Netflix Stock Price Prediction

Netflix, Inc. is an American media company based in Los Gatos, California. Founded in 1997 by Reed Hastings and Marc Randolph in Scotts Valley, California

This dataset contains the stock price values of Netflix from 2018 to 2022.

Feature Description:

Date - Date of open market Open - Price when market opens High - Highest price during open period Low - Lowest price during open period Close - Price when market is closed Adj Close - Closing price after adjustments Volume - number of shares traded

Import data

In [3]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
import statistics
import plotly.offline as pyo
import plotly.graph_objs as go
```

Upload Dataset

In [5]:
```
df=pd.read_csv("NFLX.csv")
```

In [7]:
```
df1=df.copy()
```

In [10]:
```
df1.head()
```

Out[10]:

	Date	Open	High	Low	Close	Adj Close	Volume
0	2018-02-05	262.000000	267.899994	250.029999	254.259995	254.259995	11896100
1	2018-02-06	247.699997	266.700012	245.000000	265.720001	265.720001	12595800
2	2018-02-07	266.579987	272.450012	264.329987	264.559998	264.559998	8981500
3	2018-02-08	267.079987	267.619995	250.000000	250.100006	250.100006	9306700
4	2018-02-09	253.850006	255.800003	236.110001	249.470001	249.470001	16906900

Checking the dataset in rows and columns

In [11]:
```
df.shape
```

Out[11]:
```
(1009, 7)
```

Checking datatype

In [13]:
```
df.dtypes
```

Out[13]:
```
Date          object
Open         float64
High         float64
Low          float64
Close        float64
Adj Close    float64
Volume         int64
dtype: object
```

Duplicate data check

In [16]:
```
df.duplicated().sum()
```

Out[16]:
```
0
```

Null Values

In [18]:
```
df.isnull().sum()
```

Out[18]:
```
Date         0
Open         0
High         0
Low          0
Close        0
Adj Close    0
Volume       0
dtype: int64
```

Unique values

In [19]:
```
df.nunique()
```

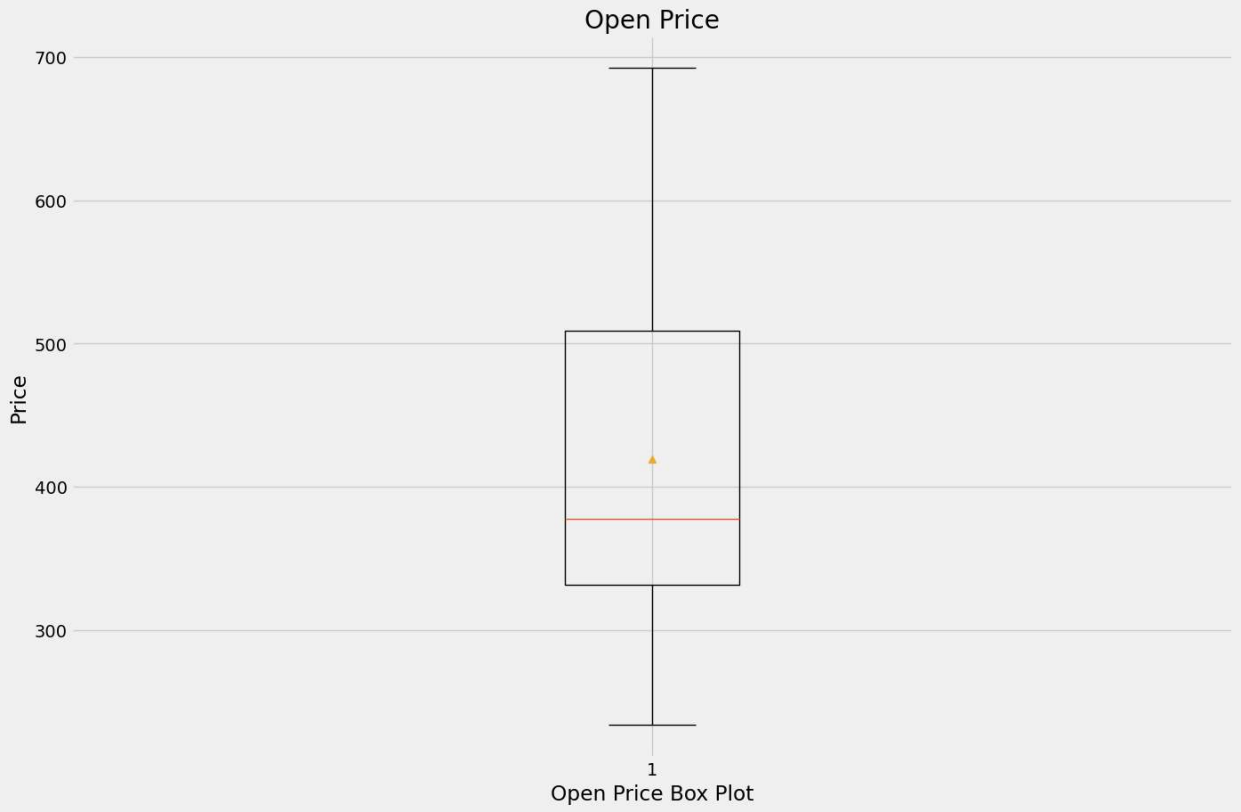
Out[19]:
```
Date         1009
Open          976
High          983
Low           989
Close         988
Adj Close     988
Volume       1005
dtype: int64
```

EDA(Exploratory Data Analysis)

Visualization

In [21]:
```
plt.style.use("fivethirtyeight")
```

In [24]:
```
plt.subplots(figsize=(15,10))
plt.title("Open Price")
plt.boxplot(df["Open"],showmeans=True)
plt.xlabel("Open Price Box Plot")
plt.ylabel("Price")
plt.show()
```



In [26]:
```
print("Mean price is :",statistics.mean(df["Open"]))
print("Mean price is :",statistics.median(df["Open"]))
```

