Stock Price Prediction – Machine Learning Project in Python

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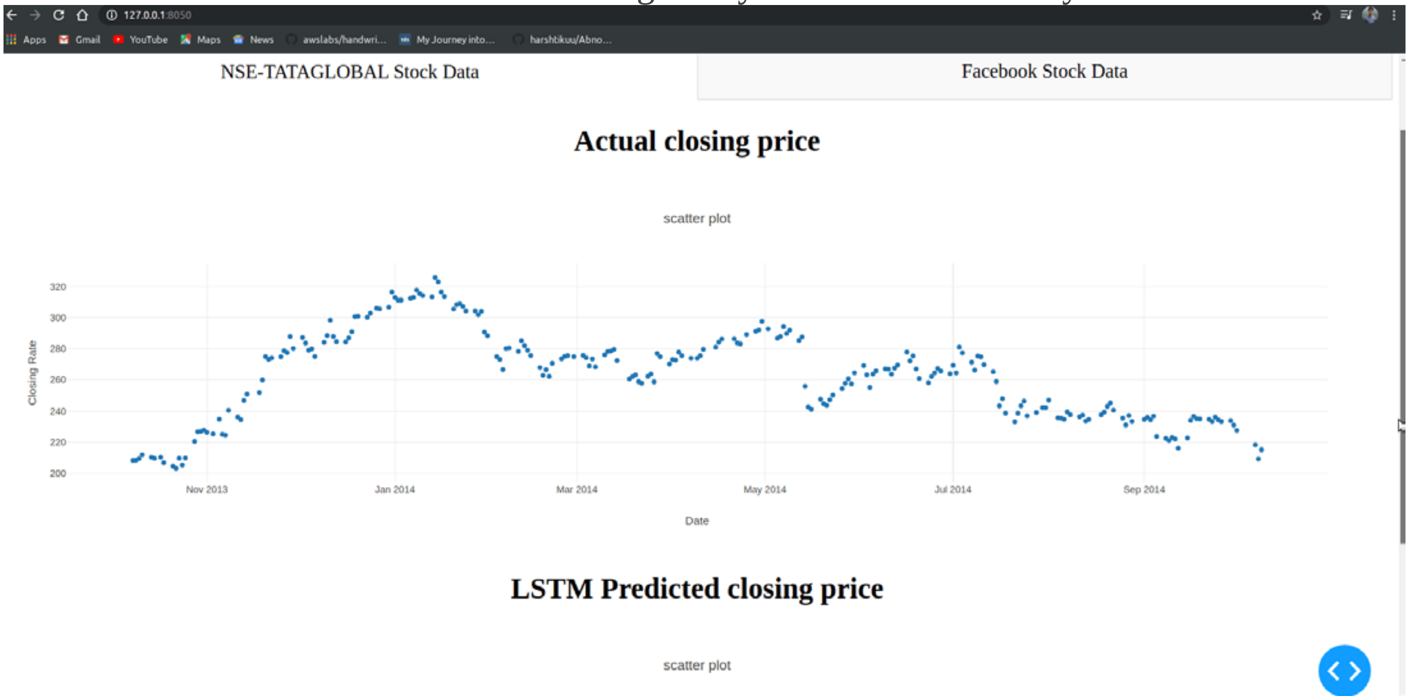
Machine learning has significant applications in the stock price prediction. In this machine learning project, we will be talking about predicting the returns on stocks. This is a very complex task and has uncertainties. We will develop this project into two parts:

1. First, we will learn how to predict stock price using the LSTM neural network.
2. Then we will build a dashboard using Plotly dash for stock analysis.



Stock Price Prediction Project

Datasets

1. To build the stock price prediction model, we will use the NSE TATA GLOBAL dataset. This is a dataset of Tata Beverages from Tata Global Beverages Limited, National Stock Exchange of India: Tata Global Dataset
2. To develop the dashboard for stock analysis we will use another stock dataset with multiple stocks like Apple, Microsoft, Facebook: Stocks Dataset

Source Code

Before proceeding ahead, please download the source code: Stock Price Prediction Project

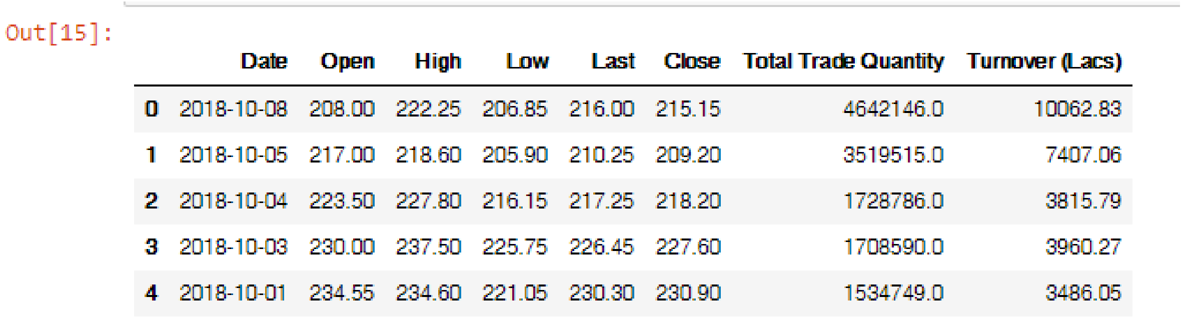
Stock price prediction using LSTM

1. Imports:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
from matplotlib.pylab import rcParams
rcParams['figure.figsize']=20,10
from keras.models import Sequential
from keras.layers import LSTM,Dropout,Dense
from sklearn.preprocessing import MinMaxScaler
```

2. Read the dataset:

```
df = pd.read_csv('C:/data/NSE-Tata-Global-Beverages-Limited.csv')
df.head()
```

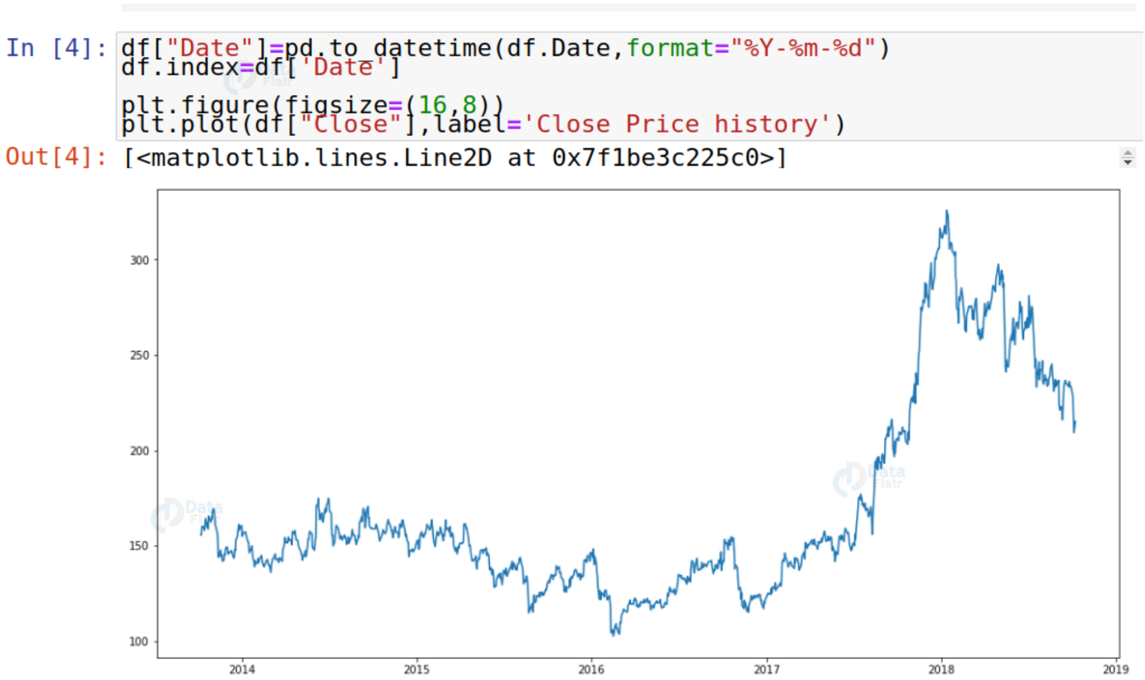


Out[15]:

	Date	Open	High	Low	Last	Close	Total Trade Quantity	Turnover (Lacs)
0	2018-10-08	208.00	222.25	206.85	216.00	215.15	4642146.0	10062.83
1	2018-10-05	217.00	218.60	205.90	210.25	209.20	3519515.0	7407.06
2	2018-10-04	223.50	227.80	216.15	217.25	218.20	1728786.0	3815.79
3	2018-10-03	230.00	237.50	225.75	226.45	227.60	1708590.0	3960.27
4	2018-10-01	234.55	234.60	221.05	230.30	230.90	1534749.0	3486.05

3. Analyze the closing prices from dataframe:

```
df["Date"]=pd.to_datetime(df.Date,format="%Y-%m-%d")
df.index=df['Date']
plt.figure(figsize=(16,8))
plt.plot(df["Close"],label='Close Price history')
```



```
In [4]: df["Date"]=pd.to_datetime(df.Date,format="%Y-%m-%d")
        df.index=df['Date']

        plt.figure(figsize=(16,8))
        plt.plot(df["Close"],label='Close Price history')
Out[4]: [<matplotlib.lines.Line2D at 0x7f1be3c225c0>]
```

4. Sort the dataset on date time and filter “Date” and “Close” columns:

```
data=df.sort_index(ascending=True,axis=0)
new_dataset=pd.DataFrame(index=range(0,len(df)),columns=['Date','Close'])
for i in range(0,len(data)):
    new_dataset["Date"][i]=data['Date'][i]
    new_dataset["Close"][i]=data["Close"][i]
```

5. Normalize the new filtered dataset:

