Tesla Stock Price Prediction Using Machine Learning

Importing necessary libraries

In [18]:

```
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)
```

Reading Dataset

In [19]:

```
tesla = pd.read_csv(R"C:\Users\91779\Downloads\datasetsandcodefilesstockmarketprediction\tesla.csv
tesla.head()
```

Out[19]:

	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

In [20]:

```
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
```

In [21]:

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

```
C:\Users\91779\AppData\Local\Temp\ipykernel_2436\3702129700.py:1: UserWarning:

Parsing '29-06-2010' in DD/MM/YYYY format. Provide format or specify infer_dateti
me_format=True for consistent parsing.

C:\Users\91779\AppData\Local\Temp\ipykernel_2436\3702129700.py:1: UserWarning:

Parsing '30-06-2010' in DD/MM/YYYY format. Provide format or specify infer_dateti
me_format=True for consistent parsing.

C:\Users\91779\AppData\Local\Temp\ipykernel_2436\3702129700.py:1: UserWarning:

Parsing '13-07-2010' in DD/MM/YYYY format. Provide format or specify infer_dateti
me_format=True for consistent parsing.

C:\Users\91779\AppData\Local\Temp\ipykernel_2436\3702129700.py:1: UserWarning:

Parsing '14-07-2010' in DD/MM/YYYY format. Provide format or specify infer_dateti
me_format=True for consistent parsing.
```

In [22]:

```
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 2010-01-07 00:00:00 2019-12-03 00:00:00
Total days = 3617 days
```

In [23]:

```
tesla.describe()
```

Out[23]:

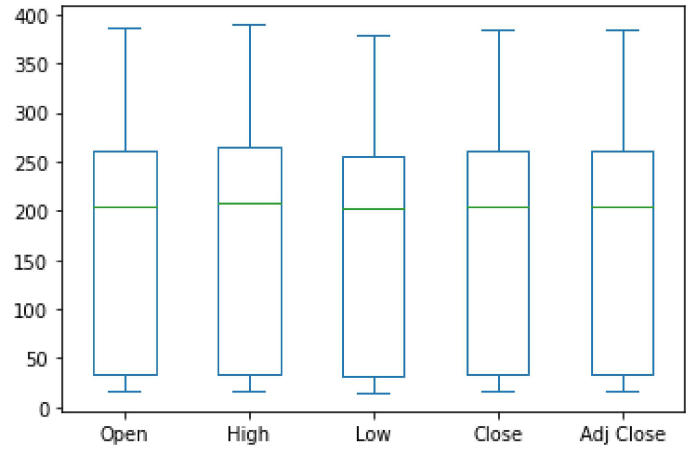
	Open	High	Low	Close	Adj Close	Volume
count	2193.000000	2193.000000	2193.000000	2193.000000	2193.000000	2.193000e+03
mean	175.652882	178.710262	172.412075	175.648555	175.648555	5.077449e+06
std	115.580903	117.370092	113.654794	115.580771	115.580771	4.545398e+06
min	16.139999	16.629999	14.980000	15.800000	15.800000	1.185000e+05
25%	33.110001	33.910000	32.459999	33.160000	33.160000	1.577800e+06
50%	204.990005	208.160004	201.669998	204.990005	204.990005	4.171700e+06
75%	262.000000	265.329987	256.209991	261.739990	261.739990	6.885600e+06
max	386.690002	389.609985	379.350006	385.000000	385.000000	3.716390e+07

In [24]:

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

Out[24]:

<AxesSubplot:>



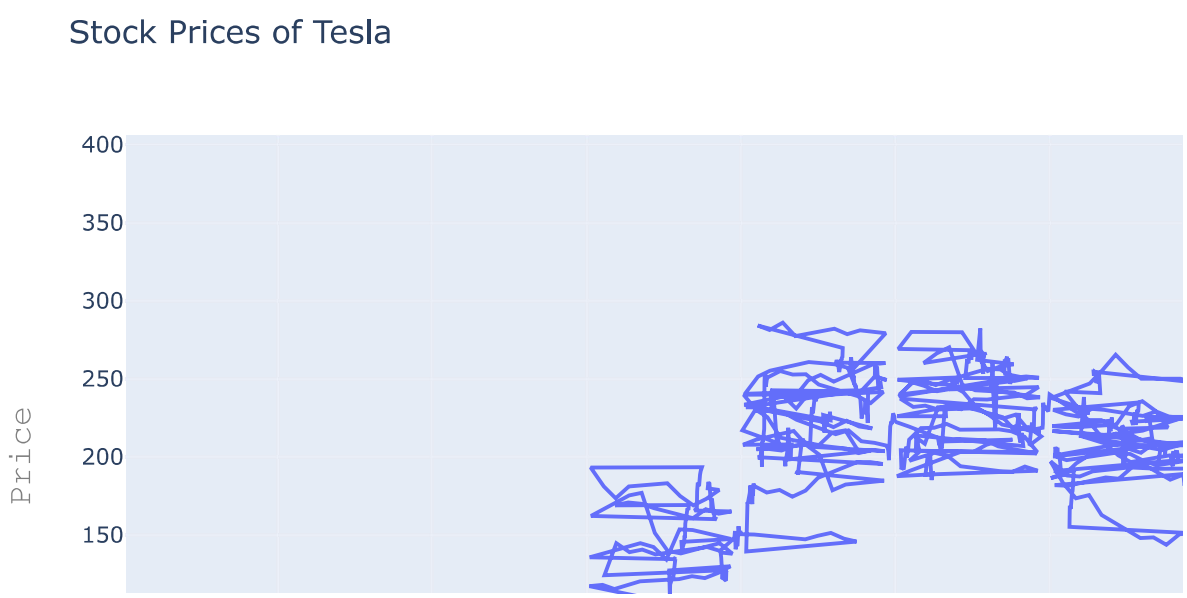
In [25]:

```
# 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)
```

In [26]:

```
#plot(plot) #plotting offline
iplot(plot)
```



Building the regression model

In [35]:

```
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
```

In [36]:

```
#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)
```

In [37]:

```
# Feature scaling
scaler = StandardScaler().fit(X_train)
```

In [38]:

```
from sklearn.linear_model import LinearRegression
```

In [39]:

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

Out[39]:

```
LinearRegression()
```

In [40]:

```
#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)
```

In [41]:

```
iplot(plot2)
```

In [42]:

```
#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_tes
{'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
```

In [ ]:

```

```