Final Assignment

April 25, 2023

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

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

```
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) (2.28.1)
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)
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: numpy>=1.15 in
```
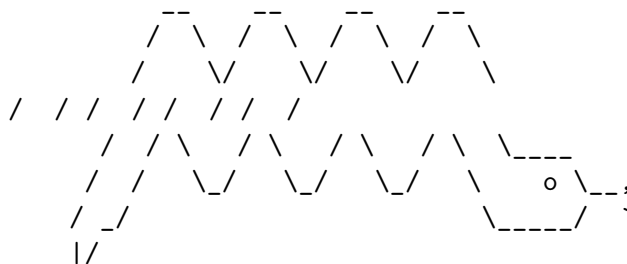
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
yfinance==0.1.67) (1.21.6)
Requirement already satisfied: python-dateutil>=2.7.3 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
pandas>=0.24->yfinance==0.1.67) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
pandas>=0.24->yfinance==0.1.67) (2022.6)
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) (2.1.1)
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) (2022.12.7)
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) (1.26.13)
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) (3.4)
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)
Installing collected packages: yfinance
  Attempting uninstall: yfinance
    Found existing installation: yfinance 0.2.4
    Uninstalling yfinance-0.2.4:
      Successfully uninstalled yfinance-0.2.4
Successfully installed yfinance-0.1.67


```
              __    __    __    __
             /  \  /  \  /  \  /  \
            /    \/    \/    \/    \
       / / /  / / /  / / /
          /  / \  / \  / \  / \  \____
         /  /   \_/   \_/   \_/   \    o \__,
        / _/                       \_____/  `
        |/
```


          mamba (0.15.3) supported by @QuantStack

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

Looking for: ['bs4==4.10.0']

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

Pinned packages:
  - python 3.7.*

Transaction

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

  All requested packages already installed

Collecting nbformat==4.2.0
  Downloading nbformat-4.2.0-py2.py3-none-any.whl (153 kB)
                         153.3/153.3 kB
22.5 MB/s eta 0:00:00
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) (5.6.0)
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: ipython-genutils in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
nbformat==4.2.0) (0.2.0)
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: 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) (5.10.1)

```
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) (22.1.0)
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) (4.4.0)
Requirement already satisfied: importlib-metadata in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (4.11.4)
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) (0.19.2)
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) (3.11.0)
Installing collected packages: nbformat
  Attempting uninstall: nbformat
    Found existing installation: nbformat 5.7.0
    Uninstalling nbformat-5.7.0:
      Successfully uninstalled nbformat-5.7.0
ERROR: pip's dependency resolver does not currently take into account all
the packages that are installed. This behaviour is the source of the following
dependency conflicts.
nbconvert 7.2.6 requires nbformat>=5.1, but you have nbformat 4.2.0 which is
incompatible.
nbclient 0.7.2 requires nbformat>=5.1, but you have nbformat 4.2.0 which is
incompatible.
jupyter-server 1.23.3 requires nbformat>=5.2.0, but you have nbformat 4.2.0
which is incompatible.
Successfully installed nbformat-4.2.0
```

```python
[3]: 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.

```
[4]: 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`.

```
[48]: 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.

```
[49]: 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.

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

```
[50]:          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
```

5

```
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
```

0.3 Question 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`.

```
[51]: 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 `beautiful_soup`.

```
[52]: 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
```

```
[53]: # using read_html
      read_html_tesla_data = pd.read_html(url)

      tesla_revenue = read_html_tesla_data[1]
      tesla_revenue.head()
```

```
[53]:   Tesla Quarterly Revenue(Millions of US $)  \
      0                                2022-09-30
      1                                2022-06-30
```

```
2                               2022-03-31
3                               2021-12-31
4                               2021-09-30
```

```
   Tesla Quarterly Revenue(Millions of US $).1
0                               $21,454
1                               $16,934
2                               $18,756
3                               $17,719
4                               $13,757
```

[54]:
```
tesla_revenue.columns = ['Date','Revenue']
tesla_revenue.head()
```

[54]:
```
         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
```

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

[55]:
```
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.
```

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

[56]:
```
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.

