

Sentiment Assignment

June 20, 2022

1 ADS 509 Sentiment Assignment

This notebook holds the Sentiment Assignment for Module 6 in ADS 509, Applied Text Mining. Work through this notebook, writing code and answering questions where required.

In a previous assignment you put together Twitter data and lyrics data on two artists. In this assignment we apply sentiment analysis to those data sets. If, for some reason, you did not complete that previous assignment, data to use for this assignment can be found in the assignment materials section of Blackboard.

1.1 General Assignment Instructions

These instructions are included in every assignment, to remind you of the coding standards for the class. Feel free to delete this cell after reading it.

One sign of mature code is conforming to a style guide. We recommend the [Google Python Style Guide](#). If you use a different style guide, please include a cell with a link.

Your code should be relatively easy-to-read, sensibly commented, and clean. Writing code is a messy process, so please be sure to edit your final submission. Remove any cells that are not needed or parts of cells that contain unnecessary code. Remove inessential `import` statements and make sure that all such statements are moved into the designated cell.

Make use of non-code cells for written commentary. These cells should be grammatical and clearly written. In some of these cells you will have questions to answer. The questions will be marked by a “Q:” and will have a corresponding “A:” spot for you. *Make sure to answer every question marked with a Q: for full credit.*

```
[1]: import os
import re
import emoji
import pandas as pd
import numpy as np

from collections import Counter, defaultdict
from string import punctuation

from nltk.corpus import stopwords

sw = stopwords.words("english")
```

```
[158]: # Add any additional import statements you need here
import emoji
import seaborn as sns
import matplotlib.pyplot as plt
```

```
[4]: # change `data_location` to the location of the folder on your machine.
data_location = "/Users/han/Desktop/USD/ADS 509/ADS509-Week1/"

# These subfolders should still work if you correctly stored the
# data from the Module 1 assignment
twitter_folder = "twitter/"
lyrics_folder = "lyrics/"

positive_words_file = "positive-words.txt"
negative_words_file = "negative-words.txt"
tidy_text_file = "tidytext_sentiments.txt"
```

1.2 Data Input

Now read in each of the corpora. For the lyrics data, it may be convenient to store the entire contents of the file to make it easier to inspect the titles individually, as you'll do in the last part of the assignment. In the solution, I stored the lyrics data in a dictionary with two dimensions of keys: artist and song. The value was the file contents. A Pandas data frame would work equally well.

For the Twitter data, we only need the description field for this assignment. Feel free all the descriptions read it into a data structure. In the solution, I stored the descriptions as a dictionary of lists, with the key being the artist.

```
[22]: lyrics_path = os.path.join(data_location, lyrics_folder)

artists = [x for x in os.listdir(lyrics_path) if 'ipynb' not in x]

lyrics = pd.DataFrame(columns=['artist', 'title', 'lyric'])

for artist in artists:

    path = os.path.join(data_location, lyrics_folder, artist)

    for file in os.listdir(path):

        if 'txt' not in file:
            continue

        song_path = os.path.join(path, file)

        with open(song_path, 'r') as file:
            song = file.readlines()
```

```

title = song[0].replace('\n', '').strip()

lyric = song[1:]
lyric = ' '.join(lyric)
lyric = lyric.replace('\n', '').strip()

lyrics = pd.concat([lyrics, pd.DataFrame({
                                'artist':artist,
                                'title':title,
                                'lyric':lyric
                                }, index=[0])], ignore_index=True)

lyrics.head()

```

```

[22]:  artist          title \
0  eminem          Rap God
1  eminem  Hellbound (H&H Remix)
2  eminem          Infinite
3  eminem          So Bad
4  eminem  The King And I

                                lyric
0  Look, I was gonna go easy on you not to hurt y...
1  Welcome back to the stage of history (Yo, Sli...
2  Aw, yeah (It's like this, like this) It's Emin...
3  Yeah, haha, you feel that, baby? Yeah, I feel ...
4  It goes: one for the trailer park, two for my ...

```

```

[31]: lyrics.tail()

```

```

[31]:  artist          title \
927  snoopdogg          Toyz N Da Hood
928  snoopdogg          Cool
929  snoopdogg  (O.J.) Wake Up
930  snoopdogg          My Medicine
931  snoopdogg  Murder Was The Case (DeathAfterVisualizingEter...

                                lyric
927  [Intro: Snoop Dogg - downsampled] What's happe...
928  [Nate Dogg] Just yesterday I had to turn a bit...
929  [Intro:] [Snoop] Yeah man, this shit here go...
930  (One, two...) [Intro: Snoop] Yeah, I like to ...
931  [Intro: (Mista Grimm's "Indo Smoke" plays in t...

