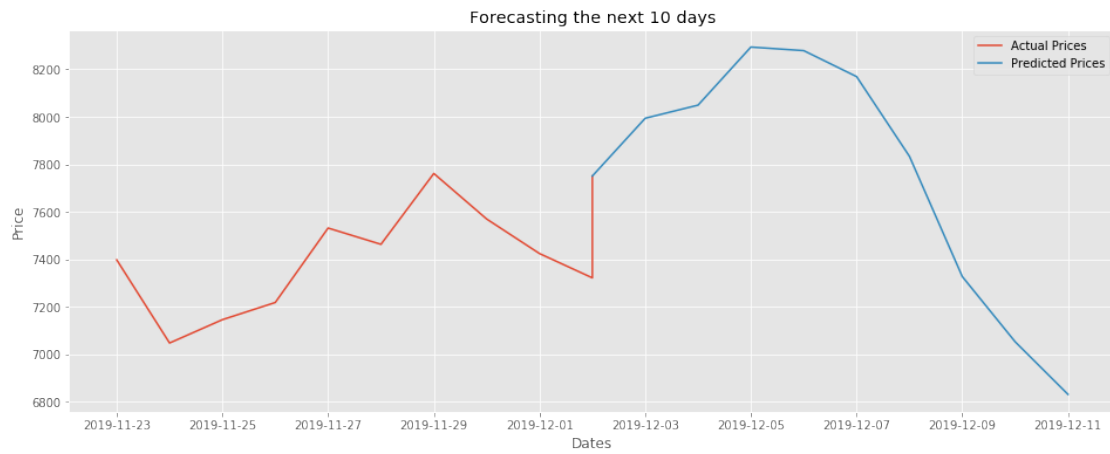
# Printing the predicted prices
print(preds)

# Number of periods back to visualize the actual values
pers = 10

# Transforming the actual values to their original price
actual = pd.DataFrame(scaler.inverse_transform(df[["Close"]].tail(pers)),
    ↪index=df.Close.tail(pers).index, columns=df.columns).append(preds.head(1))

# Plotting
plt.figure(figsize=(16,6))
plt.plot(actual, label="Actual Prices")
plt.plot(preds, label="Predicted Prices")
plt.ylabel("Price")
plt.xlabel("Dates")
plt.title(f"Forecasting the next {len(yhat)} days")
plt.legend()
plt.savefig("BTC_predictions.png")
plt.show()
```

	Close
2019-12-02	7750.527979
2019-12-03	7993.556731
2019-12-04	8048.777666
2019-12-05	8293.133372
2019-12-06	8278.055115
2019-12-07	8168.779239
2019-12-08	7833.326193
2019-12-09	7327.463403
2019-12-10	7053.108825
2019-12-11	6831.816325



[]: