In [2]:
```python
# First we will import the necessary Library

import os
import pandas as pd
import numpy as np
import math
import datetime as dt
import matplotlib as plt
```

In [3]:
```python
# For Evalution we will use these library

from sklearn.metrics import mean_squared_error, mean_absolute_error, explained_variance_score, r2_score
from sklearn.metrics import mean_poisson_deviance, mean_gamma_deviance, accuracy_score
from sklearn.preprocessing import MinMaxScaler
```

```
C:\Users\DELL\anaconda3\lib\site-packages\scipy\__init__.py:155: UserWarning: A NumPy version >=1.18.5 and <1.25.0 is required for this version of SciPy (detected version 1.26.4
  warnings.warn(f"A NumPy version >={np_minversion} and <{np_maxversion}"
```

In [4]:
```python
# For model building we will use these library

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

```
WARNING:tensorflow:From C:\Users\DELL\anaconda3\lib\site-packages\keras\src\losses.py:2976: The name tf.losses.sparse_softmax_cross_entropy is deprecated. Please use tf.compat.v1.l
osses.sparse_softmax_cross_entropy instead.
```

In [5]:
```python
# For Plotting we will use these librarimport matplotlib.pyplot as plt

from itertools import cycl
import plotly.graph_objects as go
import plotly.express as px
from plotly.subplots import make_subplots
```

In [6]:
```python
df = pd.read_csv('btc.csv')
```

In [7]:
```python
df.shape
```

Out[7]:
```
(2713, 7)
```

In [8]:
```python
df.head()
```

Out[8]:

	Date	Open	High	Low	Close	Adj Close	Volume
0	2014-09-17	465.864014	468.174011	452.421997	457.334015	457.334015	21056800
1	2014-09-18	456.859985	456.859985	413.104004	424.440002	424.440002	34483200
2	2014-09-19	424.102997	427.834991	384.532013	394.795990	394.795990	37919700
3	2014-09-20	394.673004	423.295990	389.882996	408.903992	408.903992	36863600
4	2014-09-21	408.084991	412.425995	393.181000	398.821014	398.821014	26580100

In [9]:
```python
df.tail()
```

Out[9]:

	Date	Open	High	Low	Close	Adj Close	Volume
2708	2022-02-15	42586.464844	44667.218750	42491.035156	44575.203125	44575.203125	22721659051
2709	2022-02-16	44578.277344	44578.277344	43456.691406	43961.859375	43961.859375	19792547657
2710	2022-02-17	43937.070313	44132.972656	40249.371094	40538.011719	40538.011719	26246662813
2711	2022-02-18	40552.132813	40929.152344	39637.617188	40030.976563	40030.976563	23310007704
2712	2022-02-19	40022.132813	40246.027344	40010.867188	40126.429688	40126.429688	22263900160

In [10]:
```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2713 entries, 0 to 2712
Data columns (total 7 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   Date       2713 non-null   object
 1   Open       2713 non-null   float64
 2   High       2713 non-null   float64
 3   Low        2713 non-null   float64
 4   Close      2713 non-null   float64
 5   Adj Close  2713 non-null   float64
 6   Volume     2713 non-null   int64
dtypes: float64(5), int64(1), object(1)
memory usage: 148.5+ KB
```

In [11]:
```python
df.describe()
```

Out[11]:

	Open	High	Low	Close	Adj Close	Volume
count	2713.000000	2713.000000	2713.000000	2713.000000	2713.000000	2.713000e+03
mean	11311.041069	11614.292482	10975.555057	11323.914637	11323.914637	1.470462e+10
std	16106.428891	16537.390649	15608.572560	16110.365010	16110.365010	2.001627e+10
min	176.897003	211.731003	171.509995	178.102997	178.102997	5.914570e+06
25%	606.396973	609.260986	604.109985	606.718994	606.718994	7.991080e+07
50%	6301.569824	6434.617676	6214.220215	6317.609863	6317.609863	5.098183e+09
75%	10452.399414	10762.644531	10202.387695	10462.259766	10462.259766	2.456992e+10
max	67549.734375	68789.625000	66382.062500	67566.828125	67566.828125	3.509679e+11

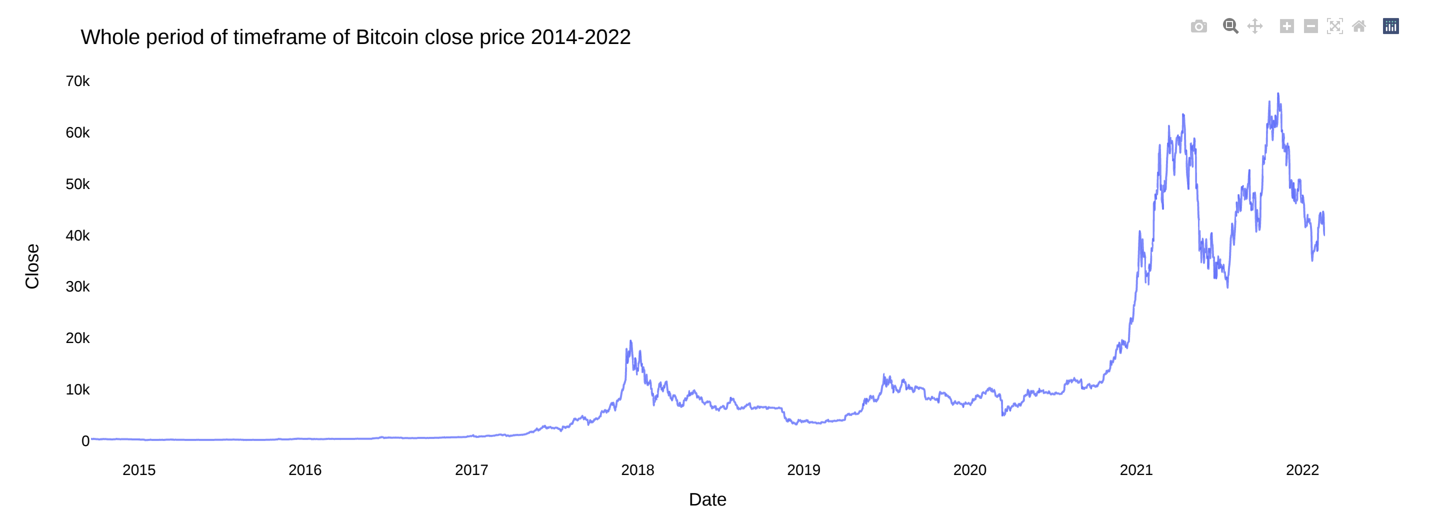
In [12]:
```python
df.isnull().values.sum()
```

Out[12]:
```
0
```

In [13]:
```python
# Lets First Take all the Close Price
closedf = df[['Date','Close']]
print("Shape of close dataframe:", closedf.shape)
```

```
Shape of close dataframe: (2713, 2)
```

In [14]:
```python
fig = px.line(closedf, x=closedf.Date, y=closedf.Close,labels={'date':'Date','close':'Close Stock'})
fig.update_traces(marker_line_width=3, opacity=0.8, marker_line_color='orange')
fig.update_layout(title_text='Whole period of timeframe of Bitcoin close price 2014-2022', plot_bgcolor='white',
                  font_size=15, font_color='black')
fig.update_xaxes(showgrid=False)
fig.update_yaxes(showgrid=False)
fig.show()
```



In [15]:
```python
# deleting date column and normalizing using MinMax Scaler

del closedf['Date']
scaler=MinMaxScaler(feature_range=(0,1))
closedf=scaler.fit_transform(np.array(closedf).reshape(-1,1))
```

In [16]:
```python
closedf.shape
```

Out[16]:
```
(2713, 1)
```

In [17]:
```python
# we take training set as 60% and 40% testing set

training_size = int(len(closedf)*0.60)
test_size = len(closedf) - training_size
train_data, test_data = closedf[0:training_size,:], closedf[training_size:len(closedf),:1]
print("train_data: ", train_data.shape)
print("test_data: ", test_data.shape)
```

```
train_data:  (1627, 1)
test_data:  (1086, 1)
```

In [18]:
```python
def create_dataset(dataset, time_step=1):
    dataX, dataY = [], []
    for i in range(len(dataset)-time_step-1):
        a = dataset[i:(i+time_step), 0]   ###i=0, 0,1,2,3-----99   100
        dataX.append(a)
        dataY.append(dataset[i + time_step, 0])
    return np.array(dataX), np.array(dataY)
```

In [19]:
```python
time_step = 20
X_train, y_train = create_dataset(train_data, time_step)
X_test, y_test = create_dataset(test_data, time_step)

print("X_train: ", X_train.shape)
print("y_train: ", y_train.shape)
print("X_test: ", X_test.shape)
print("y_test", y_test.shape)
```

```
X_train:  (1606, 20)
y_train:  (1606,)
X_test:  (1065, 20)
y_test (1065,)
```

In [20]:
```python
# reshape input to be [samples, time steps, features] which is required for LSTM
X_train =X_train.reshape(X_train.shape[0],X_train.shape[1] , 1)
X_test = X_test.reshape(X_test.shape[0],X_test.shape[1] , 1)

print("X_train: ", X_train.shape)
print("X_test: ", X_test.shape)
```

```
X_train:  (1606, 20, 1)
X_test:  (1065, 20, 1)
```

In [21]:
```python
model=Sequential()

model.add(LSTM(10,input_shape=(None,1),activation="relu"))

model.add(Dense(1))

model.compile(loss="mean_squared_error",optimizer="adam")
```

```
WARNING:tensorflow:From C:\Users\DELL\anaconda3\lib\site-packages\keras\src\backend.py:873: The name tf.get_default_graph is deprecated. Please use tf.compat.v1.get_default_graph i
nstead.

WARNING:tensorflow:From C:\Users\DELL\anaconda3\lib\site-packages\keras\src\optimizers\__init__.py:309: The name tf.train.Optimizer is deprecated. Please use tf.compat.v1.train.Opt
imizer instead.
```

In [22]:
```python
history = model.fit(X_train,y_train,validation_data=(X_test,y_test),epochs=150,batch_size=32,verbose=1)
```

```
Epoch 1/150
WARNING:tensorflow:From C:\Users\DELL\anaconda3\lib\site-packages\keras\src\utils\tf_utils.py:492: The name tf.ragged.RaggedTensorValue is deprecated. Please use tf.compat.v1.ragge
d.RaggedTensorValue instead.

