Final Assignment

June 12, 2022

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 assignment, you will extract some stock data, you will then display this data in a graph.

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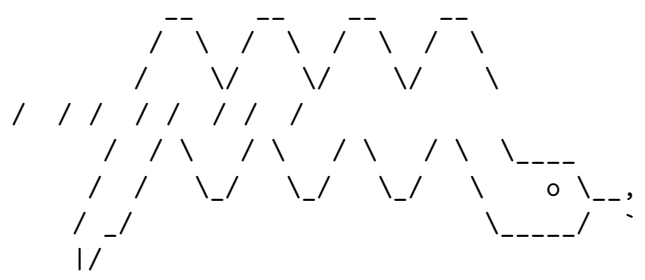
Estimated Time Needed: 30 min

[1]:
```
!pip install yfinance==0.1.67
#!pip install pandas==1.3.3
#!pip install requests==2.26.0
!mamba install bs4==4.10.0 -y
#!pip install plotly==5.3.1
```

```
Collecting yfinance==0.1.67
  Downloading yfinance-0.1.67-py2.py3-none-any.whl (25 kB)
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: requests>=2.20 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
yfinance==0.1.67) (2.27.1)
Requirement already satisfied: lxml>=4.5.1 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
yfinance==0.1.67) (4.6.4)
Collecting multitasking>=0.0.7
  Downloading multitasking-0.0.10.tar.gz (8.2 kB)
```

```
  Preparing metadata (setup.py) … done
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: 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) (2022.1)
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) (2022.5.18.1)
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) (1.26.9)
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: charset-normalizer~=2.0.0 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
requests>=2.20->yfinance==0.1.67) (2.0.12)
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)
Building wheels for collected packages: multitasking
  Building wheel for multitasking (setup.py) … done
  Created wheel for multitasking: filename=multitasking-0.0.10-py3-none-
any.whl size=8498
sha256=4637898335d303b3cef52623d49b6e3fa463ef2756efc6b91361515700b8064a
  Stored in directory: /home/jupyterlab/.cache/pip/wheels/34/ba/79/c0260c6f1a03f
420ec7673eff9981778f293b9107974679e36
Successfully built multitasking
Installing collected packages: multitasking, yfinance
Successfully installed multitasking-0.0.10 yfinance-0.1.67
```



```
        mamba (0.15.3) supported by @QuantStack

        GitHub:  https://github.com/mamba-org/mamba
        Twitter: https://twitter.com/QuantStack


Looking for: ['bs4==4.10.0']

pkgs/main/linux-64       [>                   ] (--:--) No change
pkgs/main/linux-64       [====================] (00m:00s) No change
pkgs/main/noarch         [>                   ] (--:--) No change
pkgs/main/noarch         [====================] (00m:00s) No change
pkgs/r/linux-64          [>                   ] (--:--) No change
pkgs/r/linux-64          [====================] (00m:00s) No change
pkgs/r/noarch            [>                   ] (--:--) No change
pkgs/r/noarch            [====================] (00m:00s) No change

Pinned packages:
  - python 3.7.*


Transaction

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

  All requested packages already installed
```

[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
```

0.1 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.

[3]:
```
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)
    fig.show()
```

0.2 Question 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`.

[4]:
```
Tesla = yf.Ticker("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.

[7]:
```
Tesla_data = Tesla.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.

[8]:
```
Tesla_data.head()
```

[8]:

Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
2010-06-29	3.800	5.000	3.508	4.778	93831500	0	0.0
2010-06-30	5.158	6.084	4.660	4.766	85935500	0	0.0
2010-07-01	5.000	5.184	4.054	4.392	41094000	0	0.0
2010-07-02	4.600	4.620	3.742	3.840	25699000	0	0.0
2010-07-06	4.000	4.000	3.166	3.222	34334500	0	0.0

0.3 Question 2: Use Webscraping to Extract Tesla Revenue Data

Use the `requests` library to download the webpage https://www.macrotrends.net/stocks/charts/TSLA/tesla/rever
Save the text of the response as a variable named `html_data`.

[9]:
```
url = "https://www.macrotrends.net/stocks/charts/TSLA/tesla/revenue"

html_data  = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

[11]:
```
soup = BeautifulSoup(html_data, 'html5lib')
```

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

Click here if you need help locating the table

```
Below is the code to isolate the table, you will now need to loop through the rows and columns

soup.find_all("tbody")[1]

If you want to use the read_html function the table is located at index 1
```

[19]:
```
tesla_revenue=pd.read_html(url, match="Tesla Quarterly Revenue",␣
↪flavor='bs4')[0]
tesla_revenue.head()
```

[19]:

	Tesla Quarterly Revenue(Millions of US $)	Tesla Quarterly Revenue(Millions of US $).1
0	2022-03-31	$18,756
1	2021-12-31	$17,719
2	2021-09-30	$13,757
3	2021-06-30	$11,958
4	2021-03-31	$10,389

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

[21]:
```
tesla_revenue = tesla_revenue.rename(columns={"Tesla Quarterly Revenue(Millions␣
↪of US $)":"Date","Tesla Quarterly Revenue(Millions of US $).1":"Revenue"})␣
↪#Rename df columns to 'Date' and 'Revenue'
```

```
tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|\$',"") #␣
 ↪remove the comma and dollar sign from the 'Revenue' column
tesla_revenue.head() # Display df
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-
packages/ipykernel_launcher.py:2: FutureWarning: The default value of regex will
change from True to False in a future version.
```

[21]:

	Date	Revenue
0	2022-03-31	18756
1	2021-12-31	17719
2	2021-09-30	13757
3	2021-06-30	11958
4	2021-03-31	10389

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

[22]:
```
tesla_revenue.dropna(inplace=True)

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

Display the last 5 row of the `tesla_revenue` dataframe using the `tail` function. Take a screenshot of the results.

[23]:
```
tesla_revenue.tail()
```

[23]:

	Date	Revenue
46	2010-09-30	31
47	2010-06-30	28
48	2010-03-31	21
50	2009-09-30	46
51	2009-06-30	27

0.4 Question 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`.

[24]:
```
game_stop = 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.

[25]:
```
gme_data = game_stop.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. Take a screenshot

of the results and code from the beginning of Question 3 to the results below.

[26]:
```
gme_data.reset_index(inplace=True)
gme_data.head()
```

[26]:

	Date	Open	High	Low	Close	Volume	Dividends	\
0	2002-02-13	6.480515	6.773401	6.413184	6.766667	19054000	0.0	
1	2002-02-14	6.850828	6.864294	6.682503	6.733001	2755400	0.0	
2	2002-02-15	6.733001	6.749833	6.632006	6.699336	2097400	0.0	
3	2002-02-19	6.665670	6.665670	6.312187	6.430015	1852600	0.0	
4	2002-02-20	6.463680	6.648837	6.413182	6.648837	1723200	0.0	

	Stock Splits
0	0.0
1	0.0
2	0.0
3	0.0
4	0.0

0.5 Question 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`.

[27]:
```
url = "https://www.macrotrends.net/stocks/charts/GME/gamestop/revenue"
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

[28]:
```
soup = BeautifulSoup(html_data,'html5lib')
```

Using `BeautifulSoup` or the `read_html` function extract the table with `GameStop Quarterly 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 Question 2.

Click here if you need help locating the table

```
Below is the code to isolate the table, you will now need to loop through the rows and columns

soup.find_all("tbody")[1]

If you want to use the read_html function the table is located at index 1
```

[29]:
```
gme_revenue=pd.read_html(url,match="GameStop Quarterly Revenue",␣
 ↪flavor='bs4')[0]
#gme_revenue.head()
gme_revenue = gme_revenue.rename(columns={"GameStop Quarterly Revenue(Millions␣
 ↪of US $)":"Date","GameStop Quarterly Revenue(Millions of US $).1":
 ↪"Revenue"}) #Rename df columns to 'Date' and 'Revenue'
gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',|\$',"") # remove␣
 ↪the comma and dollar sign from the 'Revenue' column
gme_revenue.head() # Display df
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-
packages/ipykernel_launcher.py:4: FutureWarning: The default value of regex will
change from True to False in a future version.
  after removing the cwd from sys.path.
```

[29]:

	Date	Revenue
0	2022-04-30	1378
1	2022-01-31	2254
2	2021-10-31	1297
3	2021-07-31	1183
4	2021-04-30	1277

Display the last five rows of the `gme_revenue` dataframe using the `tail` function. Take a screenshot of the results.

[30]:
```
gme_revenue.tail()
```

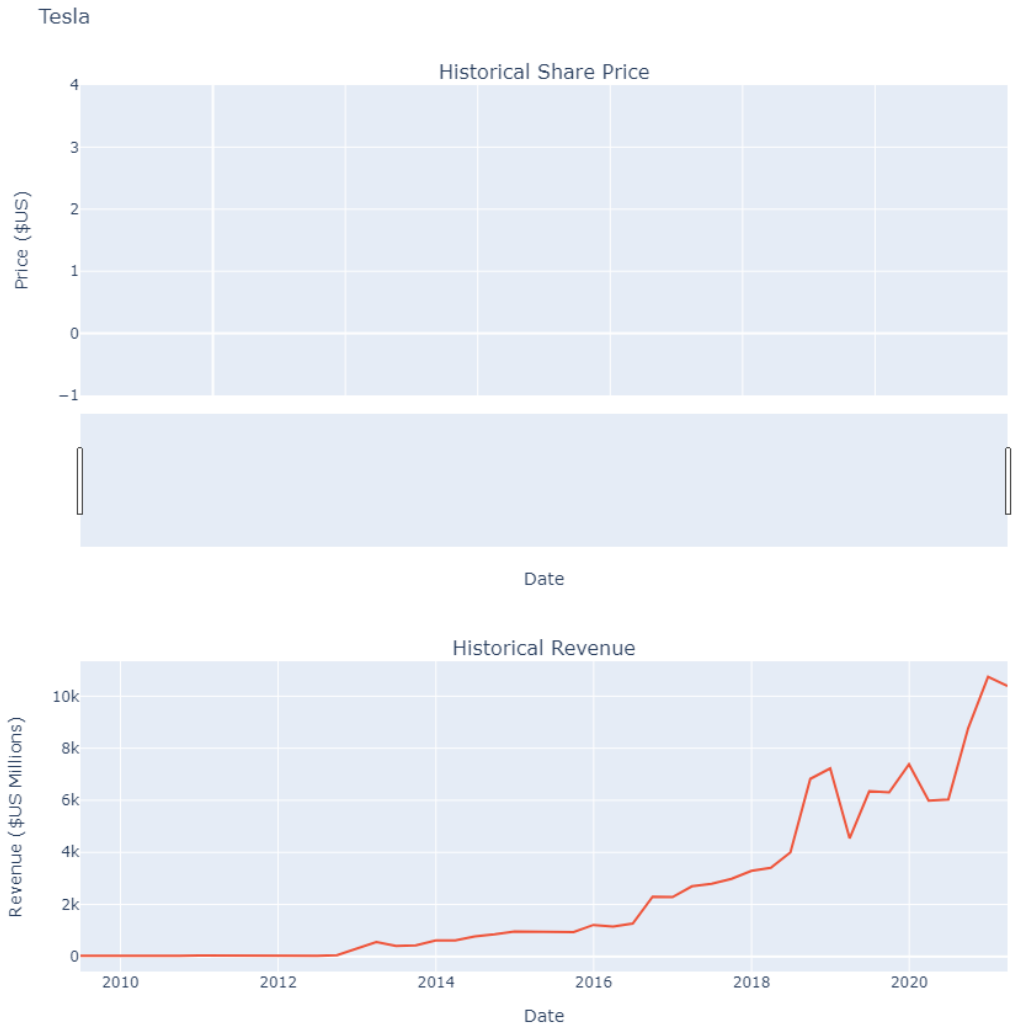
[30]:

	Date	Revenue
49	2010-01-31	3524
50	2009-10-31	1835
51	2009-07-31	1739
52	2009-04-30	1981
53	2009-01-31	3492

0.6 Question 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.

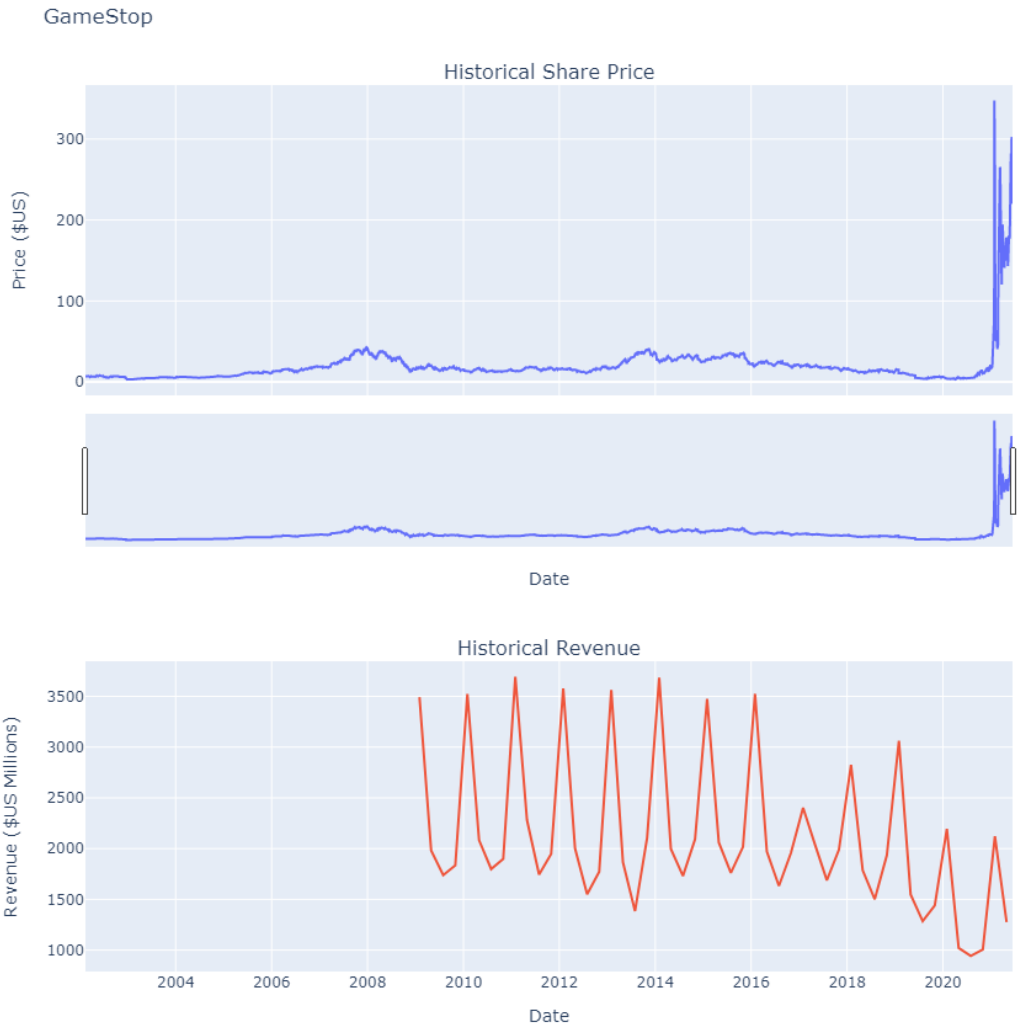
[32]:
```
make_graph(Tesla_data, tesla_revenue, 'Tesla')
```



0.7 Question 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.

[33]:
```
make_graph(gme_data, gme_revenue, 'GameStop')
```



About the Authors:

Joseph Santarcangelo has a PhD in Electrical Engineering, his research focused on using machine learning, signal processing, and computer vision to determine how videos impact human cognition. Joseph has been working for IBM since he completed his PhD.

Azim Hirjani

0.8 Change Log

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2022-02-28	1.2	Lakshmi Holla	Changed the URL of GameStop
2020-11-10	1.1	Malika Singla	Deleted the Optional part
2020-08-27	1.0	Malika Singla	Added lab to GitLab

##