

Final Assignment_StephaneDEDIEU

April 28, 2022

Extracting and Visualizing Stock Data

Stephane DEDIEU, April 27th, 2022

Course: Python Project for Data Science

0.1 Preliminary remark.

My IBM Cloud trial period is over, and I was unable to reactivate it with the code provided in this course. Therefore I am unable to add this notebook to Watson Studio. For that reason, I shared it on my Github account. I apologize for the inconvenience.

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

```
[60]: !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

      !pip install jupyterlab "ipywidgets>=7.5"
```

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Requirement already satisfied: pandas>=0.24 in
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```

mamba (0.22.1) supported by @QuantStack

GitHub: <https://github.com/mamba-org/mamba>

Twitter: <https://twitter.com/QuantStack>

Looking for: ['bs4==4.10.0']

[+] 0.0s

[+] 0.1s

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Pinned packages:

- python 3.7.*

Transaction

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

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Requirement already satisfied: urllib3<1.27,>=1.21.1 in
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requests->jupyterlab-server~=2.10->jupyterlab) (1.26.9)
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requests->jupyterlab-server~=2.10->jupyterlab) (2.0.12)
Requirement already satisfied: six>=1.5 in
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dateutil>=2.8.2->jupyter-client>=6.1.12->ipykernel>=4.5.1->ipywidgets>=7.5)
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cffi>=1.0.1->argon2-cffi-bindings->argon2-cffi->jupyter-server~=1.4->jupyterlab)
(2.21)

```

```

[61]: 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

```

0.2 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.

```

[62]:

```



```
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=True,
height=900,
title=stock,
xaxis_rangeflider_visible=True)
    #fig.show()
    fig.show("jupyterlab")    # for displaying graphs in Github
```

0.3 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.

```
[8]: tsla = 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.

```
[9]: tsla_share_price_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.

```
[10]: tsla_share_price_data.reset_index(inplace=True)
tsla_share_price_data.head()
```

```
[10]:
```

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2010-06-29	3.800	5.000	3.508	4.778	93831500	0	0.0
1	2010-06-30	5.158	6.084	4.660	4.766	85935500	0	0.0
2	2010-07-01	5.000	5.184	4.054	4.392	41094000	0	0.0
3	2010-07-02	4.600	4.620	3.742	3.840	25699000	0	0.0

```
4 2010-07-06  4.000  4.000  3.166  3.222  34334500          0          0.0
```

0.4 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/revenue>

Save the text of the response as a variable named `html_data`.

```
[11]: url="https://www.macrotrends.net/stocks/charts/TSLA/tesla/revenue?
      ↪utm_medium=Exinfluencer&utm_source=Exinfluencer&utm_content=000026UJ&utm_term=10006555&utm_
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

```
[12]: #soup = BeautifulSoup(html_data, 'html5lib')
      soup = BeautifulSoup(html_data, "html.parser")
```

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

We use a technique learned in the Web scrapping lab. (1) We determine the number of tables on the webpage, and (2) the index of the table of interest: “Tesla Quarter Revenue”.

```
[13]: tables = soup.find_all('table')
      print("Number of Tables:", len(tables))

      for index,table in enumerate(tables):
          if ("Tesla Quarterly Revenue" in str(table)):
              table_index = index
      print("Quarterly Revenue Table Index=", table_index)
```

Number of Tables: 6

Quarterly Revenue Table Index= 1

* We find the index of the table of interest to be 1. (3) We build the dataframe after table with `table_index=1`.*

```
[14]: #print(tables[table_index].prettify())
      tesla_revenue = pd.DataFrame(columns=["Date", "Revenue"])
```

```

for row in tables[table_index].tbody.find_all("tr"):
    col = row.find_all("td")
    if (col != []):
        Date = col[0].text
        Revenue = col[1].text

        tesla_revenue = tesla_revenue.append({"Date":Date, "Revenue":Revenue},
        ignore_index=True)

tesla_revenue.head(2)

```

```

[14]:
      Date  Revenue
0  2022-03-31  $18,756
1  2021-12-31  $15,339

```

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

```

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

```

/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/ipykernel_launcher.py:1: FutureWarning: The default value of regex will change from True to False in a future version.

"""Entry point for launching an IPython kernel.

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

```

[16]: 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.

Note that the unit in the Revenue column is: millions of \$.

```

[17]: tesla_revenue.tail()

```

```

[17]:
      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

```

0.5 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.

```
[18]: gme = 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.

```
[19]: gme_share_price_data = gme.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.

```
[20]: gme_share_price_data.reset_index(inplace=True)
gme_share_price_data.head()
```

```
[20]:
```

	Date	Open	High	Low	Close	Volume	Dividends	\
0	2002-02-13	6.480514	6.773400	6.413183	6.766666	19054000	0.0	
1	2002-02-14	6.850830	6.864296	6.682505	6.733002	2755400	0.0	
2	2002-02-15	6.733001	6.749833	6.632006	6.699336	2097400	0.0	
3	2002-02-19	6.665672	6.665672	6.312189	6.430017	1852600	0.0	
4	2002-02-20	6.463682	6.648839	6.413184	6.648839	1723200	0.0	

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

0.6 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`.

```
[21]: url="https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/
↳IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html"

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

Parse the html data using `beautiful_soup`.

```
[22]: gme_soup = BeautifulSoup(gme_html_data, 'html.parser')
```

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

```
[23]: tables = gme_soup.find_all('table')
print("Number of Tables:", len(tables))

for index, table in enumerate(tables):
    if ("GameStop Quarterly Revenue" in str(table)):
        table_index = index
print("Quarterly Revenue Table Index=", table_index)
```

Number of Tables: 6

Quarterly Revenue Table Index= 1

```
[24]: #print(tables[table_index].prettify())
gme_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in tables[table_index].tbody.find_all("tr"):
    col = row.find_all("td")
    if (col != []):
        Date = col[0].text
        Revenue = col[1].text

        gme_revenue = gme_revenue.append({"Date":Date, "Revenue":Revenue},
        ignore_index=True)

gme_revenue.head(2)
```

```
[24]:      Date Revenue
0  2020-04-30  $1,021
1  2020-01-31  $2,194
```

```
[25]: gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',', '\$', "")
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-
packages/ipykernel_launcher.py:1: FutureWarning: The default value of regex will
change from True to False in a future version.
    """Entry point for launching an IPython kernel.
```

```
[26]: gme_revenue.dropna(inplace=True)
gme_revenue = gme_revenue[gme_revenue['Revenue'] != ""]
```

```
gme_revenue.head(2)
```

```
[26]:
```

	Date	Revenue
0	2020-04-30	1021
1	2020-01-31	2194

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

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

```
[27]:
```

	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

0.7 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.

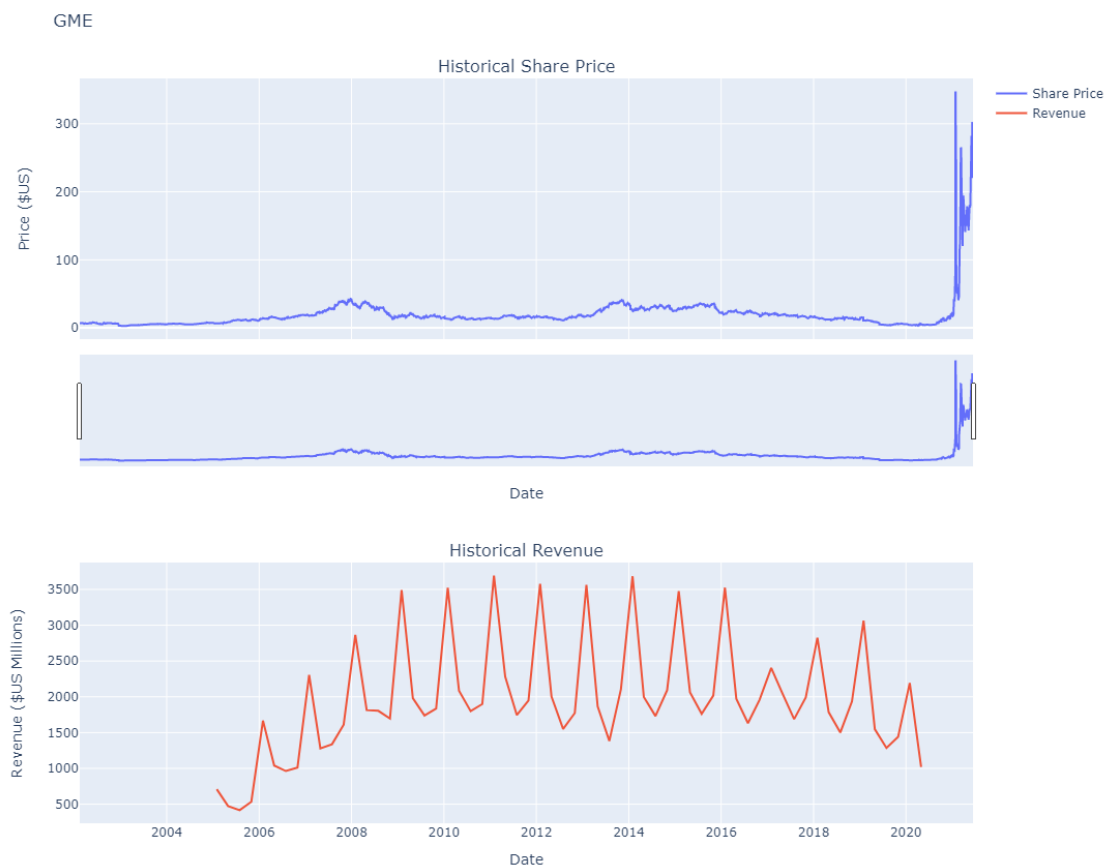
```
[63]: make_graph(tsla_share_price_data, tesla_revenue, 'Tesla')
```



0.8 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.

```
[64]: make_graph(gme_share_price_data, gme_revenue, 'GME')
```



0.8.1 Conclusions

1. Tesla revenues grew exponentially from 2010 to 2021. And the stock price increased accordingly over the same period of time. Although “revenue” is not the only criteria for the evolution of a stock price, Tesla stock price is correlated with the revenues and its evolution makes sense.

2. Gamestop revenues peaked in 2011 and then decreased and eventually collapsed in 2020. Meanwhile the stock price was skyrocketing in 2021, with erratic variations. This points to a highly speculative, risky asset, which price is totally disconnected with Gamestop financial performance.

[]:

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

0.9 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

##

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