[57]:
```
tesla_revenue.tail()
```

[57]:
```
          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
```

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`.

```
[58]: gamestop = 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.

```
[59]: gme_data = gamestop.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.

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

```
[60]:         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  1.716074  1.670626  1.683251  11021600        0.0
      2 2002-02-15  1.683251  1.687459  1.658002  1.674834   8389600        0.0
      3 2002-02-19  1.666418  1.666418  1.578047  1.607504   7410400        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
```

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`.

```
[61]: 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`.

```
[62]: 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

```
[63]: read_html_gme_data = pd.read_html(url)

      gme_revenue = read_html_gme_data[1]
      gme_revenue.head()
```

```
[63]:   GameStop Quarterly Revenue(Millions of US $)  \
      0                                   2020-04-30
      1                                   2020-01-31
      2                                   2019-10-31
      3                                   2019-07-31
      4                                   2019-04-30

         GameStop Quarterly Revenue(Millions of US $).1
      0                                          $1,021
      1                                          $2,194
      2                                          $1,439
      3                                          $1,286
      4                                          $1,548
```

```
[64]: gme_revenue.columns = ['Date','Revenue']   #to rename the columns
      gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',|\$',"")
```

/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.

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

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

```
[65]:          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
```

0.6 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.
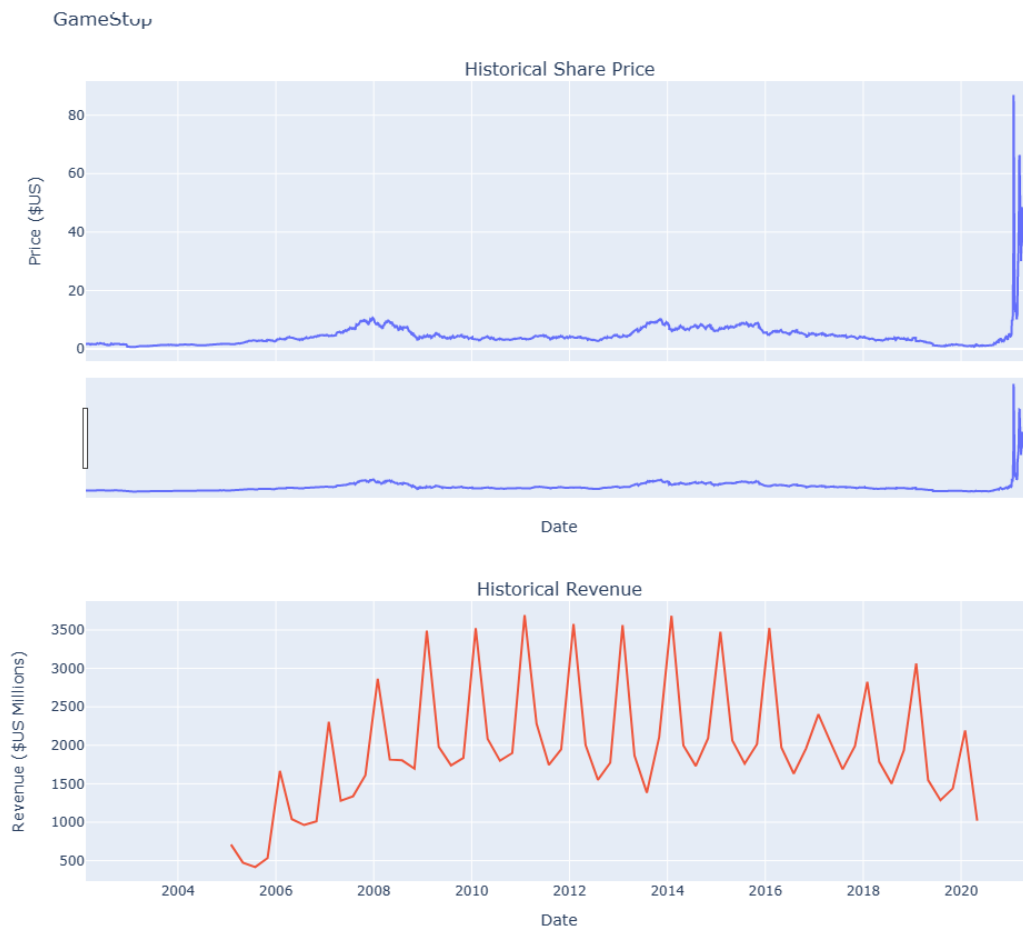
```
[66]: make_graph(tesla_data, tesla_revenue, 'Tesla')
```
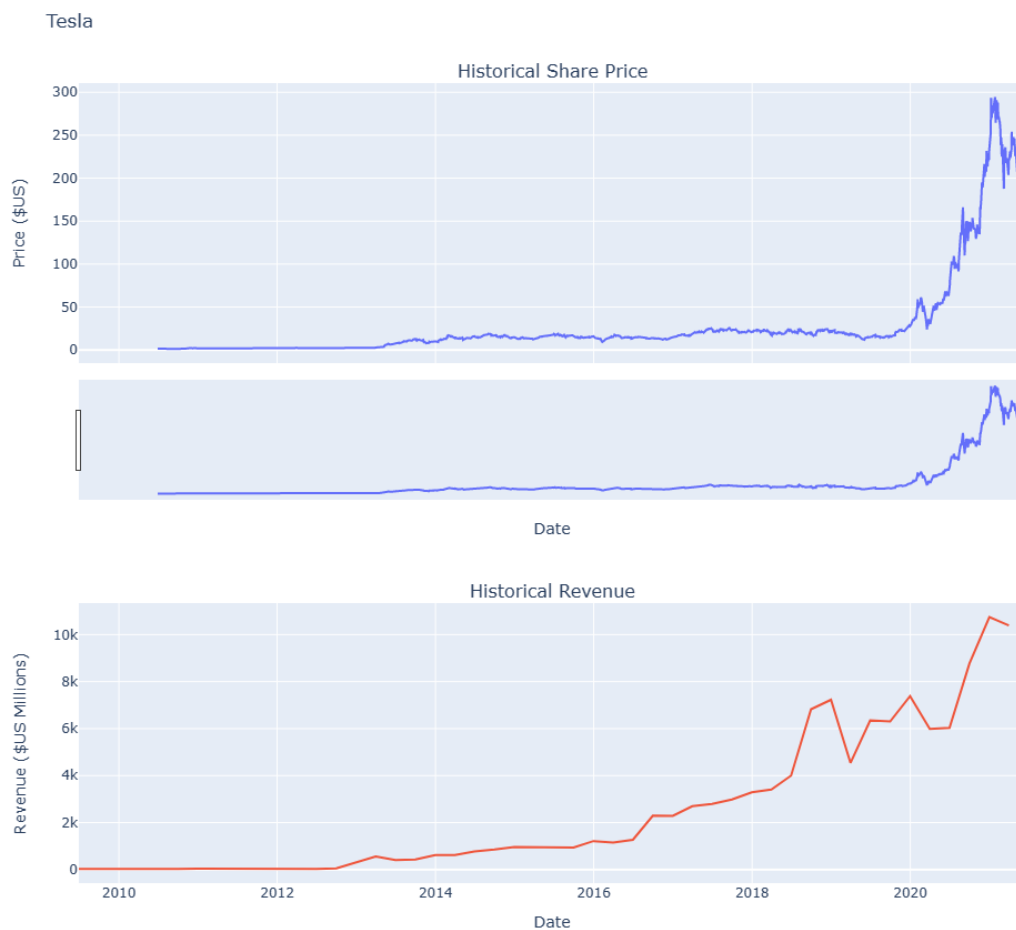
0.7 Question 6: Plot GameStop Stock Graph

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.

```
[67]: 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

##