Stock Analysis using Python (ML)

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B.tech

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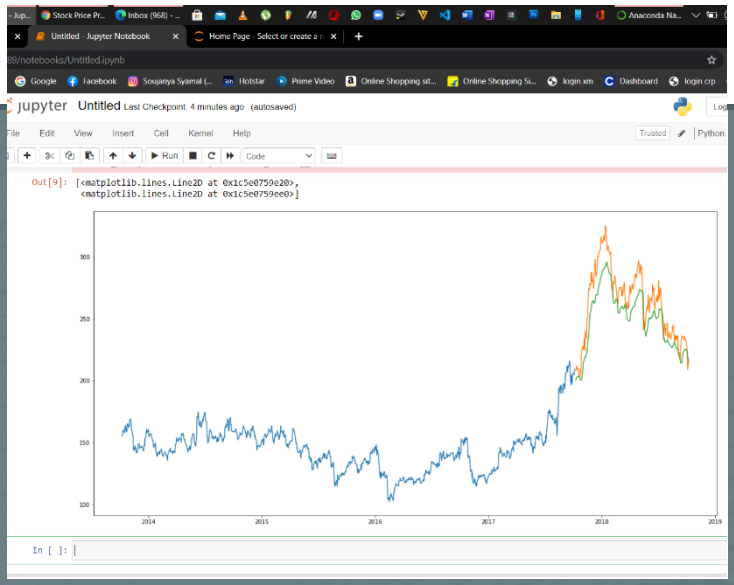
Self Project

Abstract

Stock price Analysis is a machine learning project; in this Project, I developed a stock cost prediction model and build an interactive dashboard for stock analysis. I implemented stock market prediction using the LSTM model. OTOH, Plotly dash python framework for building dashboards.

To build the stock price prediction model, I used the NSE TATA GLOBAL dataset. This is a dataset of Tata Beverages from Tata Global Beverages Limited, National Stock Exchange of India To develop the dashboard for stock analysis I used another stock dataset with multiple stocks like Apple, Microsoft, Facebook



THE PROCESS

The Source code and output graph is as follows

Stock price Analysis is a machine learning project; in this Project, we developed a stock cost prediction model and build an interactive dashboard for stock analysis. We implemented stock market prediction using the LSTM model. OTOH, Plotly dash python framework for building dashboards.

To build the stock price prediction model, I used the NSE TATA GLOBAL dataset. This is a dataset of Tata Beverages from Tata Global Beverages Limited, National Stock Exchange of India To develop the dashboard for stock analysis I used another stock dataset with multiple stocks like Apple, Microsoft, Facebook

Technology used.

1. Python (Language)
2. Jupyter (platform)
3. Numpy
4. Pandas
5. Keras
6. Tensor Flow
7. Matplot lib
8. Dash Plotly

This is a Pure Machine Learning project using deep learning and Data science , Data Analytics based Keras, Tensorflow. Data provided by NSE.

Now Here is the Source code and Output--- on the next page

In [1]:
```
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
```

In [2]:
```
df=pd.read_csv("E:\\STOCK PREDICTION\\DATA\\NSE-Tata-Global-Beverages-Limited.csv")
df.head()
```

Out[2]:

	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

In [3]:
```
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[3]:
```
[<matplotlib.lines.Line2D at 0x1c5d87e9820>]
```

In [4]:
```
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]
```

In [5]:
```
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:,:]


scaler=MinMaxScaler(feature_range=(0,1))
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)
```

In [6]:
```
lstm_model=Sequential()
lstm_model.add(LSTM(units=50,return_sequences=True,input_shape=(x_train_data.shape[1
lstm_model.add(LSTM(units=50))
lstm_model.add(Dense(1))




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)

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)
```

```
927/927 - 23s - loss: 9.7591e-04
```

In [7]:
```
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)
```

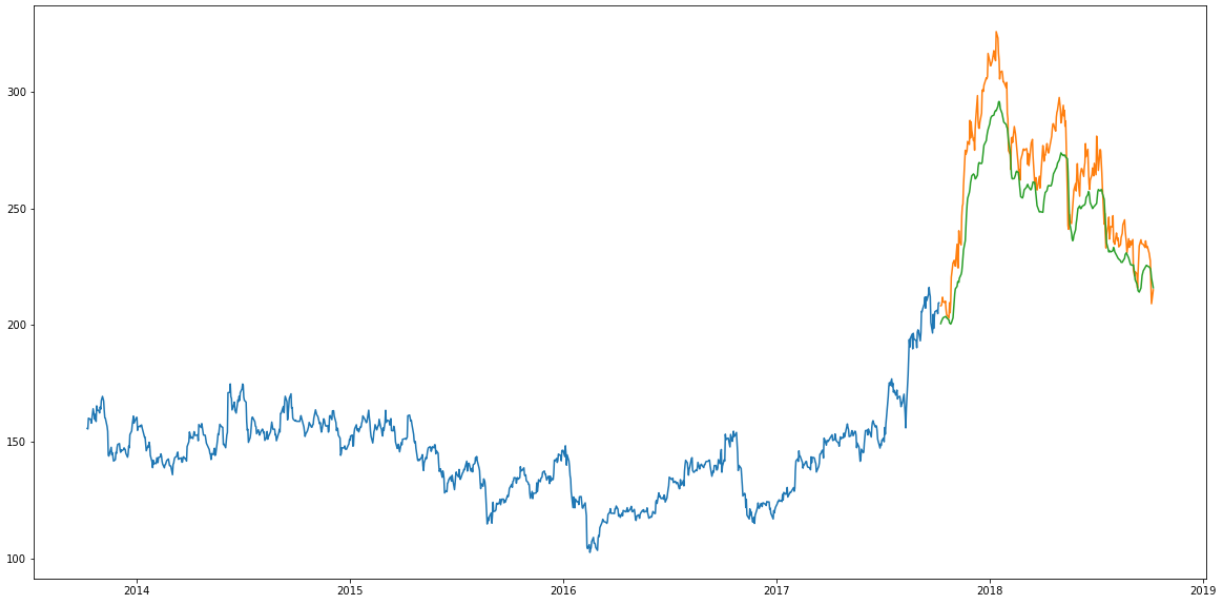
In [8]:
```
lstm_model.save("saved_model.h5")
```

In [9]:
```
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"]])
```

