Project 5: Sentiment Scoring

CS 4373: Data Mining Fall 2023

Instructor: Dr. Mohammad Imran Chowdhury

Total Points: 75

Due: 11/23/2023 11:59 PM

In this project, I invite you to do the following:

1. Import and prepare the text `LittleWomen.txt` dataset
2. Tokenize the data.
3. Score the sentiments.
4. Calculate average sentiment scores for each section of 100 lines.
5. Graph the "sentiment arc" of the story.

Task 1: Import the text `LittleWomen.txt` dataset **(10 points)**

Load the dataset `LittleWomen.txt` provided to you as **'data/LittleWomen.txt'** file into the Jupyter Notebook. Show the first 10 rows. The output should be as follows: **(5 points)**

Out[2]:

	text
0	LITTLE WOMEN
3	by
5	Louisa May Alcott
10	CONTENTS
13	PART 1
15	ONE PLAYING PILGRIMS
16	TWO A MERRY CHRISTMAS
17	THREE THE LAURENCE BOY
18	FOUR BURDENS
19	FIVE BEING NEIGHBORLY

Next, Add Line Numbers. The output should be as follows for the first 5 rows: **(5 points)**

Out[3]:

	text	line
0	LITTLE WOMEN	1
3	by	2
5	Louisa May Alcott	3
10	CONTENTS	4
13	PART 1	5

Task 2: Tokenize the data. **(15 points)**

Tokenize the Data. The output should be as follows if you show the first 5 rows: **(10 points)**

Out[4]:

	text	line
0	[little, women]	1
3	[by]	2
5	[louisa, may, alcott]	3
10	[contents]	4
13	[part, 1]	5

Now, Collect Tokens into a Single Series. The output should be as follows if you show the first 10 rows: **(5 points)**

Out[5]:

	token	line
0	little	1
0	women	1
3	by	2
5	louisa	3
5	may	3
5	alcott	3
10	contents	4
13	part	5
13	1	5
15	one	6

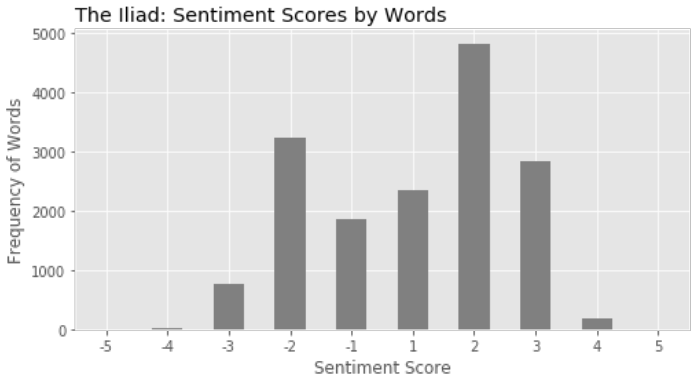
Task 3: Score the sentiments. **(20 points)**

Calculate sentiment scores using the AFINN lexicon, which scores words on a scale of -5 (most negative) to +5 (most positive). And, show a frequency table for the sentiment scores. **(10 points)**

Out[7]:

	n
-5	2
-4	20
-3	769
-2	3237
-1	1856
1	2343
2	4815
3	2842
4	192
5	3

Finally, Graph Score Frequencies. The output should be as follows: **(10 points)**



Task 4: Calculate average sentiment scores for each section of 100 lines. **(15 points)**

Just divide the text into sections of 100 lines and calculate a sentiment score for each section. The output should be as follows if show the first 10 rows:

Out[9]:

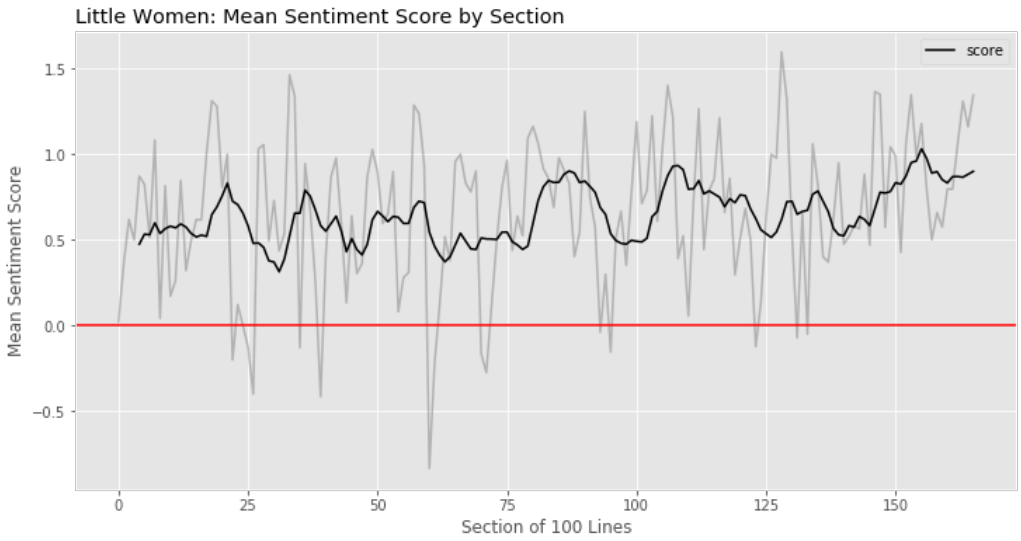
	score
section	
0	0.020408
1	0.362745
2	0.619565
3	0.500000
4	0.871795
5	0.823529
6	0.512821
7	1.082353
8	0.041667
9	0.816092

Note that you need to add line numbers first. These numbers will be used to divide the text into sections. For example, look at the following output:

	text	line
0	LITTLE WOMEN	1
3	by	2
5	Louisa May Alcott	3
10	CONTENTS	4
13	PART 1	5

Task 5: Graph the "sentiment arc" of the story. **(15 points)**

Plot Scores by Section to View Narrative Arc. The output should be as follows:



The submission grading rubric is as follows (points out of 75 total):

Project element	**Points**
Task 1	10
Task 2	15
Task 3	20
Task 4	15
Task 5	15

Submission Instructions: Create a compressed file (.zip or .tar.gz files are accepted) with your all source files such as .ipynb files and data files. Generally speaking, to complete Task 1 through Task 5, you just need one .ipynb file. But it's better to submit everything as a compressed file. Submit the compressed file to Canvas.

Late submission policy: As described in the syllabus, any late submission will the penalized with 10% off after each 24 hours late. For example, an assignment worth 100 points turned in 2 days late will receive a 20-point penalty. Assignments turned in 5 or more days after the due date will receive a grade of 0.