```

```

[ ]: artists = [x for x in os.listdir(os.path.join(data_location, twitter_folder))
                ↪if 'ipynb' not in x]

```

```

artists = [x for x in artists if 'follower_data' in x]

twitter = pd.DataFrame()

for artist in artists:

    temp = pd.read_csv(os.path.join(twitter_folder, artist), sep='\t')
    temp['artist'] = artist.replace('_follower_data.txt', '').lower()

    twitter = pd.concat([twitter, temp], ignore_index=True)

twitter.head()

```

```

[29]: twitter_path = os.path.join(data_location, twitter_folder)

twitter = pd.DataFrame()

for artist in artists:

    file_path = [x for x in os.listdir(twitter_path) if artist in x.lower() and
↳ 'data' in x][0]
    temp = pd.read_csv(os.path.join(twitter_path, file_path), sep='\t')
    temp['artist'] = artist.replace('_follower_data.txt', '').lower()

    twitter = pd.concat([twitter, temp], ignore_index=True)

twitter.head()

```

```

[29]:
  screen_name      name      id      location \
0   Tarik_k16   Tarık Keleş  1251272999497588736  Muhtemelen İstanbul
1  jisin_hatten  YZ//skrrrr  1453690241022193670
2  zemy09631379      zemy  1336382129131778048      NaN
3  MaggieWee22    Maggie Wee  1362042628624187393      NaN
4  NameIsGuyBTW  HiMyNameIsGuy456  1519110907967770625      NaN

  followers_count  friends_count \
0              18             138
1               1              43
2               0              16
3               1             165
4               0              16

                                description  artist
0  Boun, Muhendis, temel bilimci, matematik asigi...  eminem
1      # # #HIPHOP # #R&B #EDM #Rock #Eminem  eminem
2                                           NaN  eminem
3                                           NaN  eminem

```

```
[30]: twitter.tail()
```

```
[30]:
```

	screen_name	name	id	location	\
119769	buduzere	Buduzere	1525987090772676608	NaN	
119770	njosh_jon	Jon Njosh	1520303800292192256	NaN	
119771	Mariah367561791	Mariah	1527578448197214209	NaN	
119772	puangorp	P.	1398535348636905475	NaN	
119773	sombre_symphony	Sombre_symphony	1527163605325578240	NaN	

	followers_count	friends_count	\
119769	0	57	
119770	0	87	
119771	1	4	
119772	3	235	
119773	23	170	

	description	artist
119769	Living my best life	snoopdogg
119770	Fashionister	snoopdogg
119771	NaN	snoopdogg
119772	NaN	snoopdogg
119773	«I was looking for love and found myself»	snoopdogg

```
[60]: # Read in the positive and negative words and the
# tidytext sentiment. Store these so that the positive
# words are associated with a score of +1 and negative words
# are associated with a score of -1. You can use a dataframe or a
# dictionary for this.

sentiments = pd.read_csv('tidytext_sentiments.txt', sep='\t')[['word',
↳ 'sentiment']]

positive = pd.read_csv('positive-words.txt', sep='\t', header=33)
positive.columns = ['Positive Word']

negative = pd.read_csv('negative-words.txt', sep='\t', header=33,
↳ encoding='latin')
negative.columns = ['Negative Word']
```

```
[74]: scores = {}

scores['positive'] = set(positive['Positive Word'].str.lower().tolist() +
↳ sentiments[sentiments['sentiment']=='positive']['word'].str.lower().tolist())
scores['negative'] = set(negative['Negative Word'].str.lower().tolist() +
↳ sentiments[sentiments['sentiment']=='negative']['word'].str.lower().tolist())
```

```
[77]: print('There are {} positive words and {} negative words'.
        ↪format(len(scores['positive']), len(scores['negative'])))
```

There are 3778 positive words and 7761 negative words

1.3 Sentiment Analysis on Songs

In this section, score the sentiment for all the songs for both artists in your data set. Score the sentiment by manually calculating the sentiment using the combined lexicons provided in this repository.

After you have calculated these sentiments, answer the questions at the end of this section.

```
[78]: def analyze_sentiment(txt):

    txt = txt.lower()
    score = 0

    for word in txt.strip().split(' '):

        word = word.strip()

        if word in scores['positive']:
            score += 1

        elif word in scores['negative']:
            score -= 1

    return score
```

```
[82]: lyrics['Sentiment Score'] = lyrics.apply(lambda x:
        ↪analyze_sentiment(x['lyric']), axis=1)
```

```
[85]: lyrics.sort_values('Sentiment Score', inplace=True)
```

```
[87]: lyrics[lyrics['artist']=='eminem']
```

```
[87]:      artist      title \
354  eminem      Shit On You
112  eminem      Kill You
148  eminem      Quitter
102  eminem  Dead Wrong (Remix)
33   eminem  Till I Collapse (Remix)
..   ...
220  eminem      White America
361  eminem  The Real Slim Shady
310  eminem      The Re-Up
323  eminem      Searchin'
263  eminem      Superman
```

	lyric	Sentiment Score
354	I'll shit on you Da da, da da, da da I'll shit...	-114
112	When I was just a little baby boy, My momma us...	-90
148	Yo, I dedicate to this to you To all my fans, ...	-85
102	Bad Boy, baby Yeah, yeah Junior M.A.F.I.A., ye...	-70
33	Sometimes you just feel tired, feel weak When ...	-61
..
220	America, we love you How many people are proud...	30
361	May I have your attention please? May I have y...	31
310	Boom boom chuck, boom b-boom chuck Boom boom c...	33
323	[Angela Workman:] Ain't no one special, specia...	38
263	You high, baby? Yeah Ya Talk to me You want me...	71

[389 rows x 4 columns]

```
[88]: lyrics[lyrics['artist']=='snoopdogg']
```

```
[88]:
```

	artist	title \
469	snoopdogg	Back Up Off Me
490	snoopdogg	Dick Walk
687	snoopdogg	Down 4 My Niggas
596	snoopdogg	DP Gangsta
876	snoopdogg	Slow Down
..
590	snoopdogg	Drop It Like It's Hot
398	snoopdogg	Rise To The Top
886	snoopdogg	Pure Gold
472	snoopdogg	Praise Him
680	snoopdogg	Trash Bags

	lyric	Sentiment Score
469	[Mean Green] What's up y'all? It's the Mean-st...	-90
490	[Snoop Dogg:] We so controvincial, this dick i...	-71
687	[C-Murder] Fuck them niggas, ha ha. Fuck them...	-64
596	[Eddie Talking] This is a service public anno...	-64
876	Slow down cause I can't take the heat, slow do...	-54
..
590	Snoop, Snoop [Snoop Dogg:] When the pimp's in...	53
398	Woo I'm tryna pull up to he coast line and Ask...	53
886	Though we are tried like silver in the fire We...	56
472	I said I woke up early this morning I'm nowher...	62
680	[Female Voice:] You gotta come to freak girls ...	65

[543 rows x 4 columns]

```
[91]: print('Eminem Average Semantics : {:.2f}'.
        ↳format(lyrics[lyrics['artist']=='eminem']['Sentiment Score'].mean()))
print('SnoopDogg Average Semantics : {:.2f}'.
        ↳format(lyrics[lyrics['artist']=='snoopdogg']['Sentiment Score'].mean()))
```

```
Eminem Average Semantics : -10.05
SnoopDogg Average Semantics : 1.28
```

1.3.1 Questions

Q: Overall, which artist has the higher average sentiment per song?

A: Based on the analysis, SnoppDogg has higher though the number is still quite close to 0 (only a bit above 1). Meanwhile, Eminem's avg sentiment is -10 which is farther away from 0 (neutral).

Q: For your first artist, what songs have the highest and lowest sentiments? Print those songs to the screen.

```
[95]: # Eminem's highest

eminem_highest = lyrics[(lyrics['artist']=='eminem') & (lyrics['Sentiment_
↳Score']==lyrics[lyrics['artist']=='eminem']['Sentiment Score'].max())]
display(eminem_highest)

eminem_highest['lyric'].item()
```

```

      artist      title      lyric \
263  eminem  Superman  You high, baby? Yeah Ya Talk to me You want me...
```

```

      Sentiment Score
263                71
```

```
[95]: 'You high, baby? Yeah Ya Talk to me You want me to tell you something? Uh-huh I
know what you wanna hear \'Cause I know you want me baby I think I want you too
"I think I love you baby" I think I love you too I\'m here to save you girl Come
be in Shady\'s world I wanna grow together Let\'s let our love unfurl You know
you want me baby You know I want you too They call me Superman I\'m here to
rescue you I wanna save you girl Come be in Shady\'s world "Ooh boy you drive me
crazy" Bitch you make me hurl They call me Superman Leap tall hoes in a single
bound I\'m single now Got no ring on this finger now I\'d never let another
chick bring me down In a relationship Save it bitch, babysit You make me sick
Superman ain\'t savin\' shit Girl you can jump on Shady\'s dick Straight from
the hip, cut to the chase I tell a motherfuckin\' slut to her face Play no
games, say no names Ever since I broke up with what\'s-her-face I\'m a different
man, kiss my ass Kiss my lips, bitch why ask? Kiss my dick, get my cash I\'d
rather have you whip my ass Don\'t put out, I\'ll put you out Won\'t get out,
I\'ll push you out Puss blew out, poppin\' shit Wouldn\'t piss on fire to put
you out Am I too nice? Buy you ice Bitch if you died, wouldn\'t buy you life
```