```
Mean price is : 419.05967286223984
Mean price is : 377.769989
```

In [27]:
```
plt.subplots(figsize=(25, 8))
plt.title("Open Price vs Close Price")
plt.plot(df['Open'], color='red', linestyle='solid',  label = 'Open Price')
plt.plot(df['Close'], color='green', linestyle='dashed',  label = 'Close Price')
plt.xlabel("Date")
plt.ylabel("Open vs Close Price")
plt.legend(loc="upper left")
plt.show()
```

We see a price drop in January of 2022 after the 4th quarter

Possible Causes

Price raise 13.99 to 15.49 per month. Streaming competition was rising eating growth in fourth-quarter earnings

Positive Outlook

Being viewed as a value stock compared to a growth stock Price increases should keep revenue growing Solutions

Aim to convert password sharing users into subscribers Add a lower-cost ad-supported tier

Solutions Aim to convert password sharing users into subscribers Add a lower-cost ad-supported tier

Prepare Data

In [28]:
```
from sklearn.preprocessing import StandardScaler
```

In [29]:
```
# change object to datetime
df['Date']=pd.to_datetime(df['Date'],format='%Y-%m-%d')

# set date to index
df = df.set_index('Date')
```

In [30]:
```
# split data for prediciting january 2022
train = df.loc['2018-02-05':'2021-12-31']
test = df.loc['2022-01-01':'2022-01-31']
```

In [31]:
```
# split training data
X_train = train.drop(columns = ['Open'])
y_train = train['Open']
# split testing data
X_test = test.drop(columns = ['Open'])
y_test = test['Open']
```

Random Forest Model

In [32]:
```
from sklearn.ensemble import RandomForestRegressor
```

In [33]:
```
# build model
rf = RandomForestRegressor(max_depth=20, random_state = 42,  n_estimators=150)
rf.fit(X_train, y_train)
```

Out[33]:
```
RandomForestRegressor(max_depth=20, n_estimators=150, random_state=42)
```

In [35]:
```
rf_train_score = rf.score(X_train, y_train)
rf_test_score = rf.score(X_test, y_test)
print(rf_train_score)
print(rf_test_score)
```

```
0.9996830741916087
0.9918135946459509
```

In [36]:
```
pred = rf.predict(X_test)
train_pred = rf.predict(X_train)
```

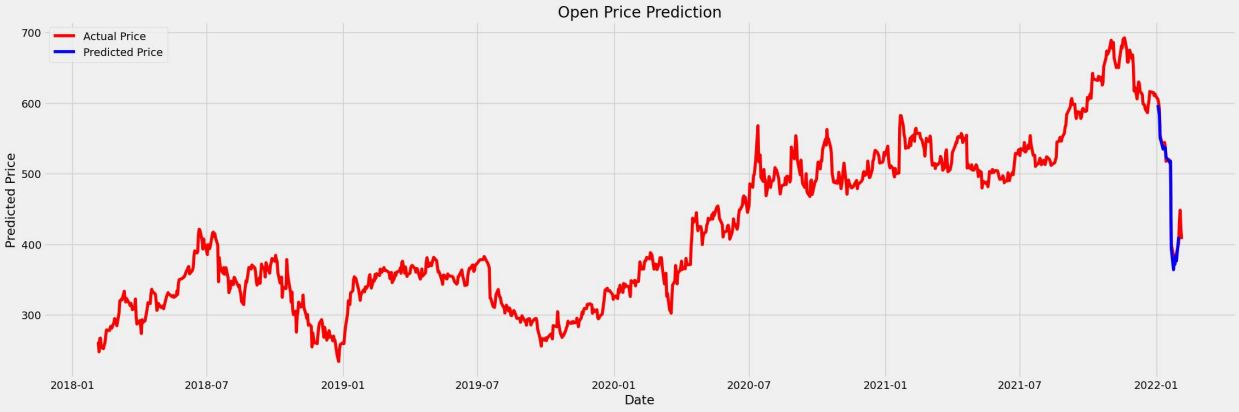
In [37]:
```
prediction_df = X_test.copy()
prediction_df['Open'] = y_test
prediction_df['Predicted Price'] = pred
prediction_df.head()
```

Out[37]:

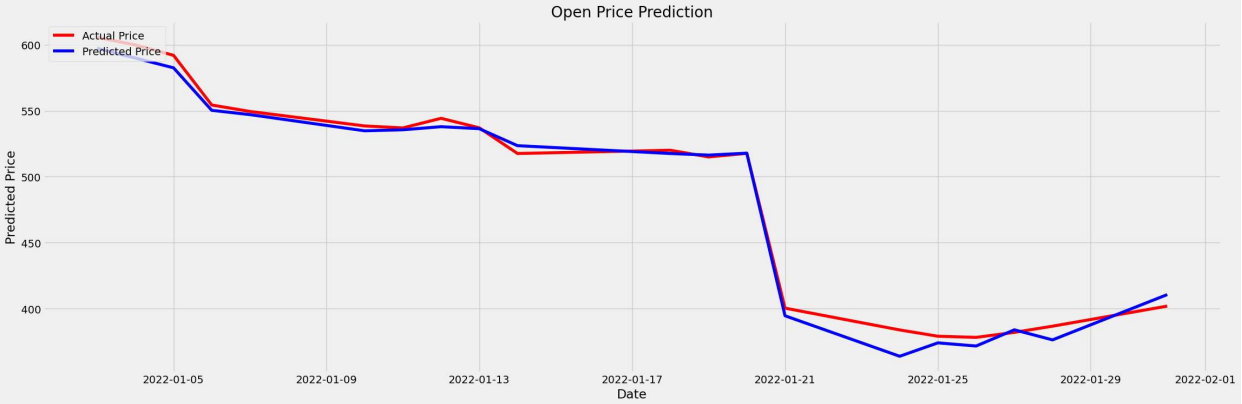
Date	High	Low	Close	Adj Close	Volume	Open	Predicted Price
2022-01-03	609.989990	590.559998	597.369995	597.369995	3067500	605.609985	597.302736
2022-01-04	600.409973	581.599976	591.150024	591.150024	4393100	599.909973	589.919729
2022-01-05	592.840027	566.880005	567.520020	567.520020	4148700	592.000000	582.541523
2022-01-06	563.359985	542.010010	553.289978	553.289978	5711800	554.340027	550.311327
2022-01-07	553.429993	538.219971	541.059998	541.059998	3381700	549.460022	547.067863

Result

In [39]:
```
plt.subplots(figsize=(25, 8))
plt.title("Open Price Prediction")
#plt.plot(prediction_df['Open'], color='red', linestyle='solid')
plt.plot(df['Open'], color='red', linestyle='solid', label = 'Actual Price')
plt.plot(prediction_df['Predicted Price'], color='blue', linestyle='solid', label = 'P
plt.xlabel("Date")
plt.ylabel("Predicted Price")
plt.legend(loc="upper left")
plt.show()
```



In [40]:
```
plt.subplots(figsize=(25, 8))
plt.title("Open Price Prediction")
plt.plot(prediction_df['Open'], color='red', linestyle='solid',  label = 'Actual Price
plt.plot(prediction_df['Predicted Price'], color='blue', linestyle='solid', label = 'P
plt.xlabel("Date")
plt.ylabel("Predicted Price")
plt.legend(loc="upper left")
plt.show()
```



Model Evaluation

In [41]:
```
from sklearn import metrics
```

In [42]:
```
print("Mean Absolute Error:", round(metrics.mean_absolute_error(y_test, pred), 4))
print("Mean Squared Error:", round(metrics.mean_squared_error(y_test, pred), 4))
print("Root Mean Squared Error:", round(np.sqrt(metrics.mean_squared_error(y_test, pre
print("(R^2) Score:", round(metrics.r2_score(y_test, pred), 4))
print(f'Train Score : {rf.score(X_train, y_train) * 100:.2f}% and Test Score : {rf.sco
errors = abs(pred - y_test)
mape = 100 * (errors / y_test)
accuracy = 100 - np.mean(mape)
print('Accuracy:', round(accuracy, 2), '%.')
```

```
Mean Absolute Error: 5.725
Mean Squared Error: 53.3474
Root Mean Squared Error: 7.3039
(R^2) Score: 0.9918
Train Score : 99.97% and Test Score : 99.18% using Random Tree.
Accuracy: 98.75 %.
```

2023 Company Outlook

Positives

> Shares have gained 1.4% this year, outperforming the S&P 500, which is up 0.2% Removing password sharing can allow a 2-8 billion growth in revenue. Ad tier plan has attracted more than 1 million users after just two months Cash flow positive in 2022 2 billion in operating cash 1.6 billion in free cash flow

Precautions

> The closure of Silicon Valley Bank may affect tech stocks Fears around higher churn from enforcing password sharing Gave some money to advertisers when number of viewers expected didn't materialize

In [ ]:
```
```