Final Assignment_Webscraping

December 26, 2022

Extracting Stock Data Using a Web Scraping

Not all stock data is available via API in this assignment; you will use web-scraping to obtain financial data. You will be quizzed on your results.

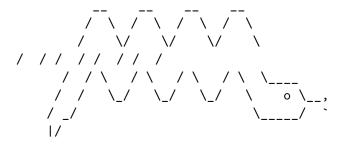
Using beautiful soup we will extract historical share data from a web-page.

Table of Contents

```
    <!i>Downloading the Webpage Using Requests Library
    <!i>Parsing Webpage HTML Using BeautifulSoup
    <!i>Extracting Data and Building DataFrame
```

Estimated Time Needed: 30 min

```
[1]: #!pip install pandas==1.3.3
#!pip install requests==2.26.0
!mamba install bs4==4.10.0 -y
!mamba install html5lib==1.1 -y
!pip install lxml==4.6.4
#!pip install plotly==5.3.1
```



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']

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Pinned packages:
  - python 3.7.*
Transaction
 Prefix: /home/jupyterlab/conda/envs/python
 Updating specs:
   -bs4==4.10.0
  - ca-certificates
   - certifi
  - openssl
 Package
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  Install:
  + bs4
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10 KB
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  - openssl
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 Upgrade:
 - ca-certificates
                     2022.9.24 ha878542_0
                                                installed
  + ca-certificates 2022.10.11 h06a4308_0
                                                pkgs/main/linux-64
124 KB
  - certifi
                     2022.9.24 pyhd8ed1ab_0
                                                installed
  + certifi
                     2022.12.7 py37h06a4308_0 pkgs/main/linux-64
150 KB
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Downgrade:

Summary:

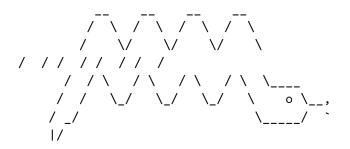
Install: 1 packages
Change: 1 packages
Upgrade: 2 packages
Downgrade: 1 packages

Total download: 4 MB

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Preparing transaction: done Verifying transaction: done Executing transaction: done



mamba (0.15.3) supported by @QuantStack

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

Looking for: ['html5lib==1.1']

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

Updating specs:

- html5lib==1.1
- ca-certificates
- certifi
- openssl

Package Version Build Channel Size

Install:

+ html5lib 1.1 pyhd3eb1b0_0 pkgs/main/noarch 91 KB + webencodings 0.5.1 py37_1 pkgs/main/linux-64 19 KB

Summary:

Install: 2 packages

Total download: 110 KB

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71.5 MB/s eta 0:00:00:00:0100:01
Installing collected packages: lxml
 Attempting uninstall: lxml
   Found existing installation: lxml 4.9.1
   Uninstalling lxml-4.9.1:
    Successfully uninstalled lxml-4.9.1
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.
yfinance 0.1.93 requires lxml>=4.9.1, but you have lxml 4.6.4 which is
incompatible.
Successfully installed lxml-4.6.4
```

```
[3]: import pandas as pd import requests from bs4 import BeautifulSoup
```

0.1 Using Webscraping to Extract Stock Data Example

First we must use the request library to downlaod the webpage, and extract the text. We will extract Netflix stock data https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/netflix_data_webpage.html.

- [8]: url
- [8]: 'https://cf-courses-data.s3.us.cloud-objectstorage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/netflix data webpage.html'
- [24]: | #data

Next we must parse the text into html using beautiful_soup

```
[10]: soup = BeautifulSoup(data, 'html5lib')
```

[25]: #soup

Now we can turn the html table into a pandas dataframe

```
# Finally we append the data of each row to the table

netflix_data = netflix_data.append({"Date":date, "Open":Open, "High":high,

→"Low":low, "Close":close, "Adj Close":adj_close, "Volume":volume},

→ignore_index=True)
```

We can now print out the dataframe

```
[13]: netflix_data.head()
```

```
[13]:
                Date
                         Open
                                High
                                         Low
                                               Close
                                                           Volume Adj Close
       Jun 01, 2021
                      504.01 536.13
                                              528.21
                                                       78,560,600
                                                                      528.21
                                      482.14
      1 May 01, 2021
                      512.65
                              518.95
                                      478.54
                                              502.81
                                                       66,927,600
                                                                      502.81
      2 Apr 01, 2021
                      529.93
                              563.56
                                              513.47
                                                       111,573,300
                                                                      513.47
                                      499.00
      3 Mar 01, 2021
                      545.57
                              556.99
                                              521.66
                                                       90,183,900
                                                                      521.66
                                      492.85
      4 Feb 01, 2021 536.79
                              566.65
                                      518.28
                                              538.85
                                                       61,902,300
                                                                      538.85
```

We can also use the pandas read_html function using the url

```
[26]: read_html_pandas_data = pd.read_html(url) #read_html_pandas_data
```

Or we can convert the BeautifulSoup object to a string

```
[27]: read_html_pandas_data = pd.read_html(str(soup))
#read_html_pandas_data
```

Beacause there is only one table on the page, we just take the first table in the list returned

```
[18]: netflix_dataframe = read_html_pandas_data[0]
netflix_dataframe.head()
```

```
[18]:
                 Date
                         Open
                                 High
                                               Close* Adi Close**
                                                                      Volume
                                          Low
      0 Jun 01, 2021
                      504.01
                              536.13
                                       482.14
                                               528.21
                                                           528.21
                                                                    78560600
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                                                           521.66
                                                                    90183900
      4 Feb 01, 2021 536.79
                               566.65 518.28
                                               538.85
                                                           538.85
                                                                    61902300
```

0.2 Using Webscraping to Extract Stock Data Exercise

```
Use the requests library to download the webpage https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/
IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/amazon_data_
webpage.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/

⇔amazon_data_webpage.html"

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

Parse the html data using beautiful soup.

```
[31]: soup= BeautifulSoup(data, 'html5lib')
#soup
```

Question 1 What is the content of the title attribute:

```
[32]: soup.title
```

[32]: <title>Amazon.com, Inc. (AMZN) Stock Historical Prices & Data - Yahoo Finance</title>

Using beautiful soup extract the table with historical share prices and store it into a dataframe named amazon_data. The dataframe should have columns Date, Open, High, Low, Close, Adj Close, and Volume. Fill in each variable with the correct data from the list col.

```
amazon_data = pd.DataFrame(columns=["Date", "Open", "High", "Low", "Close", "

"Adj Close", "Volume"])

for row in soup.find("tbody").find_all("tr"):
    col = row.find_all("td")
    date = col[0].text #ADD_CODE
    Open = col[1].text #ADD_CODE
    high = col[2].text #ADD_CODE
    low = col[3].text #ADD_CODE
    close = col[4].text #ADD_CODE
    close = col[6].text #ADD_CODE
    adj_close = col[5].text #ADD_CODE
    volume = col[6].text #ADD_CODE

amazon_data = amazon_data.append({"Date":date, "Open":Open, "High":high, "

→"Low":low, "Close":close, "Adj Close":adj_close, "Volume":volume}, "

→ ignore_index=True)
```

Print out the first five rows of the amazon_data dataframe you created.

```
[35]: amazon_data.head()
```

```
[35]:
                Date
                         Open
                                   High
                                             Low
                                                     Close Adj Close
                                                                          Volume
     0 Jan 01, 2021
                     3,270.00 3,363.89 3,086.00 3,206.20 3,206.20
                                                                      71,528,900
     1 Dec 01, 2020 3,188.50
                               3,350.65
                                        3,072.82 3,256.93 3,256.93
                                                                      77,556,200
     2 Nov 01, 2020 3,061.74
                                                  3,168.04 3,168.04
                                                                      90,810,500
                               3,366.80
                                        2,950.12
     3 Oct 01, 2020 3,208.00
                               3,496.24 3,019.00 3,036.15 3,036.15
                                                                     116,226,100
     4 Sep 01, 2020 3,489.58 3,552.25 2,871.00 3,148.73 3,148.73
                                                                     115,899,300
```

Question 2 What is the name of the columns of the dataframe

[42]: amazon_data.head(0)

[42]: Empty DataFrame

Columns: [Date, Open, High, Low, Close, Adj Close, Volume]

Index: []

Question 3 What is the Open of the last row of the amazon_data dataframe?

[51]: amazon_data.tail(1)

[51]: Date Open High Low Close Adj Close Volume 60 Jan 01, 2016 656.29 657.72 547.18 587.00 587.00 130,200,900

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

0.3 Change Log

| 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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