```
<ipython-input-9-397e778e3e61>:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/u
ser_guide/indexing.html#returning-a-view-versus-a-copy
  valid_data['Predictions']=predicted_closing_price
```

Out[9]:
```
[<matplotlib.lines.Line2D at 0x1c5e0759e20>,
 <matplotlib.lines.Line2D at 0x1c5e0759ee0>]
```



In [1]:
```
#app_build_front_end

import dash
import dash_core_components as dcc
import dash_html_components as html
import pandas as pd
import plotly.graph_objs as go
from dash.dependencies import Input, Output
from keras.models import load_model
from sklearn.preprocessing import MinMaxScaler
import numpy as np


app = dash.Dash()
server = app.server

scaler=MinMaxScaler(feature_range=(0,1))

df_nse = pd.read_csv("E:\\STOCK PREDICTION\\DATA\\NSE-Tata-Global-Beverages-Limited.

df_nse["Date"]=pd.to_datetime(df_nse.Date,format="%Y-%m-%d")
df_nse.index=df_nse['Date']


data=df_nse.sort_index(ascending=True,axis=0)
new_data=pd.DataFrame(index=range(0,len(df_nse)),columns=['Date','Close'])

for i in range(0,len(data)):
    new_data["Date"][i]=data['Date'][i]
    new_data["Close"][i]=data["Close"][i]

new_data.index=new_data.Date
new_data.drop("Date",axis=1,inplace=True)
```

```
dataset=new_data.values

train=dataset[0:987,:]
valid=dataset[987:,:]

scaler=MinMaxScaler(feature_range=(0,1))
scaled_data=scaler.fit_transform(dataset)

x_train,y_train=[],[]

for i in range(60,len(train)):
    x_train.append(scaled_data[i-60:i,0])
    y_train.append(scaled_data[i,0])

x_train,y_train=np.array(x_train),np.array(y_train)

x_train=np.reshape(x_train,(x_train.shape[0],x_train.shape[1],1))

model=load_model("saved_model.h5")

inputs=new_data[len(new_data)-len(valid)-60:].values
inputs=inputs.reshape(-1,1)
inputs=scaler.transform(inputs)

X_test=[]
for i in range(60,inputs.shape[0]):
    X_test.append(inputs[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))
closing_price=model.predict(X_test)
closing_price=scaler.inverse_transform(closing_price)

train=new_data[:987]
valid=new_data[987:]
valid['Predictions']=closing_price



df= pd.read_csv("E:\\STOCK PREDICTION\\DATA\\stock_data.csv")

app.layout = html.Div([

    html.H1("Stock Price Analysis Dashboard By Soujanya Syamal", style={"textAlign":
   html.H1("Machine Learning Project by Soujanya Syamal", style={"textAlign": "cente

    dcc.Tabs(id="tabs", children=[

        dcc.Tab(label='NSE-TATAGLOBAL Stock Data',children=[
            html.Div([
                html.H2("Actual closing price",style={"textAlign": "center"}),
                dcc.Graph(
                    id="Actual Data",
                    figure={
                        "data":[
                            go.Scatter(
                                x=train.index,
                                y=valid["Close"],
                                mode='markers'
                            )

                        ],
                        "layout":go.Layout(
                            title='scatter plot',
                            xaxis={'title':'Date'},
```

```
                            yaxis={'title':'Closing Rate'}
                        )
                    }

                ),
                html.H2("LSTM Predicted closing price",style={"textAlign": "center"}
                dcc.Graph(
                    id="Predicted Data",
                    figure={
                        "data":[
                            go.Scatter(
                                x=valid.index,
                                y=valid["Predictions"],
                                mode='markers'
                            )

                        ],
                        "layout":go.Layout(
                            title='scatter plot',
                            xaxis={'title':'Date'},
                            yaxis={'title':'Closing Rate'}
                        )
                    }

                )
            ])


        ]),
        dcc.Tab(label='Facebook Stock Data', children=[
            html.Div([
                html.H1("Facebook Stocks High vs Lows",
                        style={'textAlign': 'center'}),

                dcc.Dropdown(id='my-dropdown',
                             options=[{'label': 'Tesla', 'value': 'TSLA'},
                                      {'label': 'Apple','value': 'AAPL'},
                                      {'label': 'Facebook', 'value': 'FB'},
                                      {'label': 'Microsoft','value': 'MSFT'}],
                             multi=True,value=['FB'],
                             style={"display": "block", "margin-left": "auto",
                                    "margin-right": "auto", "width": "60%"}),
                dcc.Graph(id='highlow'),
                html.H1("Facebook Market Volume", style={'textAlign': 'center'}),

                dcc.Dropdown(id='my-dropdown2',
                             options=[{'label': 'Tesla', 'value': 'TSLA'},
                                      {'label': 'Apple','value': 'AAPL'},
                                      {'label': 'Facebook', 'value': 'FB'},
                                      {'label': 'Microsoft','value': 'MSFT'}],
                             multi=True,value=['FB'],
                             style={"display": "block", "margin-left": "auto",
                                    "margin-right": "auto", "width": "60%"}),
                dcc.Graph(id='volume')
            ], className="container"),
        ])


    ])
])


@app.callback(Output('highlow', 'figure'),
              [Input('my-dropdown', 'value')])
def update_graph(selected_dropdown):
```

```
    dropdown = {"TSLA": "Tesla","AAPL": "Apple","FB": "Facebook","MSFT": "Microsoft"
    trace1 = []
    trace2 = []
    for stock in selected_dropdown:
        trace1.append(
          go.Scatter(x=df[df["Stock"] == stock]["Date"],
                     y=df[df["Stock"] == stock]["High"],
                     mode='lines', opacity=0.7,
                     name=f'High {dropdown[stock]}',textposition='bottom center'))
        trace2.append(
          go.Scatter(x=df[df["Stock"] == stock]["Date"],
                     y=df[df["Stock"] == stock]["Low"],
                     mode='lines', opacity=0.6,
                     name=f'Low {dropdown[stock]}',textposition='bottom center'))
    traces = [trace1, trace2]
    data = [val for sublist in traces for val in sublist]
    figure = {'data': data,
              'layout': go.Layout(colorway=["#5E0DAC", '#FF4F00', '#375CB1',
                                            '#FF7400', '#FFF400', '#FF0056'],
            height=600,
            title=f"High and Low Prices for {', '.join(str(dropdown[i]) for i in sel
            xaxis={"title":"Date",
                   'rangeselector': {'buttons': list([{'count': 1, 'label': '1M',
                                                       'step': 'month',
                                                       'stepmode': 'backward'},
                                                      {'count': 6, 'label': '6M',
                                                       'step': 'month',
                                                       'stepmode': 'backward'},
                                                      {'step': 'all'}])},
                   'rangeslider': {'visible': True}, 'type': 'date'},
             yaxis={"title":"Price (USD)"})}
    return figure


@app.callback(Output('volume', 'figure'),
              [Input('my-dropdown2', 'value')])
def update_graph(selected_dropdown_value):
    dropdown = {"TSLA": "Tesla","AAPL": "Apple","FB": "Facebook","MSFT": "Microsoft"
    trace1 = []
    for stock in selected_dropdown_value:
        trace1.append(
          go.Scatter(x=df[df["Stock"] == stock]["Date"],
                     y=df[df["Stock"] == stock]["Volume"],
                     mode='lines', opacity=0.7,
                     name=f'Volume {dropdown[stock]}', textposition='bottom center')
    traces = [trace1]
    data = [val for sublist in traces for val in sublist]
    figure = {'data': data,
              'layout': go.Layout(colorway=["#5E0DAC", '#FF4F00', '#375CB1',
                                            '#FF7400', '#FFF400', '#FF0056'],
            height=600,
            title=f"Market Volume for {', '.join(str(dropdown[i]) for i in selected_
            xaxis={"title":"Date",
                   'rangeselector': {'buttons': list([{'count': 1, 'label': '1M',
                                                       'step': 'month',
                                                       'stepmode': 'backward'},
                                                      {'count': 6, 'label': '6M',
                                                       'step': 'month',
                                                       'stepmode': 'backward'},
                                                      {'step': 'all'}])},
                   'rangeslider': {'visible': True}, 'type': 'date'},
             yaxis={"title":"Transactions Volume"})}
    return figure
```

```
if __name__=='__main__':
    app.run_server(debug=True)
```

```
Dash is running on http://127.0.0.1:8050/

 * Serving Flask app "__main__" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
<ipython-input-1-dfe56a8b3e4c>:70: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  valid['Predictions']=closing_price
An exception has occurred, use %tb to see the full traceback.

SystemExit: 1
C:\Users\Soujanya\.conda\envs\project\lib\site-packages\IPython\core\interactiveshell.py:3445: UserWarning: To exit: use 'exit', 'quit', or Ctrl-D.
  warn("To exit: use 'exit', 'quit', or Ctrl-D.", stacklevel=1)
```

In [ ]:

In [ ]: