rediction-of-tesla-using-linearreg

December 14, 2023

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline

import chart_studio.plotly as py
import plotly.graph_objs as go
from plotly.offline import plot

#for offline plotting
from plotly.offline import download_plotlyjs, init_notebook_mode, plot, iplot
init_notebook_mode(connected=True)
```

[2]:
```
tesla = pd.read_csv(r"E:\xlsx\tesla.csv")
tesla.head()
```

[2]:

	Date	Open	High	Low	Close	Adj Close	Volume
0	29-06-2010	19.000000	25.00	17.540001	23.889999	23.889999	18766300
1	30-06-2010	25.790001	30.42	23.299999	23.830000	23.830000	17187100
2	01-07-2010	25.000000	25.92	20.270000	21.959999	21.959999	8218800
3	02-07-2010	23.000000	23.10	18.709999	19.200001	19.200001	5139800
4	06-07-2010	20.000000	20.00	15.830000	16.110001	16.110001	6866900

[3]:
```
tesla.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2193 entries, 0 to 2192
Data columns (total 7 columns):
 #   Column     Non-Null Count  Dtype  
---  ------     --------------  -----  
 0   Date       2193 non-null   object 
 1   Open       2193 non-null   float64
 2   High       2193 non-null   float64
 3   Low        2193 non-null   float64
 4   Close      2193 non-null   float64
 5   Adj Close  2193 non-null   float64
 6   Volume     2193 non-null   int64  
```

```
dtypes: float64(5), int64(1), object(1)
memory usage: 120.1+ KB
```

[4]:
```
tesla['Date'] = pd.to_datetime(tesla['Date'])
```

```
C:\Users\DELL\AppData\Local\Temp\ipykernel_10276\3702129700.py:1: UserWarning:

Parsing dates in %d-%m-%Y format when dayfirst=False (the default) was
specified. Pass `dayfirst=True` or specify a format to silence this warning.
```

[5]:
```
print(f'Dataframe contains stock prices between {tesla.Date.min()} {tesla.Date.
  ↪max()}')
print(f'Total days = {(tesla.Date.max()  - tesla.Date.min()).days} days')
```

```
Dataframe contains stock prices between 2010-06-29 00:00:00 2019-03-15 00:00:00
Total days = 3181 days
```

[7]:
```
tesla.describe()
```

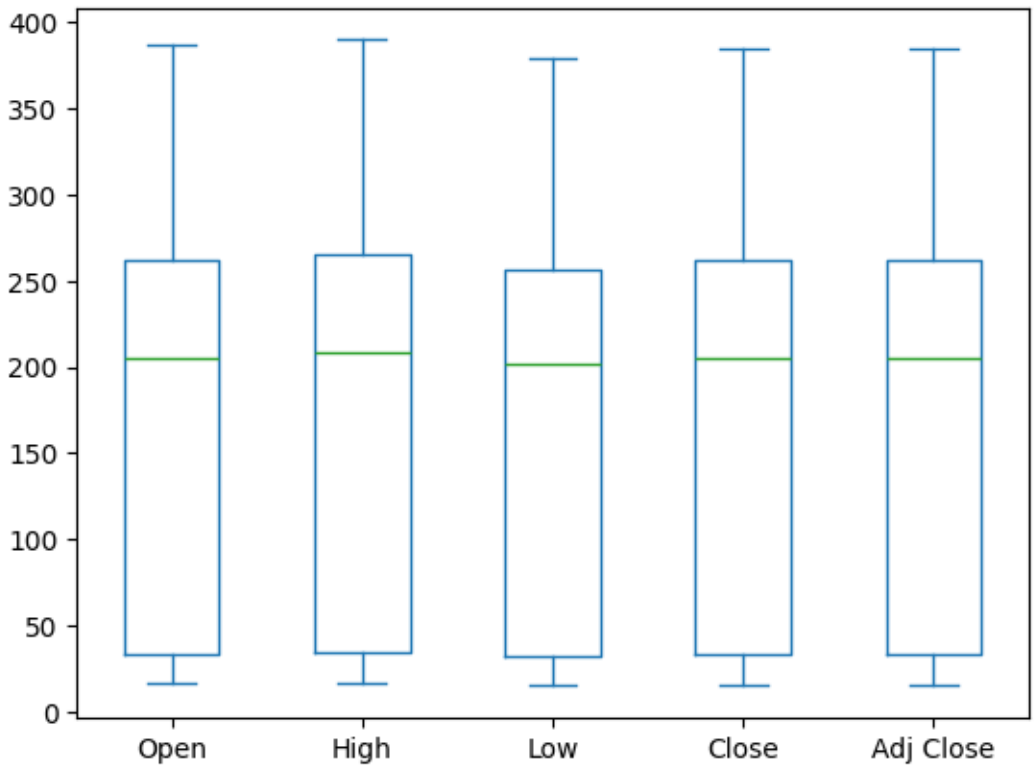
[7]:

	Date	Open	High	Low	\
count	2193	2193.000000	2193.000000	2193.000000	
mean	2014-11-04 14:37:15.841313024	175.652882	178.710262	172.412075	
min	2010-06-29 00:00:00	16.139999	16.629999	14.980000	
25%	2012-08-29 00:00:00	33.110001	33.910000	32.459999	
50%	2014-11-04 00:00:00	204.990005	208.160004	201.669998	
75%	2017-01-09 00:00:00	262.000000	265.329987	256.209991	
max	2019-03-15 00:00:00	386.690002	389.609985	379.350006	
std	NaN	115.580903	117.370092	113.654794	

	Close	Adj Close	Volume
count	2193.000000	2193.000000	2.193000e+03
mean	175.648555	175.648555	5.077449e+06
min	15.800000	15.800000	1.185000e+05
25%	33.160000	33.160000	1.577800e+06
50%	204.990005	204.990005	4.171700e+06
75%	261.739990	261.739990	6.885600e+06
max	385.000000	385.000000	3.716390e+07
std	115.580771	115.580771	4.545398e+06

[8]:
```
tesla[['Open','High','Low','Close','Adj Close']].plot(kind='box')
```

[8]:
```
<Axes: >
```



[9]:
```
# Setting the layout for our plot
layout = go.Layout(
    title='Stock Prices of Tesla',
    xaxis=dict(
        title='Date',
        titlefont=dict(
            family='Courier New, monospace',
            size=18,
            color='#7f7f7f'
        )
    ),
    yaxis=dict(
        title='Price',
        titlefont=dict(
            family='Courier New, monospace',
            size=18,
            color='#7f7f7f'
        )
    )
)