```
scaler=MinMaxScaler(feature_range=(0,1))
new_dataset.index=new_dataset.Date
new_dataset.drop("Date",axis=1,inplace=True)
final_dataset=new_dataset.values
train_data=final_dataset[0:987,:]
valid_data=final_dataset[987:,:]

scaled_data=scaler.fit_transform(final_dataset)
x_train_data,y_train_data=[],[]
for i in range(60,len(train_data)):
x_train_data.append(scaled_data[i-60:i,0])
y_train_data.append(scaled_data[i,0])
x_train_data,y_train_data=np.array(x_train_data),np.array(y_train_data)
x_train_data=np.reshape(x_train_data,(x_train_data.shape[0],x_train_data.shape[1],1))
```

6. Build and train the LSTM model:

```
lstm_model=Sequential()
lstm_model.add(LSTM(units=50,return_sequences=True,input_shape=(x_train_data.shape[1],
1)))
lstm_model.add(LSTM(units=50))
lstm_model.add(Dense(1))
inputs_data=new_dataset[len(new_dataset)-len(valid_data)-60:].values
inputs_data=inputs_data.reshape(-1,1)
inputs_data=scaler.transform(inputs_data)
lstm_model.compile(loss='mean_squared_error',optimizer='adam')
lstm_model.fit(x_train_data,y_train_data,epochs=1,batch_size=1,verbose=2)
```

7. Take a sample of a dataset to make stock price predictions using the LSTM model:

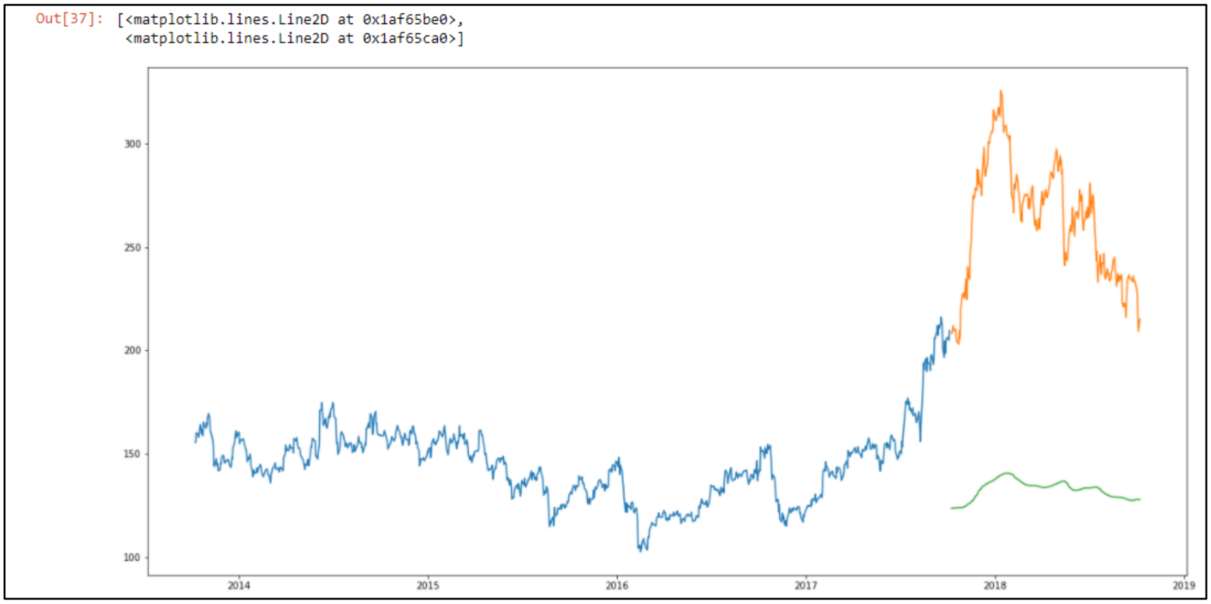
```
X_test=[]
for i in range(60,inputs_data.shape[0]):
X_test.append(inputs_data[i-60:i,0])
X_test=np.array(X_test)
X_test=np.reshape(X_test,(X_test.shape[0],X_test.shape[1],1))
predicted_closing_price=lstm_model.predict(X_test)
predicted_closing_price=scaler.inverse_transform(predicted_closing_price)
```

8. Save the LSTM model:

```
lstm_model.save("saved_model.h5")
```

9. Visualize the predicted stock costs with actual stock costs:

```
train_data=new_dataset[:987]
valid_data=new_dataset[987:]
valid_data['Predictions']=predicted_closing_price
plt.plot(train_data["Close"])
plt.plot(valid_data[['Close',"Predictions"]])
```



```
Out[37]: [<matplotlib.lines.Line2D at 0x1af65be0>,
          <matplotlib.lines.Line2D at 0x1af65ca0>]
```

You can observe that LSTM has predicted stocks almost similar to actual stocks.

Boetticher: Repeat this process using the SandPData data set. Hint, you will need to revise the layout.

Summary

Stock price prediction is a machine learning project for beginners; in this tutorial we learned how to develop a stock cost prediction model and how to build an interactive dashboard for stock analysis. We implemented stock market prediction using the LSTM model. OTOH,