Tesla Stock Price Analysis using python

In [ ]:
```
! pip install mysql-connector-python
# call the libraries like numpy,pandas,seaborn and matplotlib
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

```
Collecting mysql-connector-python
  Downloading mysql_connector_python-8.0.32-cp38-cp38-win_amd64.whl (7.9 MB)
Collecting protobuf<=3.20.3,>=3.11.0
  Downloading protobuf-3.20.3-cp38-cp38-win_amd64.whl (904 kB)
Installing collected packages: protobuf, mysql-connector-python
Successfully installed mysql-connector-python-8.0.32 protobuf-3.20.3
```

In [ ]:
```
import pandas as pd
import mysql.connector

# Establish a connection to the MySQL database
cnx = mysql.connector.connect(user='root', password='1234',database='stock_prices')

# Write a query to select the data from the table
query = "SELECT * FROM tesla_stock_prices;"

# Use pandas to read the data into a dataframe
df = pd.read_sql(query, cnx)

# Close the database connection
cnx.close()

# Display the resulting dataframe
print(df.head())
```

```
         Date   Open   High    Low  Close  Adj_Close    Volume
0  2010-06-29  19.00  25.00  17.54  23.89      23.89  18766300
1  2010-06-30  25.79  30.42  23.30  23.83      23.83  17187100
2  2010-07-01  25.00  25.92  20.27  21.96      21.96   8218800
3  2010-07-02  23.00  23.10  18.71  19.20      19.20   5139800
4  2010-07-06  20.00  20.00  15.83  16.11      16.11   6866900
```

In [ ]:
```
df.set_index('Date', inplace=True)
```

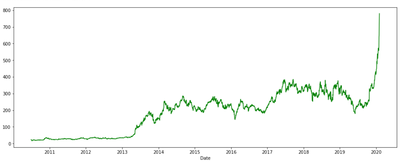
In [ ]:
```
df.head()
```

Out [ ]:

Date	Open	High	Low	Close	Adj_Close	Volume
2010-06-29	19.00	25.00	17.54	23.89	23.89	18766300
2010-06-30	25.79	30.42	23.30	23.83	23.83	17187100
2010-07-01	25.00	25.92	20.27	21.96	21.96	8218800
2010-07-02	23.00	23.10	18.71	19.20	19.20	5139800
2010-07-06	20.00	20.00	15.83	16.11	16.11	6866900

In [ ]:
```
#plot  stock data by line Graph
df['Close'].plot(figsize=(14,6), color='g')
```

Out [ ]:
```
<AxesSubplot:xlabel='Date'>
```



In [ ]:
```
df_close = df['Close']
plt.figure(figsize=(16,6))
df_close.plot(style='k.')
plt.title('Scatter plot of closing price')
plt.show()
```

In [ ]:
```
# create new colume of price difference
df['Price_Diff'] = df['Close'].shift(-1)-df['Close']
df.head()
```

Out [ ]:

Date	Open	High	Low	Close	Adj_Close	Volume	Price_Diff
2010-06-29	19.00	25.00	17.54	23.89	23.89	18766300	-0.06
2010-06-30	25.79	30.42	23.30	23.83	23.83	17187100	-1.87
2010-07-01	25.00	25.92	20.27	21.96	21.96	8218800	-2.76
2010-07-02	23.00	23.10	18.71	19.20	19.20	5139800	-3.09
2010-07-06	20.00	20.00	15.83	16.11	16.11	6866900	-0.31

In [ ]:
```
# create new column for daily return
df['Daily_Return'] = df['Price_Diff']/df['Close']
df.head()
```

Out [ ]:

Date	Open	High	Low	Close	Adj_Close	Volume	Price_Diff	Daily_Return
2010-06-29	19.00	25.00	17.54	23.89	23.89	18766300	-0.06	-0.002512
2010-06-30	25.79	30.42	23.30	23.83	23.83	17187100	-1.87	-0.078473
2010-07-01	25.00	25.92	20.27	21.96	21.96	8218800	-2.76	-0.125683
2010-07-02	23.00	23.10	18.71	19.20	19.20	5139800	-3.09	-0.160938
2010-07-06	20.00	20.00	15.83	16.11	16.11	6866900	-0.31	-0.019243

In [ ]:
```
#here we apply rolling widow calculation for 50 days
df['50_Days_Moving_Average'] = df['Close'].rolling(50).mean()
df['50_Days_Moving_Average'].plot(figsize=(14,8))
df['Close'].plot()
plt.legend()
plt.show()
```

In [ ]:
```
df['50_Days_Moving_Average']=df['Close'].rolling(50).mean()
df['10_Days_Moving_Average']=df['Close'].rolling(10).mean()
```

In [ ]:
```
df=df.dropna()
df.head()
```

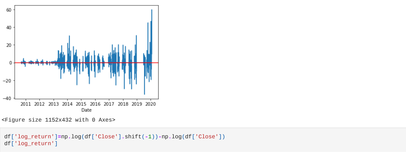
Out [ ]:

Date	Open	High	Low	Close	Adj_Close	Volume	Price_Diff	Daily_Return	50_Days_Moving_Average	10_Days_Moving_Average
2010-09-08	20.66	20.95	20.60	20.90	20.90	288400	-0.19	-0.009091	19.8336	20.270
2010-09-09	21.00	21.05	20.69	20.71	20.71	376200	-0.54	-0.026074	19.7700	20.351
2010-09-10	20.75	20.93	19.76	20.17	20.17	386600	0.55	0.027268	19.6968	20.393
2010-09-13	20.89	20.90	20.50	20.72	20.72	360800	0.40	0.019305	19.6720	20.495
2010-09-14	20.54	21.60	20.53	21.12	21.12	654700	0.86	0.040720	19.7104	20.620

In [ ]:
```
df['shares'] = [1 if df.loc[ei, '10_Days_Moving_Average']>df.loc[ei, '50_Days_Moving_Average'] else 0 for ei in df.index]
```

In [ ]:
```
#calculate profit and plot it
df['Closes1'] = df['Close'].shift(-1)
df['Profit'] = [df.loc[ei, 'Closes1'] - df.loc[ei, 'Close'] if df.loc[ei, 'shares']==1 else 0 for ei in df.index]
df['Profit'].plot()
plt.axhline(y=0, color='red')
# make fig size bigger
plt.figure(figsize=(16,6))
```

Out [ ]:
```
<Figure size 1152x432 with 0 Axes>
```