tesla_data = [{'x':tesla['Date'], 'y':tesla['Close']}]
```

```
plot = go.Figure(data=tesla_data, layout=layout)
```

[10]:
```
iplot(plot)
```

[11]:
```
# Building the regression model
from sklearn.model_selection import train_test_split

#For preprocessing
from sklearn.preprocessing import MinMaxScaler
from sklearn.preprocessing import StandardScaler

#For model evaluation
from sklearn.metrics import mean_squared_error as mse
from sklearn.metrics import r2_score
```

[12]:
```
#Split the data into train and test sets
X = np.array(tesla.index).reshape(-1,1)
Y = tesla['Close']
X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.3,␣
 ↪random_state=101)
```

[13]:
```
# Feature scaling
scaler = StandardScaler().fit(X_train)
```

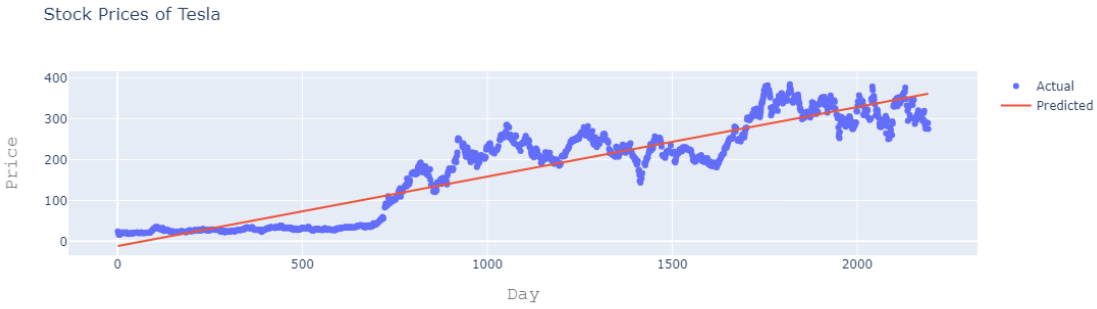
[14]:
```
from sklearn.linear_model import LinearRegression
```

[15]:
```
#Creating a linear model
lm = LinearRegression()
lm.fit(X_train, Y_train)
```

[15]:
```
LinearRegression()
```

[16]:
```
#Plot actual and predicted values for train dataset
trace0 = go.Scatter(
    x = X_train.T[0],
    y = Y_train,
    mode = 'markers',
    name = 'Actual'
)
trace1 = go.Scatter(
    x = X_train.T[0],
    y = lm.predict(X_train).T,
    mode = 'lines',
    name = 'Predicted'
)
tesla_data = [trace0,trace1]
layout.xaxis.title.text = 'Day'
plot2 = go.Figure(data=tesla_data, layout=layout)
```

[17]:
```
iplot(plot2)
```



[18]:
```
#Calculate scores for model evaluation
scores = f'''
{'Metric'.ljust(10)}{'Train'.center(20)}{'Test'.center(20)}
{'r2_score'.ljust(10)}{r2_score(Y_train, lm.
 ↪predict(X_train))}\t{r2_score(Y_test, lm.predict(X_test))}
{'MSE'.ljust(10)}{mse(Y_train, lm.predict(X_train))}\t{mse(Y_test, lm.
 ↪predict(X_test))}
'''
print(scores)
```

```
Metric           Train                Test
r2_score  0.8658871776828707    0.8610649253244574
MSE       1821.3833862936174    1780.987539418845
```

[ ]: