Data-X Spring 2019: Homework 7

Webscraping

In this homework, you will do some exercises with web-scraping.

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Fun with Webscraping & Text manipulation

1. Statistics in Presidential Debates

Your first task is to scrape Presidential Debates from the Commission of Presidential Debates website: https://www.debates.org/voter-education/debate-transcripts/ (https://www.debates.org/voter-education/debate-transcripts/)

To do this, you are not allowed to manually look up the URLs that you need, instead you have to scrape them. The root url to be scraped is the one listed above, namely: https://www.debates.org/voter-education/debate-transcripts/ (https://www.debates.org/voter-education/debate-transcripts/)

1. By using `requests` and `BeautifulSoup` find all the links / URLs on the website that links to transcriptions of **First Presidential Debates** from the years [1988, 1984, 1976, 1960]. In total you should find 4 links / URLs that fulfill this criteria. **Print the urls.**
2. When you have a list of the URLs your task is to create a Data Frame with some statistics (see example of output below):
   A. Scrape the title of each link and use that as the column name in your Data Frame.
   B. Count how long the transcript of the debate is (as in the number of characters in transcription string). Feel free to include \ characters in your count, but remove any breakline characters, i.e. \n. You will get credit if your count is +/- 10% from our result.
   C. Count how many times the word **war** was used in the different debates. Note that you have to convert the text in a smart way (to not count the word **warranty** for example, but counting **war.**, **war!**, **war,** or **War** etc.
   D. Also scrape the most common used word in the debate, and write how many times it was used. Note that you have to use the same strategy as in C in order to do this.

   Print your final output result.

Tips:

In order to solve the questions above, it can be useful to work with Regular Expressions and explore methods on strings like `.strip(), .replace(), .find(), .count(), .lower()` etc. Both are very powerful tools to do string processing in Python. To count common words for example I used a `Counter` object and a Regular expression pattern for only words, see example:

```
from collections import Counter
import re

counts = Counter(re.findall(r"[\w']+", text.lower()))
```

Read more about Regular Expressions here: https://docs.python.org/3/howto/regex.html (https://docs.python.org/3/howto/regex.html)

Example output of all of the answers to Question 1.2:

	September 25, 1988: The First Bush-Dukakis Presidential Debate				
Debate char length	87488				
war_count					
most_common_w					
most_common_w_count					

.

```
In [1]: from IPython.core.display import display, HTML
        display(HTML("<style>.container { width:90% !important; }</style
        >"))
        from __future__ import division, print_function
        from urllib.request import urlopen
        import requests, re
        import numpy as np
        import bs4 as bs
        import pandas as pd
        from collections import Counter
```

In [2]:
```python
# Part 1
source = requests.get("https://www.debates.org/voter-education/d
ebate-transcripts/")
soup = bs.BeautifulSoup(source.content, features='html.parser')
links = soup.find_all('a')
df =  pd.DataFrame(columns=["Transcript Name", "URL"])
t = "https://www.debates.org"
p = re.compile("The First")
i = -1

for l in links:
    if pd.isnull(p.search(l.text)):
        p = re.compile("The First")
    else:
        i = i + 1
        df.loc[i] = [l.text, t + l.get("href")]

HTML(df.to_html())
```

Out[2]:

	Transcript Name	URL
0	September 26, 2016: The First Clinton-Trump Pr...	https://www.debates.org/voter-education/debate...
1	October 3, 2012: The First Obama-Romney Presid...	https://www.debates.org/voter-education/debate...
2	September 26, 2008: The First McCain-Obama Pre...	https://www.debates.org/voter-education/debate...
3	September 30, 2004: The First Bush-Kerry Presi...	https://www.debates.org/voter-education/debate...
4	October 3, 2000: The First Gore-Bush President...	https://www.debates.org/voter-education/debate...
5	October 6, 1996: The First Clinton-Dole Presid...	https://www.debates.org/voter-education/debate...
6	September 25, 1988: The First Bush-Dukakis Pre...	https://www.debates.org/voter-education/debate...
7	October 7, 1984: The First Reagan-Mondale Pres...	https://www.debates.org/voter-education/debate...
8	September 23, 1976: The First Carter-Ford Pres...	https://www.debates.org/voter-education/debate...
9	September 26, 1960: The First Kennedy-Nixon Pr...	https://www.debates.org/voter-education/debate...

```
In [3]:  # Part 2a
         df_copy = df.copy()
         df_copy = df_copy.drop(labels="URL", axis=1)
         transcripts = df_copy.values.T.tolist()
         res = pd.DataFrame(columns=transcripts[0])
         headers = pd.DataFrame({ "Detail": ["Debate Character Length",
         "War Count", "Most Common Word", "Most Common Word Count"] })
         res = headers.join(res)
         res
```

Out[3]:

	Detail	September 26, 2016: The First Clinton-Trump Presidential Debate	October 3, 2012: The First Obama-Romney Presidential Debate	September 26, 2008: The First McCain-Obama Presidential Debate	September 30, 2004: The First Bush-Kerry Presidential Debate	October 3, 2000: The First Gore-Bush Presidential Debate
0	Debate Character Length	NaN	NaN	NaN	NaN	NaN
1	War Count	NaN	NaN	NaN	NaN	NaN
2	Most Common Word	NaN	NaN	NaN	NaN	NaN
3	Most Common Word Count	NaN	NaN	NaN	NaN	NaN

```
In [4]:   # Part 2b
          df_copy = df.copy()
          df_copy = df_copy.drop(labels = "Transcript Name", axis = 1)
          urls = df_copy.values.T.tolist()
          d_len = []

          for u in urls[0]:
              p = requests.get(u)
              d_len.append(len(p.text))

          res.loc[0:0, 1:] = d_len
          res
```

Out[4]:

	Detail	September 26, 2016: The First Clinton-Trump Presidential Debate	October 3, 2012: The First Obama-Romney Presidential Debate	September 26, 2008: The First McCain-Obama Presidential Debate	September 30, 2004: The First Bush-Kerry Presidential Debate	October 3, 2000: The First Gore-Bush Presidential Debate
0	Debate Character Length	114811	115496	210346	102282	106661
1	War Count	NaN	NaN	NaN	NaN	NaN
2	Most Common Word	NaN	NaN	NaN	NaN	NaN
3	Most Common Word Count	NaN	NaN	NaN	NaN	NaN

In [5]:
```python
# Part 2c
w_count = []

for u in urls[0]:
    p = requests.get(u)
    war_sum = len(re.findall(r"(war)\W|(War)\W|(wars)\W|(Wars)
\W", p.text))
    w_count.append(war_sum)

res.loc[1:1,1:] = w_count
res
```

Out[5]:

	Detail	September 26, 2016: The First Clinton-Trump Presidential Debate	October 3, 2012: The First Obama-Romney Presidential Debate	September 26, 2008: The First McCain-Obama Presidential Debate	September 30, 2004: The First Bush-Kerry Presidential Debate	October 3, 2000: The First Gore-Bush Presidential Debate
0	Debate Character Length	114811	115496	210346	102282	106661
1	War Count	18	5	48	64	11
2	Most Common Word	NaN	NaN	NaN	NaN	NaN
3	Most Common Word Count	NaN	NaN	NaN	NaN	NaN

In [6]:
```python
# Part 2d
most_common_word = []
most_common_count = []

for u in urls[0]:
    p = requests.get(u)
    word = Counter(p.text.split(" ")).most_common(1)[0][0]
    most_common_word.append(word)
    c = Counter(p.text.split(" ")).most_common(1)[0][1]
    most_common_count.append(c)

res.loc[2:2,1:] = most_common_word
res.loc[3:3,1:] = most_common_count
res
```

Out[6]:
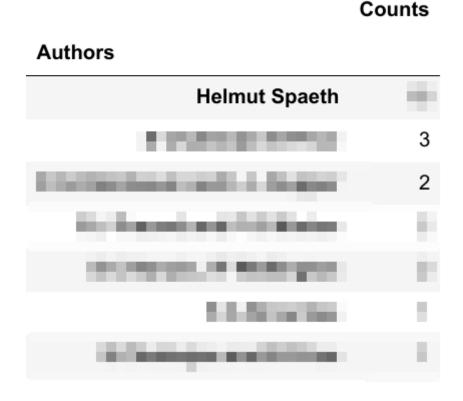
	Detail	September 26, 2016: The First Clinton-Trump Presidential Debate	October 3, 2012: The First Obama-Romney Presidential Debate	September 26, 2008: The First McCain-Obama Presidential Debate	September 30, 2004: The First Bush-Kerry Presidential Debate	October 3, 2000: The First Gore-Bush Presidential Debate
0	Debate Character Length	114811	115496	210346	102282	106661
1	War Count	18	5	48	64	11
2	Most Common Word	the	the	the	the	the
3	Most Common Word Count	592	715	1410	791	858

2. Download and read in specific line from many data sets

Scrape the first 27 data sets from this URL http://people.sc.fsu.edu/~jburkardt/datasets/regression/ (http://people.sc.fsu.edu/~jburkardt/datasets/regression/) (i.e. `x01.txt` - `x27.txt`). Then, save the 5th line in each data set, this should be the name of the data set author (get rid of the # symbol, the white spaces and the comma at the end).

Count how many times (with a Python function) each author is the reference for one of the 27 data sets. Showcase your results, sorted, with the most common author name first and how many times he appeared in data sets. Use a Pandas DataFrame to show your results, see example. **Print your final output result.**

Example output of the answer for Question 2:

In [7]:
```python
source = requests.get('http://people.sc.fsu.edu/~jburkardt/datas
ets/regression/').content
soup = bs.BeautifulSoup(source, features='html.parser')
links = soup.find('table').find_all('a')
urls = ['http://people.sc.fsu.edu/~jburkardt/datasets/regressio
n/'+l.get('href') for l in links][6:33]
urls
```

```
Out[7]: ['http://people.sc.fsu.edu/~jburkardt/datasets/regression/x01.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x02.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x03.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x04.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x05.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x06.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x07.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x08.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x09.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x10.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x11.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x12.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x13.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x14.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x15.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x16.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x17.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x18.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x19.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x20.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x21.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x22.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x23.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x24.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x25.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x26.
        txt',
         'http://people.sc.fsu.edu/~jburkardt/datasets/regression/x27.
        txt']
```

In [8]:
```python
authors = []

for u in urls:
    textfile = urlopen(u)
    file = list(textfile)
    author = file[4]
    authors.append(author)

a = pd.DataFrame(index=Counter(authors).keys())
a['counts'] = Counter(authors).values()
a = a.sort_values(by='counts', ascending=False)
a
```

Out[8]:

	counts
b'# Helmut Spaeth,\n'	16
b'# S Chatterjee, B Price,\n'	3
b'# R J Freund and P D Minton,\n'	2
b'# D G Kleinbaum and L L Kupper,\n'	2
b'# S C Narula, J F Wellington,\n'	2
b'# K A Brownlee,\n'	1
b'# S Chatterjee and B Price,\n'	1