51/51 [==============================] - 2s 11ms/step - loss: 0.0014 - val_loss: 0.0436
Epoch 2/150
51/51 [==============================] - 0s 7ms/step - loss: 3.4160e-04 - val_loss: 0.0136
Epoch 3/150
51/51 [==============================] - 0s 6ms/step - loss: 5.7750e-05 - val_loss: 0.0144
Epoch 4/150
51/51 [==============================] - 0s 6ms/step - loss: 5.2267e-05 - val_loss: 0.0155
Epoch 5/150
51/51 [==============================] - 0s 6ms/step - loss: 5.2616e-05 - val_loss: 0.0070
Epoch 6/150
51/51 [==============================] - 0s 6ms/step - loss: 5.3882e-05 - val_loss: 0.0057
Epoch 7/150
51/51 [==============================] - 0s 6ms/step - loss: 5.3832e-05 - val_loss: 0.0046
Epoch 8/150
51/51 [==============================] - 0s 7ms/step - loss: 5.1356e-05 - val_loss: 0.0021
Epoch 9/150
51/51 [==============================] - 0s 6ms/step - loss: 4.9432e-05 - val_loss: 0.0029
Epoch 10/150
51/51 [==============================] - 0s 6ms/step - loss: 5.1422e-05 - val_loss: 0.0018
Epoch 11/150
51/51 [==============================] - 0s 6ms/step - loss: 4.7514e-05 - val_loss: 0.0014
Epoch 12/150
51/51 [==============================] - 0s 6ms/step - loss: 4.6319e-05 - val_loss: 0.0011
Epoch 13/150
51/51 [==============================] - 0s 7ms/step - loss: 4.5612e-05 - val_loss: 0.0012
Epoch 14/150
51/51 [==============================] - 0s 6ms/step - loss: 4.4934e-05 - val_loss: 0.0014
Epoch 15/150
51/51 [==============================] - 0s 6ms/step - loss: 4.5411e-05 - val_loss: 0.0012
Epoch 16/150
51/51 [==============================] - 0s 6ms/step - loss: 4.4032e-05 - val_loss: 0.0011
Epoch 17/150
51/51 [==============================] - 0s 5ms/step - loss: 4.3095e-05 - val_loss: 0.0011
Epoch 18/150
51/51 [==============================] - 0s 7ms/step - loss: 4.1808e-05 - val_loss: 0.0020
Epoch 19/150
51/51 [==============================] - 0s 8ms/step - loss: 4.4354e-05 - val_loss: 0.0026
Epoch 20/150
51/51 [==============================] - 0s 7ms/step - loss: 4.1456e-05 - val_loss: 0.0042
Epoch 21/150
51/51 [==============================] - 0s 7ms/step - loss: 3.9440e-05 - val_loss: 0.0028
Epoch 22/150
51/51 [==============================] - 0s 7ms/step - loss: 3.9372e-05 - val_loss: 0.0029
Epoch 23/150
51/51 [==============================] - 0s 6ms/step - loss: 3.8021e-05 - val_loss: 0.0038
Epoch 24/150
51/51 [==============================] - 0s 6ms/step - loss: 3.8708e-05 - val_loss: 0.0044
Epoch 25/150
51/51 [==============================] - 0s 7ms/step - loss: 3.7419e-05 - val_loss: 0.0049
Epoch 26/150
51/51 [==============================] - 0s 6ms/step - loss: 3.7387e-05 - val_loss: 0.0052
Epoch 27/150
51/51 [==============================] - 0s 6ms/step - loss: 3.5654e-05 - val_loss: 0.0062
Epoch 28/150
51/51 [==============================] - 0s 7ms/step - loss: 3.6820e-05 - val_loss: 0.0060
Epoch 29/150
51/51 [==============================] - 0s 6ms/step - loss: 3.7314e-05 - val_loss: 0.0075
Epoch 30/150
51/51 [==============================] - 0s 7ms/step - loss: 3.4327e-05 - val_loss: 0.0074
Epoch 31/150
51/51 [==============================] - 0s 7ms/step - loss: 3.4192e-05 - val_loss: 0.0065
Epoch 32/150
51/51 [==============================] - 0s 6ms/step - loss: 3.4404e-05 - val_loss: 0.0082
Epoch 33/150
51/51 [==============================] - 0s 6ms/step - loss: 3.2585e-05 - val_loss: 0.0077
Epoch 34/150
51/51 [==============================] - 0s 6ms/step - loss: 3.2191e-05 - val_loss: 0.0069
Epoch 35/150
51/51 [==============================] - 0s 7ms/step - loss: 3.1684e-05 - val_loss: 0.0060
Epoch 36/150
51/51 [==============================] - 0s 6ms/step - loss: 3.1646e-05 - val_loss: 0.0057
Epoch 37/150
51/51 [==============================] - 0s 6ms/step - loss: 3.0677e-05 - val_loss: 0.0050
Epoch 38/150
51/51 [==============================] - 0s 7ms/step - loss: 2.9765e-05 - val_loss: 0.0051
Epoch 39/150
51/51 [==============================] - 0s 7ms/step - loss: 3.2827e-05 - val_loss: 0.0047
Epoch 40/150
51/51 [==============================] - 0s 8ms/step - loss: 2.9310e-05 - val_loss: 0.0032
Epoch 41/150
51/51 [==============================] - 0s 7ms/step - loss: 2.9874e-05 - val_loss: 0.0031
Epoch 42/150
51/51 [==============================] - 0s 6ms/step - loss: 2.8639e-05 - val_loss: 0.0034
Epoch 43/150
51/51 [==============================] - 0s 7ms/step - loss: 2.8197e-05 - val_loss: 0.0037
Epoch 44/150
51/51 [==============================] - 0s 7ms/step - loss: 3.0081e-05 - val_loss: 0.0028
Epoch 45/150
51/51 [==============================] - 0s 7ms/step - loss: 2.9428e-05 - val_loss: 0.0022
Epoch 46/150
51/51 [==============================] - 0s 7ms/step - loss: 2.7525e-05 - val_loss: 0.0023
Epoch 47/150
51/51 [==============================] - 0s 7ms/step - loss: 2.7480e-05 - val_loss: 0.0017
Epoch 48/150
51/51 [==============================] - 0s 6ms/step - loss: 2.8058e-05 - val_loss: 0.0027
Epoch 49/150
51/51 [==============================] - 0s 7ms/step - loss: 2.7337e-05 - val_loss: 0.0020
Epoch 50/150
51/51 [==============================] - 0s 7ms/step - loss: 2.7899e-05 - val_loss: 0.0018
Epoch 51/150
51/51 [==============================] - 0s 7ms/step - loss: 2.7759e-05 - val_loss: 0.0023
Epoch 52/150
51/51 [==============================] - 0s 7ms/step - loss: 2.6649e-05 - val_loss: 0.0013
Epoch 53/150
51/51 [==============================] - 0s 7ms/step - loss: 2.6430e-05 - val_loss: 0.0018
Epoch 54/150
51/51 [==============================] - 0s 7ms/step - loss: 2.8175e-05 - val_loss: 0.0014
Epoch 55/150
51/51 [==============================] - 0s 7ms/step - loss: 2.6214e-05 - val_loss: 0.0013
Epoch 56/150
51/51 [==============================] - 0s 7ms/step - loss: 2.5304e-05 - val_loss: 0.0011
Epoch 57/150
51/51 [==============================] - 0s 6ms/step - loss: 2.7005e-05 - val_loss: 0.0014
Epoch 58/150
51/51 [==============================] - 0s 6ms/step - loss: 2.5021e-05 - val_loss: 0.0020
Epoch 59/150
51/51 [==============================] - 0s 6ms/step - loss: 2.7554e-05 - val_loss: 0.0016
Epoch 60/150
51/51 [==============================] - 0s 7ms/step - loss: 2.4879e-05 - val_loss: 0.0011
Epoch 61/150
51/51 [==============================] - 0s 5ms/step - loss: 2.4773e-05 - val_loss: 0.0013
Epoch 62/150
51/51 [==============================] - 0s 6ms/step - loss: 2.4621e-05 - val_loss: 0.0015
Epoch 63/150
51/51 [==============================] - 0s 7ms/step - loss: 2.4394e-05 - val_loss: 0.0017
Epoch 64/150
51/51 [==============================] - 0s 5ms/step - loss: 2.5209e-05 - val_loss: 0.0017
Epoch 65/150
51/51 [==============================] - 0s 5ms/step - loss: 2.4652e-05 - val_loss: 0.0028
Epoch 66/150
51/51 [==============================] - 0s 6ms/step - loss: 2.4991e-05 - val_loss: 0.0022
Epoch 67/150
51/51 [==============================] - 0s 6ms/step - loss: 2.6851e-05 - val_loss: 0.0031
Epoch 68/150
51/51 [==============================] - 0s 5ms/step - loss: 2.3870e-05 - val_loss: 0.0020
Epoch 69/150
51/51 [==============================] - 0s 5ms/step - loss: 2.4768e-05 - val_loss: 0.0018
Epoch 70/150
51/51 [==============================] - 0s 5ms/step - loss: 2.4309e-05 - val_loss: 0.0027
Epoch 71/150
51/51 [==============================] - 0s 7ms/step - loss: 2.3517e-05 - val_loss: 0.0028
Epoch 72/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3076e-05 - val_loss: 0.0021
Epoch 73/150
51/51 [==============================] - 0s 6ms/step - loss: 3.0740e-05 - val_loss: 0.0030
Epoch 74/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3578e-05 - val_loss: 0.0018
Epoch 75/150
51/51 [==============================] - 0s 6ms/step - loss: 2.4079e-05 - val_loss: 0.0036
Epoch 76/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3535e-05 - val_loss: 0.0038
Epoch 77/150
51/51 [==============================] - 0s 6ms/step - loss: 2.6323e-05 - val_loss: 0.0035
Epoch 78/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3816e-05 - val_loss: 0.0040
Epoch 79/150
51/51 [==============================] - 0s 6ms/step - loss: 2.2556e-05 - val_loss: 0.0035
