

Final Assignment

February 6, 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.

Table of Contents

- Define a Function that Makes a Graph
- Question 1: Use yfinance to Extract Stock Data
- Question 2: Use Webscraping to Extract Tesla Revenue Data
- Question 3: Use yfinance to Extract Stock Data
- Question 4: Use Webscraping to Extract GME Revenue Data
- Question 5: Plot Tesla Stock Graph
- Question 6: Plot GameStop Stock Graph

Estimated Time Needed: 30 min

```
[1]: !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

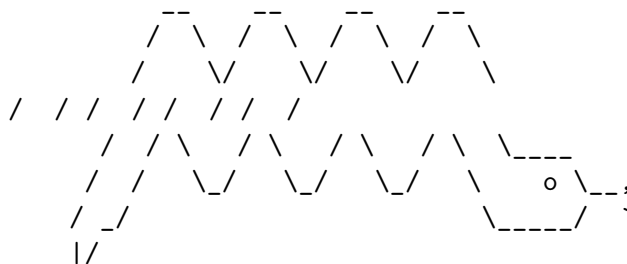
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (0.0.11)

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

```



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

Collecting nbformat==4.2.0

Downloading nbformat-4.2.0-py2.py3-none-any.whl (153 kB)

153.3/153.3 kB

18.2 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

```

```

[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.

```
[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)
    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.

```
[6]: 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.

```
[7]: Tesla_data.reset_index(inplace=True)
```

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.

```
[10]: url = "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/
↳IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm"
data = requests.get(url).text
```

Parse the html data using beautiful_soup.

```
[11]: beautiful_soup = BeautifulSoup(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

```
[37]: tesla_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in beautiful_soup.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()
```

```
[37]:   Date  Revenue
0  2021  $53,823
1  2020  $31,536
2  2019  $24,578
3  2018  $21,461
4  2017  $11,759
```

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

```
[41]: tesla_revenue["Revenue"].str.replace("$", "").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. In addition, single character

regular expressions will **not** be treated as literal strings when `regex=True`.
"""Entry point for launching an IPython kernel.

```
[41]: 0      53823
      1      31536
      2      24578
      3      21461
      4      11759
      5       7000
      6      4046
      7      3198
      8      2013
      9       413
     10       204
     11       117
     12       112
      Name: Revenue, dtype: object
```

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

```
[43]: 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.

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

```
[46]:   Date Revenue
      8  2013    2013
      9  2012     413
     10  2011     204
     11  2010     117
     12  2009     112
```

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`.

```
[47]: data = 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.

```
[48]: gme_data = data.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.

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

```
[49]:
```

	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	1.670626	1.683250	11021600	0.0	
2	2002-02-15	1.683250	1.687458	1.658001	1.674834	8389600	0.0	
3	2002-02-19	1.666417	1.666417	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`.

```
[50]: 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`.

```
[51]: 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


```
[56]: gme_revenue = pd.DataFrame(columns={'Date', 'Revenue'})

for row in soup.find_all('tbody')[1].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("$", "").str.
    replace(",", "")
```

/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/ipykernel_launcher.py:9: FutureWarning: The default value of regex will change from True to False in a future version. In addition, single character regular expressions will *not* be treated as literal strings when regex=True.

