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.

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.*

```python
In [ ]:  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")
```

```python
In [ ]:  # Add any additional import statements you need here
```

```
from nltk.tokenize import word_tokenize
import zipfile
```

In [81]:
```
import os

zip_path = "M1 Assignment Data.zip"
extract_to = "folder"

with zipfile.ZipFile(zip_path, 'r') as zip_ref:
    zip_ref.extractall(extract_to)
```

In [82]:
```
# change `data_location` to the location of the folder on your machine.
data_location = "/content/folder/M1 Results/"

# These subfolders should still work if you correctly stored the
# data from the Module 1 assignment
twitter_path = os.path.join(data_location, "twitter")
lyrics_path = os.path.join(data_location, "lyrics")

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

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.

In [83]:
```
# Read in the lyrics data
lyrics_data = {}

for artist in os.listdir(lyrics_path):
    artist_path = os.path.join(lyrics_path, artist)
    if os.path.isdir(artist_path):
        lyrics_data[artist] = {}
        for song_file in os.listdir(artist_path):
            if song_file.endswith(".txt"):
                with open(os.path.join(artist_path, song_file), 'r', encodir
                    content = f.read()
                song_title = song_file.replace(".txt", "")
                lyrics_data[artist][song_title] = content
```

In [84]:
```
# Read in the twitter data
twitter_data = {}
```

```python
for file in os.listdir(twitter_path):
    if file.endswith("_followers_data.txt"):
        artist = file.split("_")[0]
        path = os.path.join(twitter_path, file)

        # Read TSV, skipping any bad rows
        df = pd.read_csv(path, sep="\t", encoding='utf-8', on_bad_lines='ski

        # Extract non-empty descriptions
        descriptions = df['description'].dropna()
        descriptions = [desc for desc in descriptions if isinstance(desc, st

        twitter_data[artist] = descriptions
```

In [87]:
```python
# 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.
word_dict = {}

with open(positive_words_file, 'r', encoding='utf-8') as f:
    for line in f:
        word = line.strip()
        if word and not word.startswith(";"):
            word_dict[word] = 1

with open(negative_words_file, 'r', encoding='utf-8') as f:
    for line in f:
        word = line.strip()
        if word and not word.startswith(";"):
            word_dict[word] = -1

tidy_df = pd.read_csv(tidy_text_file, sep="\t", header=0)
for _, row in tidy_df.iterrows():
    word = row["word"]
    sentiment = row["sentiment"]
    word_dict[word] = 1 if sentiment == "positive" else -1
```

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.

In [90]:
```python
def bing_liu_score(text):
    sentiment_score = 0
    words = word_tokenize(text.lower())
    for word in words:
```

```
            if word in word_dict:
                sentiment_score += word_dict[word]
        return sentiment_score

song_sentiment_scores = []

for artist, songs in lyrics_data.items():
    for song, text in songs.items():
        score = bing_liu_score(text)
        song_sentiment_scores.append({
            "artist": artist,
            "song": song,
            "sentiment_score": score
        })

# Create DataFrame
sentiment_df = pd.DataFrame(song_sentiment_scores)
sentiment_df.head()
```

Out[90]:

	artist	song	sentiment_score
0	robyn	robyn_healthylove	26
1	robyn	robyn_humanbeing	2
2	robyn	robyn_fembot114519	11
3	robyn	robyn_konichiwabitches	7
4	robyn	robyn_gottoworkitout	17

```
In [91]:  artist_names = sentiment_df['artist'].unique().tolist()
          artist_1, artist_2 = artist_names[0], artist_names[1]

          avg_sentiments = sentiment_df.groupby('artist')['sentiment_score'].mean()
          print(avg_sentiments)
```

```
artist
cher      6.772152
robyn     9.105769
Name: sentiment_score, dtype: float64
```

```
In [99]:  # Filter
          artist1_df = sentiment_df[sentiment_df['artist'] == artist_1]

          # Top and bottom 3 songs
          top3_artist1 = artist1_df.sort_values('sentiment_score', ascending=False).he
          bottom3_artist1 = artist1_df.sort_values('sentiment_score').head(4)

          # Print lyrics
          print(f"\nTop 3 songs for {artist_1}:")
          for _, row in top3_artist1.iterrows():
              print(f"\n--- {row['song']} ---")
              print(lyrics_data[artist_1][row['song']])

          print(f"\nBottom 3 songs for {artist_1}:")
```

```python
for _, row in bottom3_artist1.iterrows():
    print(f"\n--- {row['song']} ---")
    print(lyrics_data[artist_1][row['song']])
```

```python
for _, row in bottom3_artist1.iterrows():
```

Top 3 songs for robyn:

--- robyn_loveisfree ---
"Love Is Free"

Free
Love is free, baby
Free
Love is free, baby
Boom boom boom boom boom chica boom
Let me give it to you, baby
Chica boom chica boom chica boom
Chica boom chica boom chica boom
Free
Love is free, baby
Free
Love is free, baby
Boom boom boom boom boom chica boom
Let me give it to you, baby

I'ma give it to you, baby
I'ma give it when I'm ready
Some lose, some steady
Some light, some heavy
It's all over this city
Sometimes in the ugly, sometimes in the pretty
You never know where you get it cause you can't control it and you can't unf
old it, slow down

I'ma give it to you, baby
I'ma give it when I'm ready
Some lose, some steady
Some light, some heavy
It's all over this city
Sometimes in the ugly, sometimes in the pretty
You never know where you get it cause you can't control it and you can't unf
old it, slow down

Free
Love is free, baby
Free
Love is free, baby
Boom boom boom boom boom chica boom
Let me give it to you, baby
Yeah! Yeah! Yeah! Yeah!
Love is free, baby
Love is free, baby

I'ma give it to you, baby
I'ma give it like a motha
Safe like a rubber
Mutter like a stutter
It's all over this city
Sometimes in the nitty, sometimes in the gritty

You know I'ma give it to you better
I'ma give you love forever
No, you can't control it, slow down

I'ma give it to you, baby
I'ma give it like a motha
Safe like a rubber
Mutter like a stutter
It's all over this city
Sometimes in the nitty, sometimes in the gritty
You know I'ma give it to you better
I'ma give you love forever
No, you can't control it, slow down

Free
Love is free, baby
Free
Love is free, baby
Boom boom boom boom boom chica boom
Let me give it to you, baby
Boom boom boom boom boom
Chica boom chica boom chica boom
Boom boom boom boom boom
Chica boom chica boom chica boom
Free
Love is free, baby
Free
Love is free, baby

Apréndelo, apréndelo
Te lo digo right now, sólo entiéndelo
Apréndelo, apréndelo
Te lo digo right now, sólo entiéndelo
Slow down

Apréndelo, apréndelo
Te lo digo right now, sólo entiéndelo
Apréndelo, apréndelo
Te lo digo right now, sólo entiéndelo
Slow down

I'ma give it to you, baby
I'ma give it when I'm ready
Some lose, some steady
Some light, some heavy
It's all over this city
Sometimes in the ugly, sometimes in the pretty
You never know where you get it cause you can't control it and you can't unf
old it, slow down

Slow down [x6]
Free
Love is free, baby
Love is free, baby
So free [x4]
You know

Love is free
So free
Free â€ Love is free, baby [x8]
So free

--- robyn_wedancetothebeat ---
"We Dance To The Beat"

We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat

We dance to the beat of the continents shifting under our feet
We dance to the beat
We dance to the beat
We dance to the beat of a new, better, faster breed
We dance to the beat
We dance to the beat
We dance to the beat of radioactivity blocking the exits
We dance to the beat
We dance to the beat
We dance to the beat of false math and unrecognised genius
We dance to the beat
We dance to the beat
We dance to the beat of distorted knowledge passed on
We dance to the beat
We dance to the beat
We dance to the beat of a distant rumble
We dance to the beat
We dancing
And it's loud and proud
And it's loud and proud
And it's loud and proud

We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat

We dance to the beat of silent mutation

We dance to the beat of your brain not evolving fast enough
We dance to the beat of raw talent wasted
We dance to the beat of bad kissers clicking teeth
We dance to the beat of opportunity knocking
We dance to the beat of an eviction next door
We dance to the beat
We dance to the beat
Of another recycled rebellion
Of consolidating assets
Of another crowd losing it
Of your voice breaking up in static
Of suburbia burning
Of communication gone mad
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat

And we don't stop
And we don't stop
And we don't stop
And we don't stop
And we don't stop

We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
And we don't stop
And we don't stop

We dance to the beat of a billion charges of endorphin
We dance to the beat
We dance to the beat
We dance to the beat of a love lost and then won back
We dance to the beat
We dance to the beat of source code and conjuring
We dance to the beat
We dance to the beat
We dance to the beat of gravity giving us a break
We dance to the beat
We dance to the beat
We dance to the beat
We dance...

--- robyn_wedancetothebeat114528 ---
"We Dance To The Beat"

We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat

```
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat

We dance to the beat of the continents shifting under our feet
We dance to the beat
We dance to the beat
We dance to the beat of a new, better, faster breed
We dance to the beat
We dance to the beat
We dance to the beat of radioactivity blocking the exits
We dance to the beat
We dance to the beat
We dance to the beat of false math and unrecognised genius
We dance to the beat
We dance to the beat
We dance to the beat of distorted knowledge passed on
We dance to the beat
We dance to the beat
We dance to the beat of a distant rumble
We dance to the beat
We dancing
And it's loud and proud
And it's loud and proud
And it's loud and proud

We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat

We dance to the beat of silent mutation
We dance to the beat of your brain not evolving fast enough
We dance to the beat of raw talent wasted
We dance to the beat of bad kissers clicking teeth
We dance to the beat of opportunity knocking
We dance to the beat of an eviction next door
We dance to the beat
We dance to the beat
Of another recycled rebellion
Of consolidating assets
Of another crowd losing it
Of your voice breaking up in static
Of suburbia burning
Of communication gone mad
We dance to the beat
We dance to the beat
```

```
We dance to the beat
We dance to the beat

And we don't stop
And we don't stop
And we don't stop
And we don't stop
And we don't stop

We dance to the beat
We dance to the beat
We dance to the beat
We dance to the beat
And we don't stop
And we don't stop

We dance to the beat of a billion charges of endorphin
We dance to the beat
We dance to the beat
We dance to the beat of a love lost and then won back
We dance to the beat
We dance to the beat
We dance to the beat of source code and conjuring
We dance to the beat
We dance to the beat
We dance to the beat of gravity giving us a break
We dance to the beat
We dance to the beat
We dance to the beat
We dance...


--- robyn_betweenthelines ---
"Between The Lines"


Even reading in between the lines

Every day, you hit my phone up
Every time
(You hit my phone up)
It makes my heart jump
I want you to say it, baby
(It makes my heart jump)
Say it like you mean it
It's right there on the tip of your tongue
(You hit my phone up)
And I can feel it
And I like it baby
Don't you stop
(Don't stop what you're doing, baby)
You know I like it
You stretch it out
(You know I like it)
You give massages
```

It's not your words
(You know I like it)
It's what's in between them
There's no need to spell out
(It makes my heart jump)
I know you want it
And I like it baby

I'm reading in between the lines
I'm reading in between the lines
(You got me reading in between the lines)
I'm reading in between the lines
(Even reading in between the lines)
I'm reading in between the lines
(You got me reading in between the lines)
And I like it, baby
And I like it, baby
(Even reading in between the lines)

I don't mind
(i don't really mind it baby)
When we get silent
Pressure's rising, it's so intense
(When we get silent)
We're making diamonds
There's no need to say it baby
(We're making diamonds)
'Cause I can tell you mean it
All over the tip of your tongue
(We're making diamonds)
You got me spaced out
And I like it, baby

I'm reading in between the lines
I'm reading in between the lines
(You got me reading in between the lines)
I'm reading in between the lines
(Even reading in between the lines)
I'm reading in between the lines
(You got me reading in between the lines)
And I like it, baby
And I like it, baby
(Even reading in between the lines)

And I like it, baby
And I like it
And I like it, baby
And I like it
(Relax)
(That's amazing)
You got me reading in between the lines
(That shit's so good)
(Relax)
You got me reading in between the lines
(Amazing)

Bottom 3 songs for robyn:

--- robyn_dontfuckingtellmewhattodo114520 ---
"Don't Fucking Tell Me What To Do"

My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me

My smoking is killing me
My diet is killing me
My heels are killing me
My shopping's killing me
My ego is killing me
Can't sleep, it's killing me
My label's killing me
Kickdrum

My phone is killing me
My email is killing me
These hours are killing me
My tour is killing me
This flight is killing me
My manager's killing me
My mother's killing me
My landlord's killing me
My boss is killing me
The TV is killing me
Your nagging is killing me
My boyfriend's killing me
My talking's killing me
Killing me
Killing me

Can't sleep, it's killing me
My dreams are killing me
TV is killing me
My talking's killing me
Let go, you're killing me
Ease up, you're killing me
Calm down, you're killing me

My god, you're killing me

My drinking is killing me
My smoking is killing me
My head is killing me
My mind is killing me
My back is killing me
My neck is killing me
Your nagging is killing me
My gut is killing me
My PMS is killing me
My email is killing me
These hours are killing me
My tour is killing me
This flight is killing me
My manager's killing me
My mother's killing me
My landlord's killing me
My smoking is killing me
The TV is killing me
Your nagging is killing me
Ease up, you're killing me
Let go, you're killing me
Calm down, you're killing me
My god, you're killing me

Don't fucking tell me what to do, do
Don't fucking tell me what to do, do, do, do, do
Don't fucking tell me what to do
Don't fucking tell me what to do, do
Don't fucking tell me what to do, do
Don't fucking tell me what to do
Don't fucking tell me what to do
Don't fucking tell me what to do
Don't fucking tell me what to do

--- robyn_dontfuckingtellmewhattodo ---
"Don't Fucking Tell Me What To Do"

My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me
My drinking is killing me

My drinking is killing me

My smoking is killing me
My diet is killing me
My heels are killing me
My shopping's killing me
My ego is killing me
Can't sleep, it's killing me
My label's killing me
Kickdrum

My phone is killing me
My email is killing me
These hours are killing me
My tour is killing me
This flight is killing me
My manager's killing me
My mother's killing me
My landlord's killing me
My boss is killing me
The TV is killing me
Your nagging is killing me
My boyfriend's killing me
My talking's killing me
Killing me
Killing me

Can't sleep, it's killing me
My dreams are killing me
TV is killing me
My talking's killing me
Let go, you're killing me
Ease up, you're killing me
Calm down, you're killing me
My god, you're killing me

My drinking is killing me
My smoking is killing me
My head is killing me
My mind is killing me
My back is killing me
My neck is killing me
Your nagging is killing me
My gut is killing me
My PMS is killing me
My email is killing me
These hours are killing me
My tour is killing me
This flight is killing me
My manager's killing me
My mother's killing me
My landlord's killing me
My smoking is killing me
The TV is killing me
Your nagging is killing me
Ease up, you're killing me

Let go, you're killing me
Calm down, you're killing me
My god, you're killing me

Don't fucking tell me what to do, do
Don't fucking tell me what to do, do, do, do, do
Don't fucking tell me what to do
Don't fucking tell me what to do, do
Don't fucking tell me what to do, do
Don't fucking tell me what to do
Don't fucking tell me what to do
Don't fucking tell me what to do
Don't fucking tell me what to do

--- robyn_criminalintent ---
"Criminal Intent"

Somebody alert the authorities, I got criminal intent
Conspiracy to engage in lewd and indecent acts and events
I'mma wind it, grind it, oh my, I'mma say it again
Somebody alert the authorities, she's got criminal intent

Somebody alert the authorities, I got criminal intent
Conspiracy to engage in lewd and indecent acts and events
I'mma wind it, grind it, oh my, I'mma say it again
Somebody alert the authorities, she's got criminal intent

Somebody alert the authorities, I got criminal intent
Conspiracy to engage in lewd and indecent acts and events
I'mma wind it, grind it, oh my, I'mma say it again
Somebody alert the authorities, I got criminal intent

- Will the defendant please rise? State your full name for the record.
- Robyn
- Do you wish to say anything before the sentence is imposed?
- I do your Honor!

You know, from time to time
I need to get down
Unwind and just bump and grind
Get my shot on, have some fun
A little dirty never hurt anyone
I admit, I can get somewhat X-rated on the floor
But your Honor, how's that something you get incarcerated for?

I-I-I done nothing that's wrong
?? something that's frowned upon
I object most strongly Judge, they played my song

Somebody alert the authorities, I got criminal intent
Conspiracy to engage in lewd and indecent acts and events
I'mma wind it, grind it, oh my, I'mma say it again
Somebody alert the authorities, she's got criminal intent

Somebody alert the authorities, I got criminal intent
Conspiracy to engage in lewd and indecent acts and events
I'mma wind it, grind it, oh my, I'mma say it again
Somebody alert the authorities, I got criminal intent
Somebody alert the authorities, she's got criminal intent

Y-yo-yo Judge, may the record reflect the fact
I don't have any priors
Besides, would you pardon me
For being inappropriately attired?
But yo, listen, them cuffs down at county
Totally ripped up my pantyhose
And some snitch punk at legal aid
Stole my voucher for court clothes

I done nothing that's wrong
?? something that's frowned upon
I object most strongly Judge, they played my song

Somebody alert the authorities, I got criminal intent
Conspiracy to engage in lewd and indecent acts and events
I'mma wind it, grind it, oh my, I'mma say it again
Somebody alert the authorities, she's got criminal intent

Somebody alert the authorities, I got criminal intent
Conspiracy to engage in lewd and indecent acts and events
I'mma wind it, grind it, oh my, I'mma say it again
Somebody alert the authorities, I got criminal intent
Somebody alert the authorities, she's got criminal intent

--- robyn_lovekills ---
"Love Kills"

If you're looking for love
Get a heart made of steel 'cus you know that love kills
Don't go messing with love
It'll hurt you for real, don't you know that love kills

If you're looking for love
Get a heart made of steel 'cus you know that love kills
Don't go messing with love
It'll hurt you for real, don't you know that love kills

Protect yourself, 'cus you'll wreck yourself
In this cold, hard world, so check yourself
You conceal your dreams and you shield yourself
'Til that one kind soul reveals itself

Protect yourself, 'cus you'll wreck yourself
In this cold, hard world, so check yourself
You conceal your dreams and you shield yourself
'Til that one kind soul reveals itself

```
If you're looking for love
Get a heart made of steel 'cus you know that love kills
Don't go messing with love
It'll hurt you for real, don't you know that love kills

If you're looking for love
Get a heart made of steel 'cus you know that love kills
Don't go messing with love
It'll hurt you for real, don't you know that love kills

Mm, and I know when you're in to deep you still think of me, sometimes
Stockholm syndrome and misery, there's a penalty for love crimes

Protect yourself, 'cus you'll wreck yourself
In this cold, hard world, so check yourself
You conceal your dreams and you shield yourself
'Til that one kind soul reveals itself

Protect yourself, 'cus you'll wreck yourself
In this cold, hard world, so check yourself
You conceal your dreams and you shield yourself
'Til that one kind soul reveals itself

Protect yourself
So check yourself

Mm, and I know when you're in to deep, is to think of me, sometimes
Stockholm syndrome and misery, there's a penalty for love crimes

Protect yourself, 'cus you'll wreck yourself
In this cold, hard world, 'cus you know that love kills
You conceal your dreams and you shield yourself
In this cold, hard world, don't you know that love kills

Protect yourself, 'cus you'll wreck yourself
In this cold, hard world, 'cus you know that love kills
You conceal your dreams and you shield yourself
In this cold, hard world, don't you know that love kills

Protect yourself, 'cus you'll wreck yourself
In this cold, hard world, 'cus you know that love kills
You conceal your dreams and you shield yourself
In this cold, hard world, don't you know that love kills
```

```python
In [93]:   # Filter
           artist2_df = sentiment_df[sentiment_df['artist'] == artist_2]

           # Top and bottom 3 songs
           top3_artist2 = artist2_df.sort_values('sentiment_score', ascending=False).he
           bottom3_artist2 = artist2_df.sort_values('sentiment_score').head(3)

           # Print lyrics
           print(f"\nTop 3 songs for {artist_2}:")
           for _, row in top3_artist2.iterrows():
```

```python
        print(f"\n--- {row['song']} ---")
        print(lyrics_data[artist_2][row['song']])

print(f"\nBottom 3 songs for {artist_2}:")
for _, row in bottom3_artist2.iterrows():
        print(f"\n--- {row['song']} ---")
        print(lyrics_data[artist_2][row['song']])
```

Top 3 songs for cher:

--- cher_loveandunderstanding ---
"Love And Understanding"

Here, here in this world
Where do we go? Where can we turn?
When we need some love
It seems that love just can't be found
Where, where do we stand?
When love's supply don't meet love's demand

We got enough stars to light the sky at night
Enough sun to make to make the whole world bright
We got more than enough
But there's one thing there's just not enough of

Not enough love and understanding
We could use some love to ease these troubled times
Not enough love and understanding
Why, oh why?

Spend all of our time
Building buildings up to the sky
Reaching everywhere
But where we need to reach the most
Hearts never can win
Oh, in this race, this race that we're in

We've got enough cars to drive around the world
Enough planes to take us anywhere
We got more than enough
But there's one thing there's just not enough of

Not enough love and understanding
We could use some love to ease these troubled times
Not enough love and understanding
Why, oh why?

Not enough love and understanding
We could use some love to ease these troubled times
Not enough love and understanding
Why, oh why?

We need some understandin'
We need a little more love
Some love and understandin'

Enough stars to light the sky at night
Enough sun to make the whole world bright
Enough hearts to find some love inside
We got more than enough
But there's one thing there's just not enough of

Not enough love and understanding
We could use some love to ease these troubled times
Not enough love and understanding
Why, oh why?
...

--- cher_ifoundyoulove ---
"I Found You Love"

Well I was looking for a new love, a different kind of true love
Who's gonna treat me right, all day and night
Hey baby I've been looking too
And I have found there's
No other love from me but you
Well I was looking for a new love
A different kind of true love
Who's gonna treat me right
Day and night
Well I found what I was after
Now my life is filled with laughter
I found you love
I was lost with no direction
Then my life was one big question
I was down and out
Filled with doubt
Found what I was after
Now my life is filled with laughter
I found you love
I found you love
I found a new love
He's wonderful and true
He's gonna spent his money
He's gonna call me honey
I gonna tease her
Oh Lord, I gonna squeeze her
Gonna love her plenty
She's gonna make me manly
We're gonna hold love while we can
I've been looking for a new love
A different kind of true love
Who's gonna treat me right
Every day and every night
Now I found what I was after
Now my life is filled with laughter
I found you love
I found you love
I found a new love
He's wonderful and true
He's gonna spent his money
He's gonna call me honey
I gonna please her
Oh Lord, I gonna squeeze her
Gonna love me madly

I'm gonna love her gladly
We're gonna hold love while we can
We're gonna hold love while we can

--- cher_perfection ---
"Perfection"

Hush little Baby, gotta be strong
'Cause in this world we are born to fight
Be the best, prove them wrong
A winner's work is never done, reach the top, number one

Oh, perfection
You drive me crazy with perfection
I've worn my pride as my protection
Perfection, ohh

I was taught to be tough
That the best that you can be ain't enough
Crack the whip, sacrifice
But I found out paradise had a price

I didn't know it then, but oh I know it now
You gotta work as hard as love to make the love work out
You know this heart of mine has made some big mistakes
I guess that when it comes to love, I just don't know what I takes

All my life I've been driven by perfection
Pushed it to the limit every day and night
Ohh, I've been driven by perfection
But nothing's perfect when love ain't right
Nothing's perfect when the love ain't right

Gave it all, played my part
I gave everything I had but my heart
Worked so hard, made a name
But the loneliness inside stays the same

When love is here today, and then it's gone today
You got a list of lovers lookin' like a resume
You gotta take some time to make it something real
I guess that when it comes to love, I just don't know how to feel

All my life I've been driven by perfection
Pushed it to the limit every day and night
Ohh, I've been driven by perfection
But nothing's perfect when love ain't right
Nothing's perfect when the love ain't right

Oh, perfection
You drive me crazy with perfection
I've worn my pride as my protection
I'm goin' crazy with perfection

Ohh, I didn't know it then, but oh I know it now
You gotta work as hard as love to make the love work out
You know this heart of mine has made some big mistakes
I guess that when it comes to love, I just don't know what I takes

I've been driven by perfection
Pushed it to the limit every day and night
Ohh, I've been driven by perfection
But nothing's perfect when love ain't right

All my life I've been driven by perfection
Pushed it to the limit every day and night
Ohh, I've been driven by perfection
But nothing's perfect when love ain't right

All my life I've been driven by perfection
Pushed it to the limit every day and night
Ohh, I've been driven by perfection
But nothing's perfect when love ain't right

All my life I've been driven by perfection

Bottom 3 songs for cher:

--- cher_bangbang ---
"Bang-Bang"

Bang bang you shot me down
Bang bang I hit the ground
Bang bang that awful sound
Bang bang my baby shot me down

I was five and you were six
We rode on horses made of sticks
I wore black you wore white
You would always win the fight

Bang bang you shot me down
Bang bang I hit the ground
Bang bang that awful sound
Bang bang my baby shot me down

Seasons came and changed the time
I grew up I called you mine
You would always laugh and say
Remember when we used to play

Bang bang you shot me down
Bang bang and I hit the ground
Bang bang that awful sound
Bang bang my baby shot me down

Music played and people sang
Just for me the church bells rang
After echoes from a gun
We both vowed that we'd be one

Now you're gone I don't know why
Sometimes I cry
You didn't say goodbye
You didn't take the time to lie

Bang bang you shot me down
Bang bang I hit the ground
Bang bang that awful sound
Bang bang my baby shot me down

Bang bang you shot me right between my eyes
Bang bang you can't go paralyzed
Bang bang bang bang bang bang
Bang bang oh baby I'm laying on the ground
Bang bang I'll never come around

Bang bang
Bang bang
Oh baby
Bang bang
Oh baby come and wrap me
Bang bang
You see how sweet it's gonna be

Bang bang
Bang bang
Bang bang
Oh my baby my baby shot me down
Bang bang
I'm up on the ground now

--- cher_bangbangmybabyshotmedown ---
"Bang Bang (My Baby Shot Me Down)"

I was five and he was six
We rode on horses made of sticks
He wore black and I wore white
He would always win the fight

Bang bang, he shot me down
Bang bang, I hit the ground
Bang bang, that awful sound
Bang bang, my baby shot me down

Seasons came and changed the time
When I grew up I called him mine
He would always laugh and say
Remember when we used to play

Bang bang, I shot you down
Bang bang, you hit the ground
Bang bang, that awful sound
Bang bang, I used to shoot you down

Music played and people sang
Just for me the church bells rang

Now he's gone I don't know why
And 'til this day, sometimes I cry
He didn't even say goodbye
He didn't take the time to lie

Bang bang, he shot me down
Bang bang, I hit the ground
Bang bang, that awful sound
Bang bang, my baby shot me down

--- cher_outrageous ---
"Outrageous"

Outrageous, outrageous
(They say) I'm outrageous
It's the rage

I'm gonna wear what I will and spend some
And I will be dress to kill don'tcha know
And when the lights come up
I'm ready I'm ready
To put on a show with class
And if I clash it's cause I want to
What a show and I want everyone to know
They're gonna fly up, get an eyeful
Everything that's craved from me
I'm gonna be, I'm gonna be outrageous

Outrageous
(They say) I'm outrageous
It's the rage it's the rage

With my long black hair hanging way down to my
Ask me no questions and I'll tell you no lies
Don't tell me what to do don't tell me what to be
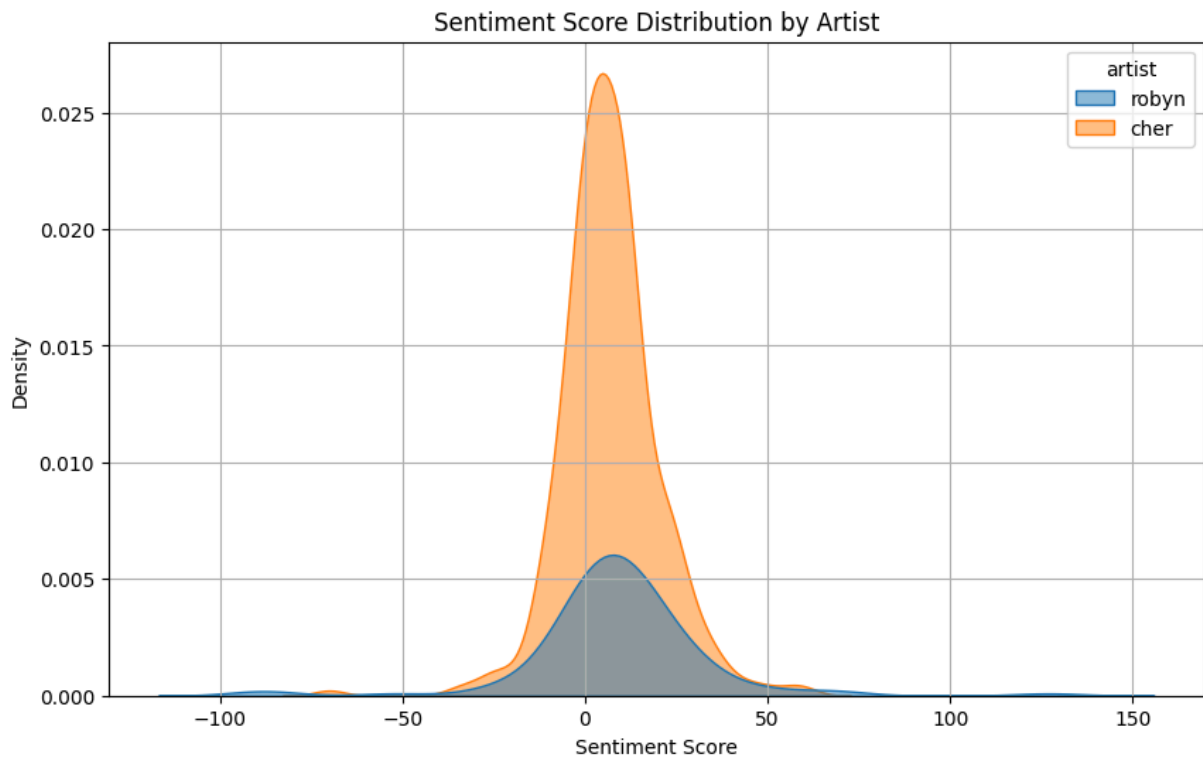See I don't trust anybody else's traits about make-up and me

Well in my show I let everything go
Is what you want is whatcha wanna see from me
But when the curtain comes down
And you're on your way back home
I change into my jeans that are split at the seam
I grab my funky black jacket and make quite a racket
You drive like you're an outlaw

```
Cause everything that's craved from me
I'm gonna be, I'm gonna be outrageous

So outrageous
I'm outrageous honey yes a rage
It's the rage
Outrageous, outrageous
I'm outrageous
It's the rage it's a rage
Outrageous, outrageous
They say I'm outrageous
```

In [94]:
```python
import seaborn as sns
import matplotlib.pyplot as plt

plt.figure(figsize=(10, 6))
sns.kdeplot(data=sentiment_df, x='sentiment_score', hue='artist', fill=True,
plt.title("Sentiment Score Distribution by Artist")
plt.xlabel("Sentiment Score")
plt.ylabel("Density")
plt.grid(True)
plt.show()
```


Questions

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

A: robyn

Q: For your first artist, what are the three songs that have the highest and lowest sentiments? Print the lyrics of those songs to the screen. What do you think is driving the sentiment score?

A: For Robyn, the three songs with the highest sentiment scores are "Love Is Free," "We Dance to the Beat," and "Between the Lines." The three songs with the lowest scores are "Don't Fucking Tell Me What to Do," "Criminal Intent," and "Love Kills." The higher scores are influenced by the presence of more positive words in the lyrics, such as "love," "dance," and "proud" while the lower-scoring songs contain more negative or aggressive language, which is evident even in their titles.

Q: For your second artist, what are the three songs that have the highest and lowest sentiments? Print the lyrics of those songs to the screen. What do you think is driving the sentiment score?

A: For Cher, the three songs with the highest sentiment scores are "Love and Understanding," "I Found You Love," and "Perfection." The three with the lowest scores are "Bang Bang," "Bang Bang (My Baby Shot Me Down)," and "Outrageous." The high sentiment scores are driven by lyrics that focus on uplifting themes and positive emotions, while the lower-scoring songs contain more negative language, which brings down their sentiment.

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

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 emojitracker.

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. You do not need to calculate sentiment on non-emoji content for this section.

In [95]:
```python
positive_emojis = ['😂', '😊', '😍', '😄', '❤️', '😎', '🤗', '👍', '🎉', '🥰'
negative_emojis = ['😢', '😡', '😠', '💔', '😞', '😫', '😭', '👎', '🤬', '🥺'

emoji_sentiment = {}
for emoji_ in positive_emojis:
    emoji_sentiment[emoji_] = 1
for emoji_ in negative_emojis:
    emoji_sentiment[emoji_] = -1
```

```python
artist_emoji_scores = {}

for artist, descriptions in twitter_data.items():
    total_score = 0
    for desc in descriptions:
        for char in desc:
            if char in emoji_sentiment:
                total_score += emoji_sentiment[char]
    average_score = total_score / len(descriptions) if descriptions else 0
    artist_emoji_scores[artist] = average_score

for artist, avg_score in artist_emoji_scores.items():
    print(f"{artist} average emoji sentiment score: {avg_score:.3f}")
```

```
robynkonichiwa average emoji sentiment score: 0.006
cher average emoji sentiment score: 0.013
```

In [96]:
```python
artist_emoji_counts = {}

for artist, descriptions in twitter_data.items():
    emoji_counter = Counter()
    for desc in descriptions:
        for char in desc:
            if char in emoji_sentiment:
                emoji_counter[char] += 1
    artist_emoji_counts[artist] = emoji_counter

for artist, counter in artist_emoji_counts.items():
    most_common_positive = max((e for e in positive_emojis if e in counter),
    most_common_negative = max((e for e in negative_emojis if e in counter),

    print(f"{artist}:")
    print(f"  Most popular positive emoji: {most_common_positive} ({counter[
    print(f"  Most popular negative emoji: {most_common_negative} ({counter[
```

```
robynkonichiwa:
  Most popular positive emoji: 😎  (280 times)
  Most popular negative emoji: 💔  (60 times)

cher:
  Most popular positive emoji: 😍  (8197 times)
  Most popular negative emoji: 💔  (1616 times)
```

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

A: robynkonichiwa has an average sentiment of 0.006 while cher has an average sentiment score of 0.013.

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

A: For robynkonichiwa, the most popular positive emoji is the 😎 (sunglasses) emoji, while the most common negative emoji is 💔 (broken heart). For Cher, the most

frequently used positive emoji is 😍 (heart eyes), and the most common negative emoji is also 💔 (broken heart).