Epoch 80/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3314e-05 - val_loss: 0.0039
Epoch 81/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3048e-05 - val_loss: 0.0035
Epoch 82/150
51/51 [==============================] - 0s 6ms/step - loss: 2.2568e-05 - val_loss: 0.0047
Epoch 83/150
51/51 [==============================] - 0s 6ms/step - loss: 2.2884e-05 - val_loss: 0.0037
Epoch 84/150
51/51 [==============================] - 0s 7ms/step - loss: 2.2936e-05 - val_loss: 0.0040
Epoch 85/150
51/51 [==============================] - 0s 6ms/step - loss: 2.2116e-05 - val_loss: 0.0049
Epoch 86/150
51/51 [==============================] - 0s 7ms/step - loss: 2.1802e-05 - val_loss: 0.0039
Epoch 87/150
51/51 [==============================] - 0s 7ms/step - loss: 2.3796e-05 - val_loss: 0.0047
Epoch 88/150
51/51 [==============================] - 0s 7ms/step - loss: 2.1569e-05 - val_loss: 0.0051
Epoch 89/150
51/51 [==============================] - 0s 7ms/step - loss: 2.2911e-05 - val_loss: 0.0060
Epoch 90/150
51/51 [==============================] - 0s 7ms/step - loss: 2.2433e-05 - val_loss: 0.0053
Epoch 91/150
51/51 [==============================] - 0s 6ms/step - loss: 2.1232e-05 - val_loss: 0.0063
Epoch 92/150
51/51 [==============================] - 0s 5ms/step - loss: 2.1586e-05 - val_loss: 0.0053
Epoch 93/150
51/51 [==============================] - 0s 6ms/step - loss: 2.1134e-05 - val_loss: 0.0054
Epoch 94/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3495e-05 - val_loss: 0.0088
Epoch 95/150
51/51 [==============================] - 0s 5ms/step - loss: 2.1133e-05 - val_loss: 0.0077
Epoch 96/150
51/51 [==============================] - 0s 5ms/step - loss: 2.1092e-05 - val_loss: 0.0085
Epoch 97/150
51/51 [==============================] - 0s 5ms/step - loss: 2.1070e-05 - val_loss: 0.0078
Epoch 98/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0620e-05 - val_loss: 0.0070
Epoch 99/150
51/51 [==============================] - 0s 5ms/step - loss: 2.0839e-05 - val_loss: 0.0066
Epoch 100/150
51/51 [==============================] - 0s 6ms/step - loss: 2.1449e-05 - val_loss: 0.0054
Epoch 101/150
51/51 [==============================] - 0s 6ms/step - loss: 2.1337e-05 - val_loss: 0.0065
Epoch 102/150
51/51 [==============================] - 0s 6ms/step - loss: 2.1476e-05 - val_loss: 0.0060
Epoch 103/150
51/51 [==============================] - 0s 6ms/step - loss: 2.1125e-05 - val_loss: 0.0061
Epoch 104/150
51/51 [==============================] - 0s 6ms/step - loss: 2.3646e-05 - val_loss: 0.0069
Epoch 105/150
51/51 [==============================] - 0s 7ms/step - loss: 2.1293e-05 - val_loss: 0.0073
Epoch 106/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0687e-05 - val_loss: 0.0063
Epoch 107/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0435e-05 - val_loss: 0.0070
Epoch 108/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0562e-05 - val_loss: 0.0077
Epoch 109/150
51/51 [==============================] - 0s 5ms/step - loss: 2.0335e-05 - val_loss: 0.0066
Epoch 110/150
51/51 [==============================] - 0s 5ms/step - loss: 2.1551e-05 - val_loss: 0.0072
Epoch 111/150
51/51 [==============================] - 0s 5ms/step - loss: 1.9950e-05 - val_loss: 0.0070
Epoch 112/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0169e-05 - val_loss: 0.0068
Epoch 113/150
51/51 [==============================] - 0s 5ms/step - loss: 1.9600e-05 - val_loss: 0.0067
Epoch 114/150
51/51 [==============================] - 0s 5ms/step - loss: 1.9578e-05 - val_loss: 0.0073
Epoch 115/150
51/51 [==============================] - 0s 5ms/step - loss: 2.1301e-05 - val_loss: 0.0073
Epoch 116/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9898e-05 - val_loss: 0.0083
Epoch 117/150
51/51 [==============================] - 0s 5ms/step - loss: 1.9482e-05 - val_loss: 0.0079
Epoch 118/150
51/51 [==============================] - 0s 5ms/step - loss: 2.0049e-05 - val_loss: 0.0077
Epoch 119/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9590e-05 - val_loss: 0.0082
Epoch 120/150