```
if __name__ == "__main__":
```

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

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

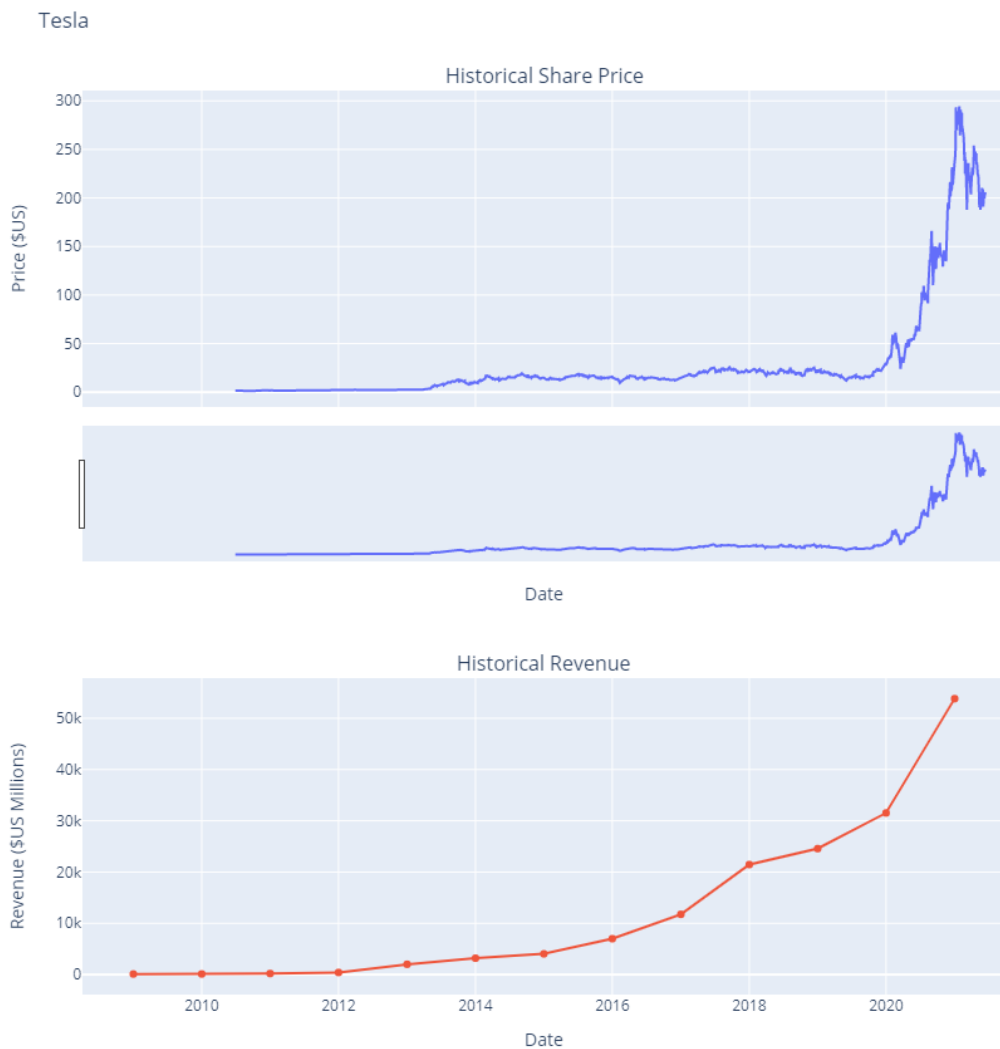
```
[57]:
```

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

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.

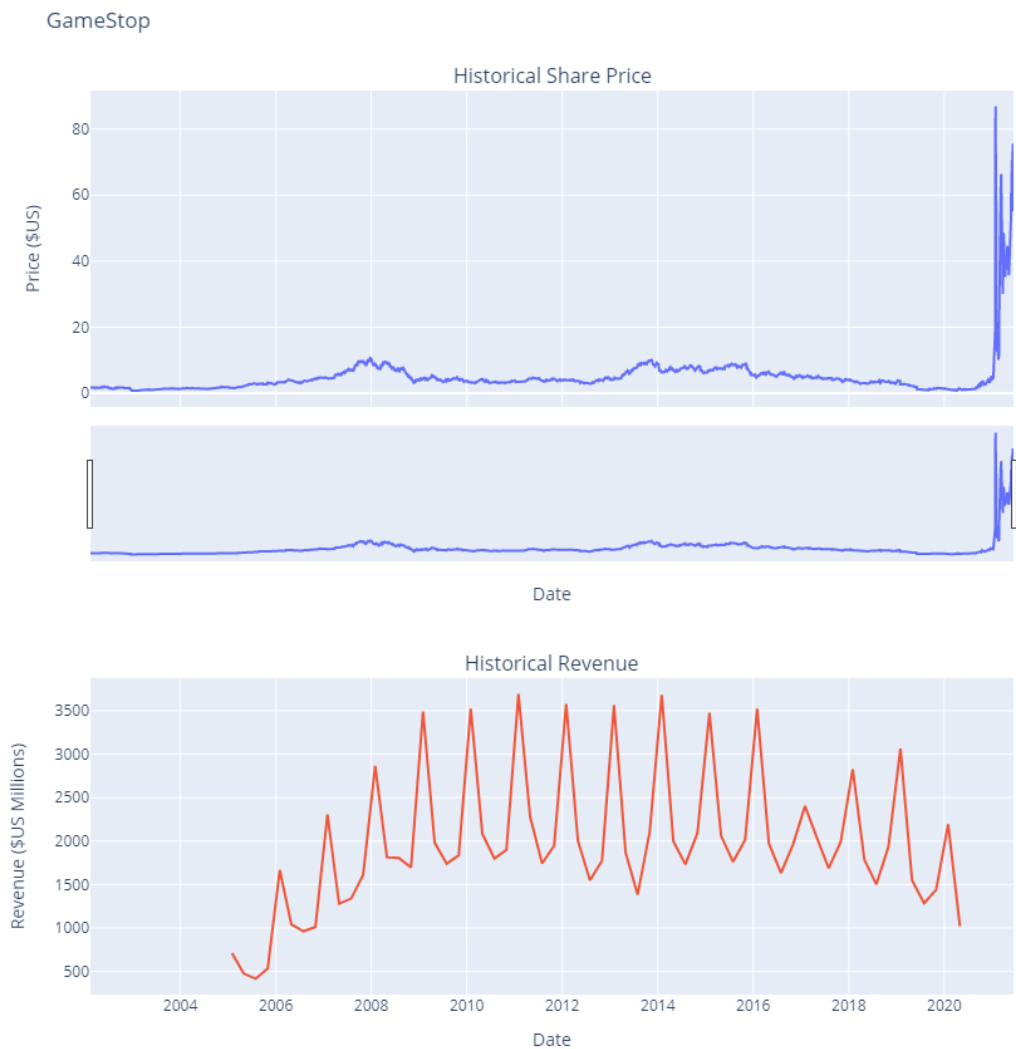
```
[59]: make_graph(Tesla_data, tesla_revenue, 'Tesla')
```



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.

```
[60]: 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

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2020-08-27	1.0	Malika Singla	Added lab to GitLab

##

© IBM Corporation 2020. All rights reserved.