.... Forcasting Google Stock data by python

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Project objective

This project will try to forcast the closing price of Google stock prises from dataset of Nasdaq website(this dataset has more than 1000 rows) and will compare the forcasted prises with the actual prises. This project will use regression analysis to do the forcasting.

Tools used and justification

to discover this huge set of data, MS Excel cannot be used. instead, Python programming language will be used to gain compelete insight, Because python is common tool that specilzed in dealing with this type of issues. Python has many programming libraries in statistics .

in the two coming code cells , important libararies for this project will be imported

Pandas : this libarary used to load the dataset to this file.

farthermore, it help to show samples of this dataset

numby : this library used to do the numrical operations.

sklearn : in this project I will use this library to do the forcasting by regression method.

matplotlib: this library used to do the data visualization.

In [76]:

```
import pandas as pd
import numpy as np
from sklearn import metrics
%matplotlib inline
import matplotlib.pyplot as plt
```

In [77]:

```
df = pd.read_csv('GOOGL.csv')
```

The above code will load the data into this file by Pandas.

And in the below code first 10 rows of the dataset will be displayed.

In [78]:

```
df.head(10)
```

Out[78]:

	Date	Open	High	Low	Close	Adj Close	Volume
0	2015-12-09	771.099976	776.090027	752.010010	762.549988	762.549988	2327500
1	2015-12-10	763.590027	766.070007	755.000000	760.039978	760.039978	1622900
2	2015-12-11	749.000000	757.440002	748.650024	750.419983	750.419983	2159200
3	2015-12-14	751.260010	764.150024	736.260010	762.539978	762.539978	2693200
4	2015-12-15	767.789978	774.750000	758.000000	760.090027	760.090027	2469300
5	2015-12-16	766.570007	781.500000	757.049988	776.590027	776.590027	2656000
6	2015-12-17	781.159973	781.590027	769.299988	769.830017	769.830017	1825500
7	2015-12-18	767.229980	774.140015	756.590027	756.849976	756.849976	3389700
8	2015-12-21	763.049988	766.349976	754.150024	760.799988	760.799988	1742400
9	2015-12-22	764.270020	770.340027	761.200012	767.130005	767.130005	1816900

In [79]:

```
df['Date'] = pd.to_datetime(df.Date)
```

In [80]:

```
df.drop('Adj Close',axis = 1,inplace= True)
```

The above code will drop "Adj Close" column because it is not needed in this project.

Data analysis and Discussion part

this part will discover this dataset and will make a regression model to forcasting.

In [81]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1259 entries, 0 to 1258
Data columns (total 6 columns):
Date      1259 non-null datetime64[ns]
Open      1259 non-null float64
High      1259 non-null float64
Low       1259 non-null float64
Close     1259 non-null float64
Volume    1259 non-null int64
dtypes: datetime64[ns](1), float64(4), int64(1)
memory usage: 59.1 KB
```

In [82]:

```
df.shape
```

Out[82]:

```
(1259, 6)
```

In [83]:

```
df.describe()
```

Out[83]:

	Open	High	Low	Close	Volume
count	1259.000000	1259.000000	1259.000000	1259.000000	1.259000e+03
mean	1086.605766	1097.011731	1076.126570	1086.996021	1.835547e+06
std	252.589317	256.592644	249.640484	253.245127	8.811597e+05
min	682.489990	683.330017	672.659973	681.140015	5.206000e+05
25%	847.820007	852.100006	843.505005	849.375000	1.294850e+06
50%	1084.020020	1094.839966	1070.890015	1084.089966	1.588700e+06
75%	1224.059998	1236.369995	1214.535034	1225.005005	2.092650e+06
max	1820.540039	1843.829956	1817.000000	1824.969971	7.039900e+06

the above codes shows that there are 1259 rows and 6 columns in this dataset. and also found that

the data have 5 variables if date column was ignored.

Therefore, the below codes will divide all variables into 2 sets of array

Independent and dependent.

After that, the regression model will be created using Sklearn library which is imported in the first code.

In [84]:

```
ind = df[['Open','High','Low','Volume']]
dep = df['Close']
```

In [85]:

```
from sklearn.model_selection import train_test_split
x_train , x_test, y_train, y_test = train_test_split(ind, dep, random_state = 0)
```

In [86]:

```
x_train.shape
```

Out[86]:

```
(944, 4)
```

In [87]:

```
x_test.shape
```

Out[87]:

```
(315, 4)
```

In [88]:

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import confusion_matrix, accuracy_score
regressor = LinearRegression()
```

In [89]:

```
regressor.fit(x_train,y_train)
```

```
Out[89]:

LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None, normalize=False)
```

```
In [90]:

print(regressor.coef_)
```

```
[-5.95366632e-01  8.48408385e-01  7.44703218e-01 -3.78676955e-07]
```

```
In [91]:

forcasted = regressor.predict(x_test)
```

In the above codes Linear Regression model was created and the foracsted data are created by predict method in Sklearn library .

After that , I will load both 'actual close price' and 'forcasted close price' into one data frame and save as MS Excel file .

```
In [92]:

df_f = pd.DataFrame({'Actual':y_test,'forcasted':forcasted})

df_f.to_csv('forcstedVsActual.csv')
```

The below code will show the first 30 rows of the forcasted data versus the actual to compare how the defrenece.

```
In [93]:

df_f.head(30)
```

```
Out[93]:
```

	Actual	forcasted
5	776.590027	771.964385
494	1056.520020	1057.231223
52	729.119995	721.525932
986	1309.000000	1313.787913
186	808.020020	806.788651
18	759.330017	761.583400
317	868.390015	864.730748
511	1079.780029	1076.279306
364	964.070007	963.175089
571	1100.069946	1096.474524
609	1103.380005	1104.823300
703	1193.890015	1186.635633
924	1196.729980	1199.070870
461	992.309998	996.843177
742	1027.420044	1036.414466
957	1221.140015	1220.366608
923	1174.500000	1175.832233
1160	1555.920044	1561.063622
85	771.909973	770.809478
1250	1764.130005	1753.699963
927	1179.209961	1176.993523

	Actual	forcasted
124	742.929993	740.651128
709	1211.530029	1205.835874
492	1050.300049	1047.936669
1159	1563.839966	1550.226771
211	809.570007	813.997188
907	1131.550049	1137.301538
1052	1518.729980	1511.222943
453	959.900024	960.943754
811	1153.420044	1150.988539

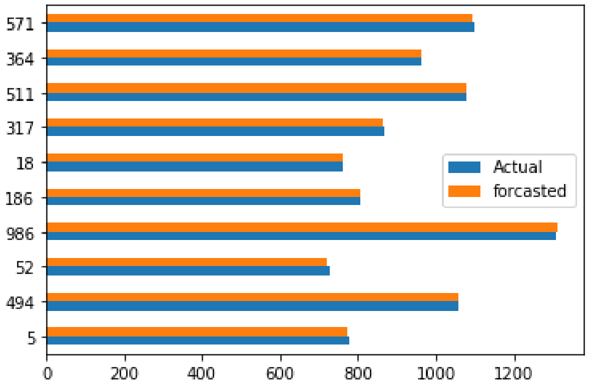
Here I used matplotlip libaray to make a visualization for comparing the actual versus the forcasted for the first 10 rows because more 300 rows and cannot be displayed in one graph.

In [94]:

```
df_f.head(10).plot(kind='barh')
```

Out[94]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x23f2c6ca348>
```



In [95]:

```
print('MAE:',metrics.mean_absolute_error(y_test,forcasted))
```

```
MAE: 4.676034871210051
```

Mean Absolute Error (MAE): 4.6760

Conclusion

From the first 30 rows and the plot of the forcasted and the actual it appears that the regression model has suceeded to forecast the close price signficantly .

Mean Absolute Error (MAE)measures the average magnitude of the errors in a set of predictions, without considering their direction.

in this foracsting model on average, the forecast's distance from the true value is 4.6760. Which implies there no signficant deference between the forcasted and the actual close price which is means the model was almost perfect in forcasting this huge data set.

References:

https://finance.yahoo.com/quote/GOOGL/history?period1=1449619200&period2=1607472000&interval=1d&filter=history&frequency=1d&includeAdj

https://www.kaggle.com/

https://scikit-learn.org/stable/modules/generated/sklearn.model_selection.train_test_split.html

https://realpython.com/train-test-split-python-data/