51/51 [==============================] - 0s 5ms/step - loss: 1.9921e-05 - val_loss: 0.0093
Epoch 121/150
51/51 [==============================] - 0s 5ms/step - loss: 2.0924e-05 - val_loss: 0.0087
Epoch 122/150
51/51 [==============================] - 0s 5ms/step - loss: 2.0343e-05 - val_loss: 0.0086
Epoch 123/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0100e-05 - val_loss: 0.0086
Epoch 124/150
51/51 [==============================] - 0s 5ms/step - loss: 2.1365e-05 - val_loss: 0.0091
Epoch 125/150
51/51 [==============================] - 0s 5ms/step - loss: 2.2505e-05 - val_loss: 0.0095
Epoch 126/150
51/51 [==============================] - 0s 5ms/step - loss: 1.9373e-05 - val_loss: 0.0092
Epoch 127/150
51/51 [==============================] - 0s 7ms/step - loss: 1.9244e-05 - val_loss: 0.0101
Epoch 128/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0523e-05 - val_loss: 0.0101
Epoch 129/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9571e-05 - val_loss: 0.0094
Epoch 130/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9571e-05 - val_loss: 0.0099
Epoch 131/150
51/51 [==============================] - 0s 5ms/step - loss: 1.8706e-05 - val_loss: 0.0097
Epoch 132/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9619e-05 - val_loss: 0.0095
Epoch 133/150
51/51 [==============================] - 0s 7ms/step - loss: 1.8667e-05 - val_loss: 0.0105
Epoch 134/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8528e-05 - val_loss: 0.0095
Epoch 135/150
51/51 [==============================] - 0s 5ms/step - loss: 1.9352e-05 - val_loss: 0.0098
Epoch 136/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8748e-05 - val_loss: 0.0099
Epoch 137/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8540e-05 - val_loss: 0.0102
Epoch 138/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9671e-05 - val_loss: 0.0093
Epoch 139/150
51/51 [==============================] - 0s 6ms/step - loss: 2.0606e-05 - val_loss: 0.0107
Epoch 140/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9548e-05 - val_loss: 0.0122
Epoch 141/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8781e-05 - val_loss: 0.0111
Epoch 142/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8399e-05 - val_loss: 0.0102
Epoch 143/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9294e-05 - val_loss: 0.0100
Epoch 144/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9000e-05 - val_loss: 0.0106
Epoch 145/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9566e-05 - val_loss: 0.0119
Epoch 146/150
51/51 [==============================] - 0s 6ms/step - loss: 1.9124e-05 - val_loss: 0.0107
Epoch 147/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8421e-05 - val_loss: 0.0107
Epoch 148/150
51/51 [==============================] - 0s 6ms/step - loss: 1.7817e-05 - val_loss: 0.0120
Epoch 149/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8533e-05 - val_loss: 0.0117
Epoch 150/150
51/51 [==============================] - 0s 6ms/step - loss: 1.8433e-05 - val_loss: 0.0117
```

In [23]:
```python
### Lets Do the prediction and check performance metrics
train_predict=model.predict(X_train)
test_predict=model.predict(X_test)
train_predict.shape, test_predict.shape
```

```
51/51 [==============================] - 0s 2ms/step
34/34 [==============================] - 0s 2ms/step
```

Out[23]:
```
((1606, 1), (1065, 1))
```

In [24]:
```python
train_predict = scaler.inverse_transform(train_predict)
test_predict = scaler.inverse_transform(test_predict)
original_ytrain = scaler.inverse_transform(y_train.reshape(-1,1))
original_ytest = scaler.inverse_transform(y_test.reshape(-1,1))
```

In [28]:
```python
# Evaluation metrices RMSE
print("Train data RMSE: ", math.sqrt(mean_squared_error(original_ytrain,train_predict)))

print("-------------------------------------------------------------------------------------")
print("Test data RMSE: ", math.sqrt(mean_squared_error(original_ytest,test_predict)))
```

```
Train data RMSE:  280.9547894583391
-------------------------------------------------------------------------------------
Test data RMSE:  7299.367960666792
```

In [ ]: