Extracting and Visualizing Stock Data

Description

Extracting essential data from a dataset and displaying it is a necessary part of data science; therefore individuals can make correct decisions based on the data. In this project, we will extract some stock data and then display this data in a graph.

In [1]:
```
!pip install yfinance==0.1.67
!mamba install bs4==4.10.0 -y
!pip install nbformat==4.2.0
```


```
Requirement already satisfied: yfinance==0.1.67 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (0.1.67)
Requirement already satisfied: pandas>=0.24 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (1.3.5)
Requirement already satisfied: numpy>=1.15 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (1.21.6)
Requirement already satisfied: requests>=2.20 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (2.28.0)
Requirement already satisfied: multitasking>=0.0.7 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (0.0.11)
Requirement already satisfied: lxml>=4.5.1 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (4.9.2)
Requirement already satisfied: python-dateutil>=2.7.3 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from pandas>=0.24->yfinance==0.1.67) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from pandas>=0.24->yfinance==0.1.67) (2022.7)
Requirement already satisfied: charset-normalizer<3,>=2 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.67) (2.1.0)
Requirement already satisfied: idna<4,>=2.5 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.67) (3.3)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.67) (1.26.11)
Requirement already satisfied: certifi>=2017.4.17 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.67) (2022.5.7)
Requirement already satisfied: six>=1.5 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from python-dateutil>=2.7.3->pandas>=0.24->yfinance==0.1.67) (1.16.0)
```



```
Looking for: ['bs4==4.10.0']

pkgs/main/linux-64                                  Using cache
pkgs/main/noarch                                    Using cache
pkgs/r/linux-64                                     Using cache
pkgs/r/noarch                                       Using cache

Pinned packages:
  - python 3.7.*


transaction

  Prefix: /home/jupyterlab/conda/envs/python

  All requested packages already installed

Requirement already satisfied: nbformat==4.2.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (4.2.0)
Requirement already satisfied: ipython-genutils in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (0.2.0)
Requirement already satisfied: jsonschema!=2.5.0,>=2.4 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (4.17.3)
Requirement already satisfied: jupyter-core in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (4.12.0)
Requirement already satisfied: traitlets>=4.1 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (5.9.0)
Requirement already satisfied: attrs>=17.4.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (23.1.0)
Requirement already satisfied: importlib-resources>=1.4.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (5.12.0)
Requirement already satisfied: pkgutil-resolve-name>=1.3.10 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (1.3.10)
Requirement already satisfied: pyrsistent!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (0.19.3)
Requirement already satisfied: typing-extensions in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (4.5.0)
Requirement already satisfied: zipp>=3.1.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from importlib-resources>=1.4.0->jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (3.15.0)
```


PyFinance Explorer: Data, Scraping, and Visualization

The Python libraries for financial data retrieval, web scraping, and interactive plotting. A single use case could be to fetch historical stock data for both Tesla and GameStop using Yahoo Finance (`yfinance`), extract relevant financial news from a website using BeautifulSoup (`bs4`), and then visualize the stock prices using interactive subplots with Plotly (`plotly.graph_objects` and `plotly.subplots`). This could help you analyze and compare the historical performance of Tesla and GameStop in relation to relevant news events.

In [2]:
```
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
```

In Python, you can ignore warnings using the **warnings** module. You can use the filterwarnings function to filter or ignore specific warning messages or categories.

In [3]:
```
import warnings
# Ignore all warnings
warnings.filterwarnings("ignore", category=FutureWarning)
```

In [4]:
```
!pip install plotly --upgrade
```


```
Requirement already satisfied: plotly in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (5.10.0)
Requirement already satisfied: tenacity>=6.2.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from plotly) (8.2.2)
Requirement already satisfied: typing-extensions in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from plotly) (4.5)
Note: you may need to restart the kernel to use updated packages.
```


Define Graphing Function

In this section, we define the function `make_graph`. You don't have to know how the function works, you should only care about the inputs. It takes a dataframe with stock data (dataframe must contain Date and Close columns), a dataframe with revenue data (dataframe must contain Date and Revenue columns), and the name of the stock.