```
<Figure size 1152x432 with 0 Axes>
```

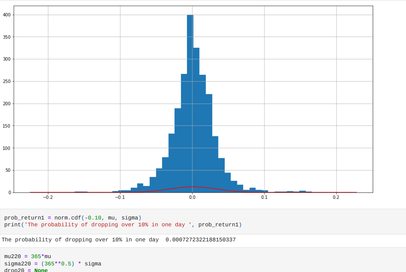
In [ ]:
```
df['log_return']=np.log(df['Close'].shift(-1))-np.log(df['Close'])
df['log_return']
```

Out [ ]:
```
Date
2010-09-08   -0.009133
2010-09-09   -0.026420
2010-09-10    0.026938
2010-09-13    0.019121
2010-09-14    0.039912
               ...
2020-01-27    0.015788
2020-01-28    0.024551
2020-01-29    0.097899
2020-01-30    0.015116
2020-01-31         NaN
Name: log_return, Length: 2366, dtype: float64
```

In [ ]:
```
from scipy.stats import norm
mu = df['log_return'].mean()
sigma = df['log_return'].std(ddof=1)

density = pd.DataFrame()
density['x'] = np.arange(df['log_return'].min()-0.01, df['log_return'].max()+0.01, 0.001)
density['pdf'] = norm.pdf(density['x'], mu, sigma)

df['log_return'].hist(bins=50, figsize=(15, 8))
plt.plot(density['x'], density['pdf'], color='red')
plt.show()
```



In [ ]:
```
prob_return1 = norm.cdf(-0.10, mu, sigma)
print('The probability of dropping over 10% in one day ', prob_return1)
```

```
The probability of dropping over 10% in one day  0.0007272322188158037
```

In [ ]:
```
mu220 = 365*mu
sigma220 = (365**0.5) * sigma
drop20 = None
print('The probability of dropping over 25% over a year: ', drop20)
```

```
The probability of dropping over 25% over a year:  None
```

In [ ]:
```
from pandas.plotting import scatter_matrix
sm = scatter_matrix(df, figsize=(10, 10))
```