What you tryin\' to be? My new wife? What you Mariah, fly through twice But I do know one thing though Bitches, they come they go Saturday through Sunday, Monday Monday through Sunday yo Maybe I\'ll love you one day Maybe we\'ll someday grow \'Til then just sit your drunk ass on that fuckin\' runway ho \'Cause I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Your Superman, your Superman Don\'t get me wrong, I love these hoes It\'s no secret, everybody knows Yeah we fucked, bitch so what? That\'s about as far as your buddy goes We\'ll be friends, I\'ll call you again I\'ll chase you around every bar you attend Never know what kinda car I\'ll be in We\'ll see how much you\'ll be partying then You don\'t want that, neither do I I don\'t wanna flip when I see you with guys Too much pride between you and I Not a jealous man, but females lie But I guess that\'s just what sluts do How could it ever be just us two I\'d never love you enough to trust you We just met and I just fucked you But I do know one thing though Bitches, they come they go Saturday through Sunday, Monday Monday through Sunday yo Maybe I\'ll love you one day Maybe we\'ll someday grow \'Til then just sit your drunk ass on that fuckin\' runway ho \'Cause I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Your Superman, your Superman \'Cause I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Your Superman, your Superman \'Cause I know you want me baby I think I want you too "I think I love you baby" I think I love you too I\'m here to save you girl Come be in Shady\'s world I wanna grow together Let\'s let our love unfurl You know you want me baby You know I want you too They call me Superman I\'m here to rescue you I wanna save you girl Come be in Shady\'s world "Ooh boy you drive me crazy" Bitch you make me hurl First thing you say "I\'m not fazed, I hang around big stars all day I don\'t see what the big deal is anyway You\'re just plain old Marshall to me" Ooh yeah girl run that game "Hailie Jade, I love that name Love that tattoo, what\'s that say?" "Rot in pieces, uh, that\'s great" First off you don\'t know Marshall At all so don\'t grow partial That\'s ammo for my arsenal I\'ll slap you off that bar stool There goes another lawsuit Leave hand prints all across you Good Lordy whoadie You must be gone off that water bottle You want what you can\'t have Ooh girl that\'s too damn bad Don\'t touch what you can\'t grab End up with two backhands Put anthrax on a Tampax, and slap you \'til you can\'t stand Girl you just blew your chance Don\'t mean to ruin your plans But I do know one thing though Bitches, they come they go Saturday through Sunday, Monday Monday through Sunday yo Maybe I\'ll love you one day Maybe we\'ll someday grow \'Til then just sit your drunk ass on that fuckin\' runway ho \'Cause I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Your Superman, your Superman \'Cause I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Your Superman, your Superman \'Cause I know you want me baby I think I want you too "I think I love you baby" I think I

love you too I\'m here to save you girl Come be in Shady\'s world I wanna grow together Let\'s let our love unfurl You know you want me baby You know I want you too They call me Superman I\'m here to rescue you I wanna save you girl Come be in Shady\'s world "Ooh boy you drive me crazy" Bitch you make me hurl \'Cause I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Your Superman, your Superman \'Cause I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Can\'t be your Superman I can\'t be your Superman Can\'t be your Superman Can\'t be your Superman Your Superman, your Superman'

[102]: # *Eminem's highest*

```
eminem_lowest = lyrics[(lyrics['artist']=='eminem') & (lyrics['Sentiment_
↳Score']==lyrics[lyrics['artist']=='eminem']['Sentiment Score'].min())]
display(eminem_lowest)

eminem_lowest['lyric'].item()
```

	artist	title	lyric \
354	eminem	Shit On You	I'll shit on you Da da, da da, da da I'll shit...

	Sentiment Score
354	-114

[102]: 'I\'ll shit on you Da da, da da, da da I\'ll shit on you Da da, da da, da da I\'ll shit on you Da da, da da, da da I\'ll shit on you I will shit on you I\'ll shit on you Girl you know it\'s true I\'ll shit on you Bitch or man I\'ll shit on you I will shit on you I remain fatter than gluttony Taping bombs to the back of record companies Blow them up if they ain\'t want me The National Guard, they scared to hunt me I love beef; I got you hoes ducking me A drug thief, bitch I\'ll take your marijuana These slugs with keep your ass away from my corner I drown niggas in hundred degree saunas You can act a fool if you wanna (bitch) It\'s this lyrical piranha Strapped with a grenade, in the pool with your mama Attack her by the legs then I pull her to the bottom Twist nothing up like a condom Slap it if you fuckers got a problem When I see them, you hoes ending up in a fuckin\' mausoleum Or hidden in the trunk of a black and gold BM Pull in the garage while you screaming Keep the motor on then I\'m leaving (I\'ll shit on you!) I\'ll shit on you! I will shit on you I don\'t care who you are (I\'ll shit on you!) I don\'t give a fuck about you or your car (I\'ll shit on you!) Fuck your house, fuck your jewelry and fuck your watch (I\'ll shit on you!) Fuck your wife, fuck your kids, fuck your family (I\'ll shit on you!) I\'m a alcoholic with the fucking toilet Pass the hot dogs (Bizarre aren\'t you Islamic?) Bitch shut your fucking mouth I\'m a keep eating \'til Richard Simmons comes to my house With a chain saw to cut me out My fuckin\' wife I haven\'t had sex since I met her I\'m to busy fucking, your 12 year old baby sitter And all women ain\'t shit Only good for cooking, cleaning And sucking dick and that\'s it (I said it) I was

responsible for killing John Candy I got Jonbenet Ramsey in my Ninety Eight
Camry I don't give a fuck who you are I'll shit on anybody Truly yours the
idiotic Bizarre My adolescent years weren't shit 'til what I do now I never
grew up I was born grown, and grew down The older I get, the dumber the shit, I
get in The more ignorant, the incident, is I fit in Ignoring the shit how boring
it gets When there's no one to hit I don't know when to quit throwing a fit I
know I'm a bit flaky but they make me It's they who raised me and say the can
take me Come on It's they who legs I brake and make achy It's they who mistake
me and make me so angry (I'll shit on you!) I'll spit on you Start pissing and
do the opposite on you You weren't listening, I said I'll cop a squat on you
Start spilling my guts like chicken cordon blew and Straight shit like Notorious
B.I.G. did to that bitch On his skit on his last album Pull my pants down and
(I'll shit on you!) I will shit on you I don't care who you are (I'll shit
on you!) I don't give a fuck about you or your car (I'll shit on you!) Fuck
your house, fuck your jewelry and fuck your watch (I'll shit on you!) Fuck your
wife, fuck your kids, fuck your family (I'll shit on you!) Is Richard Pryor
still alive? If not I'm sicker than he was prior to him dying (what?) Born
brainless, this steel ain't stainless Your bloodstains are all over this steel
God dang-it Bitch bring it, these niggas that I hang with Will hang you up naked
by your ankles dangling Come on My need I stay strangling I don't need your
help If you gon' give me the pussy I'll un-loosen my belt (I'll shit on you!)
I'll punch your daddy not, your mom's kinda cock Your sister tends court, your
aunt supply her rocks Buck fifty cross your neck Floss your teck, I'll beat you
with it across your chest Yo, it's only right I jack your car keys and run
Spent all of my advancements on weed and guns For fun, when I'm drunk I'll run
a truck through the weed house Jump out and beat your peeps down worst than
Steve Stout Put you in chokeholds I learned last week From the police man who
caught me stealing weed from his jeep (Hey, hey, hey!) I see hoes biting, y'all
don't wanna brawl That's like D-Bo fighting Peablo Bryson (I'll shit on you)
So what you hollering and yelling about I'll reach in your mouth and pull your
fucking skeleton out Niggas get hit with a two piece, "Bling Bling" With a
poisonous sting I'm such a violent thing I will shit on you I don't care who
you are (I'll shit on you!) I don't give a fuck about you or your car (I'll
shit on you!) Fuck your house, fuck your jewelry and fuck your watch (I'll shit
on you!) Fuck your wife, fuck your kids, fuck your family (I'll shit on you!)
Once I get on two, hits of X My disk slips and disconnects 'Til I walk around
this bitch with a twisted neck But still shit on the first bitch who disrespects
(C'mon, I'll shit on you!) Over reaction is my only reaction Which only sets
off a chain reaction And puts five more zainiac than maniacs in action A rat
pack in black jackets who pack ten Nine millimeters, five criminals pulling
heaters And spilling liters of blood like swimming pools Shiesty individuals
shoot at bitches too A lot of people say misogynistic which is true I don't
deny it matter of fact I stand by it So please stand by it before we start up a
damn riot If you don't wanna get stampeded then stand quiet Boy girl dog woman
man child (I'll shit on you!) I will shit on you I don't care who you are
(I'll shit on you!) I don't give a fuck about you or your car (I'll shit on
you!) Fuck your house, fuck your jewelry and fuck your watch (I'll shit on

you!) I will fuck your wife if you fuck with me (I'll shit on you!) You heard me, bitch (I'll shit on you!) D12 (I'll shit on you!) You life, your wife, your kids, your car (I'll shit on you!) Your house, your spouse, your rings, your things (I'll shit on you!) (I'll shit on you!) (I'll shit on you!)

A: Highest is Superman with the score of 71 while the lowest is Shit On You with the score of -114

Q: For your second artist, what songs have the highest and lowest sentiments? Print those songs to the screen.

```
[104]: # Snoopdogg's highest

snoopdogg_highest = lyrics[(lyrics['artist']=='snoopdogg') & (lyrics['Sentiment_
↳Score']==lyrics[lyrics['artist']=='snoopdogg']['Sentiment Score'].max())]
display(snoopdogg_highest)

snoopdogg_highest['lyric'].item()
```

	artist	title	lyric \
680	snoopdogg	Trash Bags	[Female Voice:] You gotta come to freak girls ...

	Sentiment Score
680	65

```
[104]: '[Female Voice:] You gotta come to freak girls right now It\'s poppin\ ', like,
niggas is throwing money left to right I say you bring that bag Music Major [K
Camp (Snoop Dogg):] Trash bag, full of cash, full of cash Count that Trash bag,
full of cash, full of cash Count that Count that up, count that up, count that
up Count that Trash bag, full of cash, full of cash Count that (Twenties), count
that (Hundreds), count that (Dollars), count that (Money), count that (Paper)
Trash bag, full of cash, full of cash Count that [Snoop Dogg:] Passion, Angy,
Keshia, Brandy Tangy, paradise, obsession and candy Lily, butterfly What are
you, what am I? Bella, Lauren, Linda Rose On the stage, on the pole Oceanate,
Pina Colada At the top, on the bottom Ace of diamonds, keep \'em shinin\' Crazy
girls oh yeah we got \'em Daisy it\'s crazy, and so as the home gon\' red Don\'t
fuck around when it come around to pickin\' up that bread It\'s yours [K Camp
(Snoop Dogg):] Trash bag, full of cash, full of cash Count that Trash bag, full
of cash, full of cash Count that Count that up, count that up, count that up
Count that Trash bag, full of cash, full of cash Count that (Twenties), count
that Hundreds), count that (Dollars), count that (Money), count that (Paper)
Trash bag, full of cash, full of cash Count that [Snoop Dogg:] Peaches and
Desiree, baby girl that\'s from the A KeKe and Showtime, there\'s no time like
today Champagne, Tyra, Coco and Chocolate Stina and Devina, I\'m lovin\' how
ya\'ll poppin\' it XO, Hennessy, PatrÃ³n and lime after Baby say, "roll the J",
tangerine with pineapple Daisy it\'s crazy, and so as the home gon\' red Don\'t
fuck around when it come around to pickin\' up that bread It\'s yours [K Camp:]
Trash bag, full of cash, full of cash Count that Trash bag, full of cash, full
```

of cash Count that Count that up, count that up, count that up Count that Trash bag, full of cash, full of cash Count that Count that, count that, count that, count that Trash bag, full of cash, full of cash Count that'

[105]: # Snoopdogg's lowest

```
snoopdogg_lowest = lyrics[(lyrics['artist']=='snoopdogg') & (lyrics['Sentiment_
↳Score']==lyrics[lyrics['artist']=='snoopdogg']['Sentiment Score'].min())]
display(snoopdogg_lowest)

snoopdogg_lowest['lyric'].item()
```

```
artist          title \
469 snoopdogg Back Up Off Me
```

```
lyric Sentiment Score
469 [Mean Green] What's up y'all? It's the Mean-st... -90
```

[105]: '[Mean Green] What\'s up y\'all? It\'s the Mean-ster Green-ster THIS should be played in residential neighborhoods clubs, cars, at high volume Get (?) wodies, at high volume [Master P - over Mean Green] UNNNNNGHHH! Where all my No Limit Soldiers at? WHAT? WHAT? WHAT? WHAT? Where y\'all at? WHAT? WHAT? WHAT? WHAT? (Throw \'em up, throw \'em up, throw \'em up) WHAT? WHAT? WHAT? WHAT? (Get \'em up, get \'em up, get \'em up) [Chorus 2X: Master P] I\'m a Down South nigga so FUCK Y\'ALL NIGGAZ I\'m a West coast nigga so FUCK Y\'ALL NIGGAZ I\'m a East coast nigga so FUCK Y\'ALL NIGGAZ I\'m a Midwest nigga so FUCK Y\'ALL NIGGAZ [Master P] Rented gat in his ride, wodie throw \'em up high We some No Limit Soldiers \'til the day that we die And everybody in my click be rowdy (UNNNNNGHHH) (?) boot up, or shut up, or get routed! I\'m from the streets and I hang with killers I make music by the ghetto for the thugs and killers Wodie respect my hood, screamin C-P-3 Nigga and Magic and Snoop, over there with me Cause I\'m a Uptown nigga so FUCK Y\'ALL NIGGAZ If we got problems we gon\' bust them triggers Throw them thangs boy, like Sugar Shane Mosley Shake them haters, cause y\'all can\'t hold me [Chorus] [Mr. Magic] Get bucked up, nigga tear da club up If you ain\'t bout gettin rowdy then back the FUCK UP Y\'all, know when I\'m comin you hear the chopper go BLAKA BLAKA I came to tear the ROOF off this motherfucker The hyper y\'all get the harder I spit (WHOOO!) And won\'t stop until they start a fight in this bitch! When I touch the mic I set the bitch on fire Who say they harder? They a motherfuckin LIAR! I touch the stage the crowd go crazy (AHHH!) The Devil raised me, you motherfuckers can\'t fade me Mr. 9th Ward, better respect this I keep my head in the air because I know I\'m the shit! [Chorus] [Snoop Dogg] B-O-U-T bout it (bout it) Tear this motherfuckin club up, nigga get rowdy Big Snoop D-O-double-G in this sonuvabitch (beitch) Gotcha runnin cause I\'m comin with that South shit Close your mouth BITCH, DoggHouse BITCH Whatchu thought motherfucker? We gon\' stay rich Well, the sayin goes, we slangin hoes while y\'all be payin hoes, we G\'d up and we pushin these pony-ups And the heat goes where the homie goes and the homie knows No Limit and DoggHouse keep it crack-a-lackin Mackin actin, rip-rackin, gun clappin and chip

stackin [Chorus - 1/2] [Magic] Back up off me! [M.P.] Bitch, get off me!
[Magic] Better back up off me! [M.P.] Bitch, get off me! [Magic] Better back up
off me! [M.P.] Bitch, get off me! [Magic] Better back up off me! [M.P.] Bitch,
get off me! [Magic] Better back up off me! [M.P.] Bitch, get off me! [Magic]
Better back up off me! [M.P.] Bitch, get off me! [Magic] Better back up off me!
[M.P.] Bitch, get off me! [Magic] Better back up off me! [M.P.] Bitch, get off
me! [M.P.] I\'m a 3rd Ward nigga so FUCK Y\'ALL NIGGAZ [Magic] I\'m a 9th Ward
nigga so FUCK Y\'ALL NIGGAZ [Snoop] I\'m a Long Beach nigga so FUCK Y\'ALL
NIGGAZ [M.P.] I\'m a No Limit nigga so FUCK Y\'ALL NIGGAZ [Master P] Shake them
haters off, shake them haters off Shake them haters off, shake them haters off
Shake them haters off, shake them haters off Now which one of y\'all
motherfuckers (??) BACK THE FUCK UP!! Shake them haters off, shake them haters
off Shake them haters off, shake them haters off Shake them haters off, shake
them haters off Shake them haters off, shake them haters off Shake them haters
off, shake them haters off Fuck the world nigga, haha (BEOTCH) We back wodie! No
Limit! Snoop! (WOOF WOOF) P! And Magic So what I want y\'all to do right now
BOUNCE! (Shake them haters shake them haters shake them haters off) Motherfucker
[Snoop] Shake them haters off, shake them haters off Shake them haters off,
shake them haters off Shake them haters off, shake them haters off Shake them
haters off, shake them haters off Shake them haters off, shake them haters off
Shake them haters off, shake them haters off Shake them haters off, shake them
haters off Shake them haters off, shake them haters off Shake them haters off,
shake them haters off [Master P] Yo Snoop, it\'s your country uncle Master P
man The black Tony Montana, I wanna tell you Thank you for ery\'thing you did
for No Limit We won the fuckin war together We can do what we wanna do after
this It ain\'t No Limit Snoop, you been good to me Now it\'s time for me to be
good to you I\'m bout to give you your own blocks wodie You do what you wanna do
Bring \'em in, we get the kilos from the South to the West We ship \'em, give it
to the world Sell it to the fuckin record stores! Tell the fuckin haters to shut
up! Cause it still ain\'t No Limit I know they thought this was "Tha Last Meal"
but they don\'t realize it ain\'t the last deal Snoopy It\'s me and you baby,
let\'s toast to success! DoggHouse, No Limit, to the fuckin world man! "Last
Meal" on that puta, you fuckin cockroaches!"

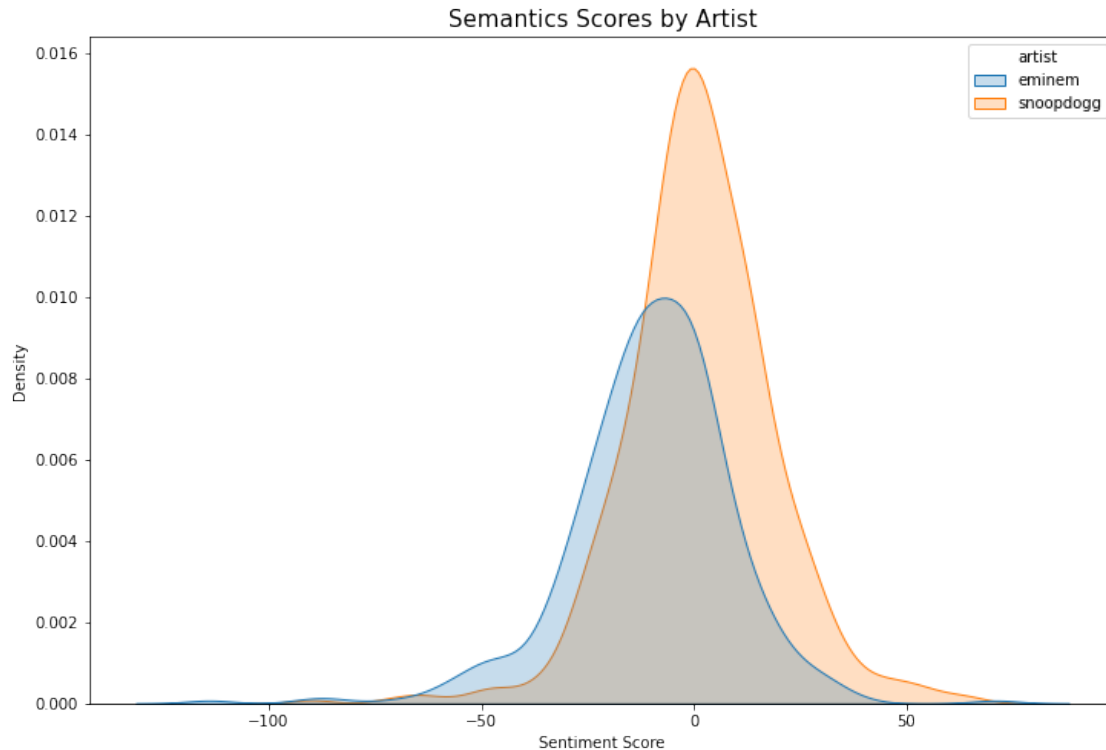
A: Highest is Trash Bags with the score of 65 while the lowest is Back Up Off Me with the score of -90

Q: Plot the distributions of the sentiment scores for both artists. You can use `seaborn` to plot densities or plot histograms in `matplotlib`.

```
[128]: fig, ax = plt.subplots(1, 1, figsize=(12, 8))

sns.kdeplot(x='Sentiment Score', data=lyrics, hue='artist', fill=True)
ax.set_title("Semantics Scores by Artist", size=15)

plt.show();
```



1.4 Sentiment Analysis on Twitter Descriptions

In this section, define two sets of emojis you designate as positive and negative. Make sure to have at least 10 emojis per set. You can learn about the most popular emojis on Twitter at [the emoji tracker](#).

Associate your positive emojis with a score of +1, negative with -1. Score the average sentiment of your two artists based on the Twitter descriptions of their followers. The average sentiment can just be the total score divided by number of followers.

```
[179]: twitter.fillna('', inplace=True)
```

```
[180]: positive_emojis = ['\U0001F602', '\U0001F4AF', '\U0001F60D', '\U0001F61D',
↪ '\U0001F60A',
                        '\U0001F618', '\U0001F601', '\U0001F607', '\U0001F604',
↪ '\U0001F609']

negative_emojis = ['\U0001F62D', '\U0001F614', '\U0001F629', '\U0001F612',
↪ '\U0001F622',
                  '\U0001F61E', '\U0001F615', '\U0001F62B', '\U0001F620',
↪ '\U0001F494']
```

```
[181]: def analyze_sentiment(txt):

    txt = txt.lower()
    score = 0

    for word in txt.strip().split(' '):

        word = word.strip()

        # Include emojis as well

        if word in scores['positive'] or word in positive_emojis:
            score += 1

        elif word in scores['negative'] or word in negative_emojis:
            score -= 1

    return score
```

Q: What is the average sentiment of your two artists?

A:

```
[182]: twitter['Sentiment Score'] = twitter.apply(lambda x:
    ↪analyze_sentiment(x['description']), axis=1)
twitter.groupby('artist').mean()[['Sentiment Score']]
```

```
[182]:          Sentiment Score
artist
eminem          0.190891
snoopdogg       0.254376
```

Q: Which positive emoji is the most popular for each artist? Which negative emoji?

```
[184]: eminem_tweets = twitter[twitter['artist']=='eminem']
snoopdogg_tweets = twitter[twitter['artist']=='snoopdogg']

eminem_tweets.shape, snoopdogg_tweets.shape
```

```
[184]: ((59898, 9), (59876, 9))
```

```
[217]: emojis_counts = pd.DataFrame()

# Eminem's
for p in positive_emojis:

    emojis_counts = pd.concat([emojis_counts, pd.DataFrame({
```



```

        'artist':'eminem',
        'emoji':p,
        'sentiment':'positive',
        'count':eminem_tweets['description'].str.count(p).sum()
    }, index=[0])), ignore_index=True)

for p in negative_emojis:

    emojis_counts = pd.concat([emojis_counts, pd.DataFrame({
        'artist':'eminem',
        'emoji':p,
        'sentiment':'negative',
        'count':eminem_tweets['description'].str.count(p).sum()
    }, index=[0])), ignore_index=True)

# Snoopdogg's
for p in positive_emojis:

    emojis_counts = pd.concat([emojis_counts, pd.DataFrame({
        'artist':'snoopdogg',
        'emoji':p,
        'sentiment':'positive',
        'count':snoopdogg_tweets['description'].str.count(p).sum()
    }, index=[0])), ignore_index=True)

for p in negative_emojis:

    emojis_counts = pd.concat([emojis_counts, pd.DataFrame({
        'artist':'snoopdogg',
        'emoji':p,
        'sentiment':'negative',
        'count':snoopdogg_tweets['description'].str.count(p).sum()
    }, index=[0])), ignore_index=True)

```

```

[218]: emojis_counts.sort_values('count', ascending=False).groupby(['artist', 'sentiment']).head(1)

```

```

[218]:
   artist emoji sentiment  count
21  snoopdogg      positive    466
1    eminem      positive    405
39  snoopdogg      negative     98
19    eminem      negative     80

```

A: As it can be seen, they both have the same emojis for both positive and negative sentiments though the counts are slightly different.