In [5]:
```
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)
    # print(stock_data_specific.head()) # Print the first few rows of stock_data_specific for debugging
    print(revenue_data_specific.head())

    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)
    fig.show()
```

1. Use yfinance to Extract Stock Data

Using the `Ticker` function enter the ticker symbol of the stock we want to extract data on to create a ticker object. The stock is Tesla and its ticker symbol is `TSLA`.

In [6]:
```
tsla = yf.Ticker("TSLA")
print(tsla)
```


```
yfinance.Ticker object <TSLA>
```


Using the ticker object and the function `history` extract stock information and save it in a dataframe named `tesla_data`. Set the `period` parameter to `max` so we get information for the maximum amount of time.

In [7]:
```
tesla_data = tsla.history(period = "max")
```

Reset the index using the `reset_index(inplace=True)` function on the tesla_data DataFrame and display the first five rows of the `tesla_data` dataframe using the `head` function. Take a screenshot of the results and code from the beginning of Question 1 to the results below.

In [8]:
```
tesla_data.reset_index(inplace=True)
tesla_data.head()
```

Out[8]:

	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

2. Use Webscraping to Extract Tesla Revenue Data

Use the `requests` library to download the webpage https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm Save the text of the response as a variable named `html_data`.

In [9]:
```
import requests
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
```

In [10]:
```
!pip install lxml
```


```
Requirement already satisfied: lxml in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (4.9.2)
Note: you may need to restart the kernel to use updated packages.
```


Parse the html data using `beautiful_soup`.

In [11]:
```
beautiful_soup = BeautifulSoup(html_data,"html.parser")
```

Using `BeautifulSoup` or the `read_html` function extract the table with `Tesla Revenue` and store it into a dataframe named `tesla_revenue`. The dataframe should have columns `Date` and `Revenue`.

In [12]:
```
from bs4 import BeautifulSoup
tesla_revenue = pd.DataFrame(columns=["Date", "Revenue"])
for row in beautiful_soup.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)
```

Execute the following line to remove the comma and dollar sign from the `Revenue` column.

In [13]:
```
tesla_revenue["Revenue"] = tesla_revenue["Revenue"].str.replace(',|$',"")
```

Execute the following lines to remove an null or empty strings in the Revenue column.

In [14]:
```
tesla_revenue.dropna(inplace=True)

tesla_revenue = tesla_revenue[tesla_revenue['Revenue'] != ""]
```

Display the last 5 rows of the `tesla_revenue` dataframe using the `tail` function.

In [15]:
```
tesla_revenue.tail()
```

Out[15]:

	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

3. Use yfinance to Extract Stock Data

Using the `Ticker` function enter the ticker symbol of the stock we want to extract data on to create a ticker object. The stock is GameStop and its ticker symbol is `GME`.

In [16]:
```
GS_stock = yf.Ticker("GME")
```

Using the ticker object and the function `history` extract stock information and save it in a dataframe named `gme_data`. Set the `period` parameter to `max` so we get information for the maximum amount of time.

In [17]:
```
gme_data = GS_stock.history(period="max")
```

Reset the index using the `reset_index(inplace=True)` function on the gme_data DataFrame and display the first five rows of the `gme_data` dataframe using the `head` function.

In [18]:
```
gme_data.reset_index(inplace=True)
gme_data.head()
```

Out[18]:

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2002-02-13	1.620129	1.693350	1.603296	1.691667	76216000	0.0	0.0
1	2002-02-14	1.712707	1.716073	1.670625	1.683250	11021600	0.0	0.0
2	2002-02-15	1.683250	1.687458	1.658001	1.674834	8389600	0.0	0.0
3	2002-02-19	1.666418	1.666418	1.578047	1.607504	7416400	0.0	0.0
4	2002-02-20	1.615920	1.662210	1.603296	1.662210	6892800	0.0	0.0

4.Use Webscraping to Extract GME Revenue Data

Use the `requests` library to download the webpage https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html. Save the text of the response as a variable named `html_data`.

