

Analyzing Tesla's Historical Stock and Revenue Data

```
!pip install yfinance==0.1.67
```

```
!mamba install bs4==4.10.0 -y
```

```
!pip install nbformat==5.8.0
```

```
import yfinance as yf
```

```
import pandas as pd
```

```
import requests
```

```
from bs4 import BeautifulSoup
```

```
import plotly.graph_objects as go
```

```
from plotly.subplots import make_subplots
```

```
# Define the function make_graph
```

```
def make_graph(stock_data, revenue_data, stock):
```

```
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles=("Historical  
Share Price", "Historical Revenue"), vertical_spacing = .3)
```

```
    stock_data_specific = stock_data[stock_data.Date <= '2021-06-14']
```

```
    revenue_data_specific = revenue_data[revenue_data.Date <= '2021-04-30']
```

```
    fig.add_trace(go.Scatter(x=pd.to_datetime(stock_data_specific.Date,  
infer_datetime_format=True), y=stock_data_specific.Close.astype("float"), name="Share  
Price"), row=1, col=1)
```

```
    fig.add_trace(go.Scatter(x=pd.to_datetime(revenue_data_specific.Date,  
infer_datetime_format=True), y=revenue_data_specific.Revenue.astype("float"),  
name="Revenue"), row=2, col=1)
```

```
    fig.update_xaxes(title_text="Date", row=1, col=1)
```

```
    fig.update_xaxes(title_text="Date", row=2, col=1)
```

```
    fig.update_yaxes(title_text="Price ($US)", row=1, col=1)
```

```
    fig.update_yaxes(title_text="Revenue ($US Millions)", row=2, col=1)
```

```
    fig.update_layout(showlegend=False,  
                        height=900,  
                        title=stock,  
                        xaxis_rangeslider_visible=True)
```

```
# Use Yfinance to extract Tesla's stock data
```

```
# Create a ticker object, "tesla", that takes in the stock data using the key "TSLA"
```

```
tesla = yf.Ticker("TSLA")
```

```
# Extract stock information and save it in a dataframe named tesla_data. The period parameter is set to max so we get information for the maximum amount of time.
```

```
tesla_data = tesla.history(period="max")
```

```
tesla_data
```

```
# Output:
```

	Open	High	Low	Close	Volume	Dividends	Stock Splits
Date							
2010-06-29	1.266667	1.666667	1.169333	1.592667	281494500	0	0.0
2010-06-30	1.719333	2.028000	1.553333	1.588667	257806500	0	0.0
2010-07-01	1.666667	1.728000	1.351333	1.464000	123282000	0	0.0
2010-07-02	1.533333	1.540000	1.247333	1.280000	77097000	0	0.0
2010-07-06	1.333333	1.333333	1.055333	1.074000	103003500	0	0.0
...
2023-02-28	210.589996	211.229996	203.750000	205.710007	153144900	0	0.0
2023-03-01	206.210007	207.199997	198.520004	202.770004	156852800	0	0.0
2023-03-02	186.740005	193.750000	186.009995	190.899994	181500700	0	0.0
2023-03-03	194.800003	200.479996	192.880005	197.789993	153800400	0	0.0
2023-03-06	198.539993	198.567993	192.309998	193.809998	127504923	0	0.0

3103 rows x 7 columns

```
# Reset the index and display the first 5 rows
```

```
tesla_data.reset_index(inplace=True)
```

```
Tesla_data
```

```
# Output:
```

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2010-06-29	1.266667	1.666667	1.169333	1.592667	281494500	0	0.0
1	2010-06-30	1.719333	2.028000	1.553333	1.588667	257806500	0	0.0
2	2010-07-01	1.666667	1.728000	1.351333	1.464000	123282000	0	0.0
3	2010-07-02	1.533333	1.540000	1.247333	1.280000	77097000	0	0.0
4	2010-07-06	1.333333	1.333333	1.055333	1.074000	103003500	0	0.0
...
3263	2023-06-15	248.399994	258.950012	247.289993	255.899994	160171200	0	0.0
3264	2023-06-16	258.920013	263.600006	257.209991	260.540009	167563700	0	0.0
3265	2023-06-20	261.500000	274.750000	261.119995	274.450012	165611200	0	0.0
3266	2023-06-21	275.130005	276.989990	257.779999	259.459991	211797100	0	0.0
3267	2023-06-22	250.770004	264.980011	248.250000	264.609985	166007038	0	0.0

```
# Use web scraping to extract Tesla Revenue Data
```

Download the webpage

<https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.html> and save the text as a variable, `html_data`

```
import requests
from bs4 import BeautifulSoup
url =
"https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm"
html_data = requests.get(url).text
```

Parse the html data using BeautifulSoup

```
soup = BeautifulSoup(html_data,'html.parser')
tag_object=soup.title
print("tag object:",tag_object)
```

Output:

tag object: <title>Tesla Revenue 2010-2022 | TSLA | MacroTrends</title>

Use BeautifulSoup to extract the table with Tesla Quarterly Revenue and store it into a dataframe named `tesla_revenue`, with columns `Date` and `Revenue`

```
tesla_revenue = pd.DataFrame(columns=["Date" , "Revenue"])
for table in soup.find_all('table'):
    if table.find('th').getText().startswith("Tesla Quarterly Revenue"):
        for row in table.find("tbody").find_all("tr"):
            col = row.find_all("td")
            date = col[0].text
            revenue = col[1].text
            tesla_revenue = tesla_revenue.append({"Date":date, "Revenue":revenue},
            ignore_index=True)
tesla_revenue.head()
```

Output:

```
:      Date  Revenue
0  2022-09-30  $21,454
1  2022-06-30  $16,934
2  2022-03-31  $18,756
3  2021-12-31  $17,719
4  2021-09-30  $13,757
```

Remove the comma and dollar sign from the `Revenue` column

```
tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|\$', '')
```

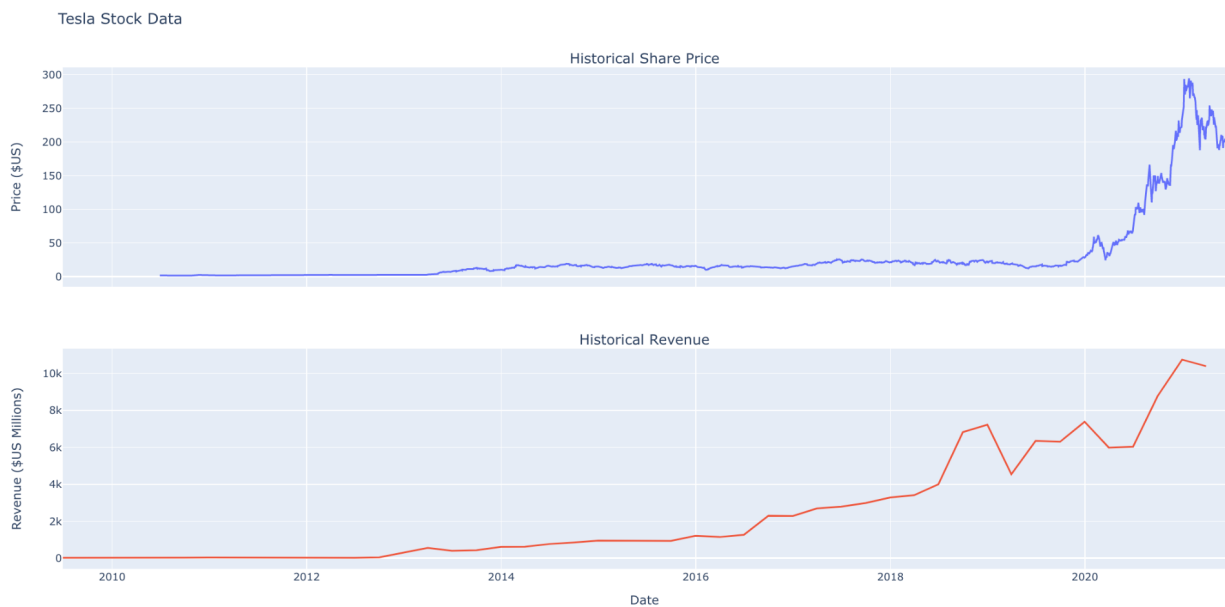
```
# Remove an null or empty strings in the Revenue column
tesla_revenue.dropna(inplace=True)
tesla_revenue = tesla_revenue[tesla_revenue['Revenue'] != ""]
tesla_revenue.tail(5)
```

Output:

	Date	Revenue
48	2010-09-30	31
49	2010-06-30	28
50	2010-03-31	21
52	2009-09-30	46
53	2009-06-30	27

```
# Graph the Tesla Stock Data. The graph will only show data up to June 2021
make_graph(tesla_data, tesla_revenue, 'Tesla Stock Data')
```

Output:



Analysis:

Tesla's Historical Share Price:

During the lockdown in the beginning of 2020, all stock prices decreased, including Teslas, since people had no desire to buy cars at the time. Shortly after the lockdown was lifted, people began to buy cars once again. However, production took a long time to recover, thereby increasing stock prices. In 2021, people started to realize that Tesla's stock price was exaggerated and overhyped, which likely caused the decline.

Tesla's Historical Revenue:

Tesla started to deliver the new model 3 in 2017. However, they struggled to produce enough cars to meet the market demand. They began to overcome their production issues in 2018, allowing them to sell many more cars to cover the demand, which is likely the reason for the spike shown in late 2018. The government federal tax incentives ended during the 3rd and 4th quarter of 2019, which is likely the cause for the decline in revenue. However, Tesla continued to gain in popularity, which is likely the reason their revenue continued to increase following the decline of late 2019. The sharp revenue increase in mid-2020 is likely due to the end of lockdown, in which the demand came back in large, but slowed production during the lockdown caused a shortage, thereby causing prices to spike by tens of percentages.