In [19]:
```
import requests
url = "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html"
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

In [20]:
```
beautiful_soup = BeautifulSoup(html_data,"html.parser")
```

Using `BeautifulSoup` or the `read_html` function extract the table with `GameStop Revenue` and store it into a dataframe named `gme_revenue`. The dataframe should have columns `Date` and `Revenue`. Make sure the comma and dollar sign is removed from the `Revenue` column using a method similar to what you did in 2.

In [21]:
```
gme_revenue = pd.DataFrame(columns=["Date", "Revenue"])
for row in beautiful_soup.find_all("tr"):
    col = row.find_all("td")
    date = col[0].text
    revenue = col[1].text
    gme_revenue = gme_revenue.append({"Date":date, "Revenue":revenue},ignore_index=True)

gme_revenue["Revenue"] = gme_revenue["Revenue"].str.replace(',|$',"")

gme_revenue.dropna(inplace=True)

gme_revenue = gme_revenue[gme_revenue['Revenue'] != ""]
```

Display the last five rows of the `gme_revenue` dataframe using the `tail` function.

In [22]:
```
gme_revenue.tail()
```

Out[22]:

	Date	Revenue
57	2006-01-31	1667
58	2005-10-31	534
59	2005-07-31	416
60	2005-04-30	475
61	2005-01-31	709

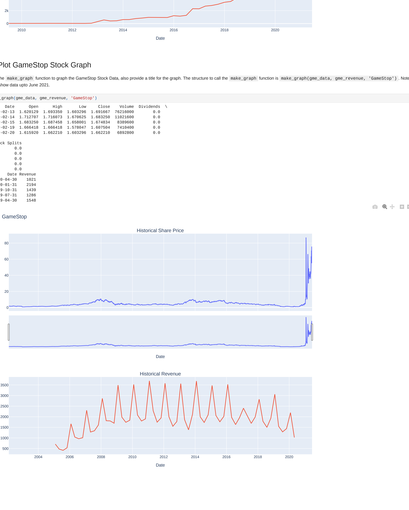
5.Plot Tesla Stock Graph

Use the `make_graph` function to graph the Tesla Stock Data, also provide a title for the graph. The structure to call the `make_graph` function is `make_graph(tesla_data, tesla_revenue, 'Tesla')`. Note the graph will only show data upto June 2021.

In [23]:
```
make_graph(tesla_data,tesla_revenue,"Tesla")
```


```
        Date      Open      High       Low     Close     Volume  Dividends  \
0 2010-06-29  1.266667  1.666667  1.169333  1.592667  281494500        0
1 2010-06-30  1.719333  2.028000  1.553333  1.588667  257806500        0
2 2010-07-01  1.666667  1.728000  1.351333  1.464000  123282000        0
3 2010-07-02  1.533333  1.540000  1.247333  1.280000   77097000        0
4 2010-07-06  1.333333  1.333333  1.055333  1.074000  103003500        0

  Stock Splits
0          0.0
1          0.0
2          0.0
3          0.0
4          0.0
         Date Revenue
5  2021-03-31   10389
6  2020-12-31   10744
7  2020-09-30    8771
8  2020-06-30    6036
9  2020-03-31    5985
```

6. Plot GameStop Stock Graph

Use the `make_graph` function to graph the GameStop Stock Data, also provide a title for the graph. The structure to call the `make_graph` function is `make_graph(gme_data, gme_revenue, 'GameStop')`. Note the graph will only show data upto June 2021.

In [24]:
```
make_graph(gme_data, gme_revenue, 'GameStop')
```


```
        Date      Open      High       Low     Close     Volume  Dividends  \
0 2002-02-13  1.620129  1.693350  1.603296  1.691667   76216000        0.0
1 2002-02-14  1.712707  1.716073  1.670625  1.683250   11021600        0.0
2 2002-02-15  1.683250  1.687458  1.658001  1.674834    8389600        0.0
3 2002-02-19  1.666418  1.666418  1.578047  1.607504    7416400        0.0
4 2002-02-20  1.615920  1.662210  1.603296  1.662210    6892800        0.0

  Stock Splits
0          0.0
1          0.0
2          0.0
3          0.0
4          0.0
         Date Revenue
0  2020-04-30   1021
1  2020-01-31   2194
2  2019-10-31   1439
3  2019-07-31   1286
4  2019-04-30   1548
```