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Lab Assignment 4: Using APIs in Python

DS 6001: Practice and Application of Data Science

Instructions

Please answer the following questions as completely as possible using text, code, and the results of code as needed. Format your answers in a Jupyter notebook. To receive full credit, make sure you address every part of the problem, and make sure your document is formatted in a clean and professional way.

In this lab, you will work with the public API provided by genius.com, a website that calls itself "the world's biggest collection of song lyrics and musical knowledge." You will need to read the API documentation carefully, acquire an access key, and use it without sharing it to pull data from this API into Python. You will also practice using a library made specifically to wrap around requests to make calling from the Genius API easier.

Problem 0

Import the following libraries:

```
In [ ]: import numpy as np
import pandas as pd
import requests
import json
import os
import dotenv
import sys
sys.tracebacklimit = 0 # turn off the error tracebacks for more compact error messages
```

Problem 1

The Genius API documentation is here: <https://docs.genius.com/#/getting-started-h1>. Read through the documentation carefully. Although the Genius API is free and public, it still requires users an access key to use the API. In this case, Genius provides users with three codes: a client ID, a client ID secret, and a client access token. Use the documentation to find a way to obtain these codes for yourself. Write a paragraph that describes all of the steps you needed to take (but DO NOT list your access codes in this paragraph). Some hints and cautions:

1. Before you can use the API, you will need a regular, free user account with Genius. Sign-up

here: https://genius.com/signup_or_login

1. Genius's API is built to support third-party app development, not data scientists. The

language is entirely geared toward app development. Under "Authentication" there are instructions to third-party developers for guiding their own users in getting access keys. That's not relevant to getting access for yourself. It's not hard to get an access key, but the guidance here is not very clear. Be patient and read everything in the Authentication section carefully. 3. When you arrive at the page that allows you to register for API access keys, the language is still geared toward app development. You will be prompted to name your app and provide the URLs associated with the app. It doesn't much matter what you name your app, and I just used the Collab main page (<https://collab.its.virginia.edu/portal?containerLogin=true>) for the URLs. 4. When you get your codes, copy them in a text file. In problem 2 you will copy these codes over again to a .env file. [4 points]

Answer:

In order to obtain the client ID, client ID secret and client access token I first needed to sign up for my free Genius user account. I used my UVa Google account.

Then I needed to "Register my Application". This provides me with the "client_id" and "client_secret" to identify my client application (which is actually just my jupyter notebook). I had to visit the "API Client Management page" to create my "New API Client". I named my app "DianaM DS 6001 Client App." I used a URL for a free icon, and I used the collab main page URL as recommended.

Once I created the app, I was provided with the client_id, client_secret, and I was able to generate the client_access_token.

Problem 2

Create a .env file for this project. Open it, copy your access codes into it, and save it. Then use Python code to load the environmental variables contained in the .env file, and create variables that contain each of the three codes. (You can print these variables to make sure it worked, but do not allow your access keys to display in your notebook). [4 points]

```
In [ ]: #Load an env file from a location
dotenv.load_dotenv('mod4.env')
```

```
Out[ ]: True
```

Problem 3

The root for all Genius APIs is <https://api.genius.com>. Find the endpoint for the Search API. (You will have to click the "Authorize with Genius" button in the upper-right corner if you haven't already done so). Use the requests library to issue a search for Bob Dylan. Genius's API is organized in a way that every individual artist has his or her own API endpoint. Display a portion of the JSON output that displays the API endpoint path for the data on Bob Dylan. Hint: to authenticate, specify your access token (not your client ID or client secret) as the access_token parameter. You will have to dig around the JSON output to find the artist ID, but it is listed under primary_artist several branches down the JSON tree. [4 points]

Answer:

TODO Find the Artist ID for Bob Dylan

<https://api.genius.com/search?q=Bob%20Dylan>

```
In [ ]: artist_name = "Bob Dylan"
client_access_token = os.getenv("CLIENT_ACCESS_TOKEN")
#print(client_access_token)
search_url = "http://api.genius.com/search?q={}".format(artist_name)
search_params = {"q": artist_name}
print(search_params)
print(search_url)

# I needed to add headers; otherwise I got a 503 error, hence the User-Agent header - I included my email address per
headers = {"Authorization": "Bearer " + os.getenv("CLIENT_ACCESS_TOKEN"), 'User-Agent': 'Class Example (hdm5s@virginia.edu)'}
#print(headers)
```

```

# get the response from the API
response = requests.get(search_url, params=search_params, headers=headers).json()
meta = response['meta']

#print(search_url)
# if response == 200, i.e. success, print the first two songs, and Bob Dylan's artist ID
if meta['status'] == 200:
    print("Success!")
    # print the first two songs
    for hit in response['response']['hits'][:2]:
        print(hit['result']['full_title'])
        print('Bob Dylan Artist ID is:, ', hit['result']['primary_artist']['id'])
        artist_id = hit['result']['primary_artist']['id']
else:
    print("Error")
    print(response.status_code)
    #print(response.text)

```

```

{'q': 'Bob Dylan'}
http://api.genius.com/search?q=Bob Dylan
Success!
Blowin' in the Wind by Bob Dylan
Bob Dylan Artist ID is:, 181
Murder Most Foul by Bob Dylan
Bob Dylan Artist ID is:, 181

```

Problem 4

Add /songs to the end of the the endpoint path you found in problem 3 and use this path to request the 20 most popular Bob Dylan songs. Organize these data in a pandas data frame. [4 points]

Answer:

I'll want the API call to:

http://api.genius.com/artists/181/songs?per_page=20

I realize that the `per_page` should be set to **20** per documentation, but I only was returned 19 results when I set it to 20. So, I set it to 21, to retrieve the top 20 results.

```
In [ ]: artist_name = "Bob Dylan"
artist_id = 181
per_page = 21 # set the per_page parameter to 21 for top 20. I confirmed this same behavior in when looking at the re
client_access_token = os.getenv("CLIENT_ACCESS_TOKEN")
#print(client_access_token)
search_url = f"http://api.genius.com/artists/{artist_id}/songs"
search_params = {"per_page": per_page}
print(search_params)
print(search_url)

# I needed to add headers; otherwise I got a 503 error, hence the User-Agent header
headers = {"Authorization": "Bearer " + os.getenv("CLIENT_ACCESS_TOKEN"), 'User-Agent': 'Class Example (hdm5s@virginia

# create an empty dataframe
df_songs = pd.DataFrame()
# get the response from the API
response = requests.get(search_url, params=search_params, headers=headers)
meta = response.json()['meta']

if meta['status'] == 200:
    print("Success!")
    r_json = json.loads(response.text)
    df_songs = pd.json_normalize(r_json, record_path=['response', 'songs'])
    print("Shape of df_songs DataFrame: ", df_songs.shape)
else:
    print("Error")
    print(response.status_code)
    #print(response.text)

df_songs

{'per_page': 21}
http://api.genius.com/artists/181/songs
Success!
Shape of df_songs DataFrame: (20, 36)
```

Out[]:

	annotation_count	api_path	artist_names	full_title	header_image_thumbnail_url	
0	0	/songs/200681	Bob Dylan	10,000 Men by Bob Dylan	https://images.genius.com/9a0da499b7383ddf2327...	https://images.ge
1	0	/songs/7105561	Bob Dylan & The Band	2 Dollars and 99 Cents by Bob Dylan & The Band	https://images.genius.com/84a940f13d290fc51835...	https://images.g
2	1	/songs/200682	Bob Dylan	2 X 2 by Bob Dylan	https://images.genius.com/9a0da499b7383ddf2327...	https://images.ge
3	1	/songs/1686914	Bob Dylan	32-20 Blues by Bob Dylan	https://images.genius.com/dec36dae98920363912f...	https://images.ge
4	15	/songs/105774	Bob Dylan	4th Time Around by Bob Dylan	https://images.genius.com/f96e173addad27a13065...	https://images.ge
5	1	/songs/994912	Robyn Hitchcock	4th Time Around by Robyn Hitchcock	https://images.genius.com/4476c7b6ab3bd711b40f...	https://images.ge
6	1	/songs/1493543	Traveling Wilburys	7 Deadly Sins by Traveling Wilburys	https://images.genius.com/eda586eb0d4993017d17...	https://images.ge
7	1	/songs/1994655	Bob Dylan	900 Miles from My Home by Bob Dylan	https://images.genius.com/22306423b6ad8777d1ed...	https://images.ge
8	0	/songs/7103550	Bob Dylan & The Band	900 Miles from My Home by Bob Dylan & The Band	https://images.genius.com/84a940f13d290fc51835...	https://images.g
9	0	/songs/7105812	Bob Dylan & The Band	900 Miles From My Home / Confidential (Hidden ...	https://images.genius.com/84a940f13d290fc51835...	https://images.g
10	0	/songs/5754536	Gillian Welch	Abandoned Love by Gillian Welch	https://images.genius.com/9c5f4e16c1a98d20850b...	https://images.g
11	1	/songs/1390070	The Everly Brothers	Abandoned Love by The Everly Brothers	https://images.genius.com/bc5e5be909fcfb184432...	https://images.g
12	3	/songs/118651	Bob Dylan (Ft. George Harrison)	Abandoned Love by Bob Dylan (Ft. George Harrison)	https://images.genius.com/3473ef0e3a751805b4da...	https://images.ge
13	1	/songs/2234570	Paul Rodgers (Ft. Nils Lofgren)	Abandoned Love by Paul Rodgers (Ft. Nils Lofgren)	https://images.genius.com/5467e90c6f628d46c2c9...	https://images.g

	annotation_count	api_path	artist_names	full_title	header_image_thumbnail_url	
14	1	/songs/7236491	Bob Dylan	Abraham, Martin, and John (Rehearsal) by Bob D...	https://images.genius.com/046f5a790beb6972f382...	https://images.g
15	7	/songs/105773	Bob Dylan	Absolutely Sweet Marie by Bob Dylan	https://images.genius.com/f96e173addad27a13065...	https://images.ge
16	1	/songs/941697	George Harrison	Absolutely Sweet Marie by George Harrison	https://images.genius.com/a107d4ceec3046900f54...	https://images.g
17	0	/songs/7873562	The Byker Grove Fan Club	Accountant by The Byker Grove Fan Club	https://images.genius.com/b3658c1d5a1474965d0b...	https://images.ge
18	0	/songs/4111895	Francesco De Gregori	Acido Seminterrato (Subterranean Homesick Blue...	https://images.genius.com/491379012f4984d452b8...	https://images.ge
19	1	/songs/1534549	Bob Dylan	Acne by Bob Dylan	https://images.genius.com/22306423b6ad8777d1ed...	https://images.ge

20 rows × 36 columns

In []: `# r_json # this is where I reviewed the JSON text and confirmed I was only seeing 19 songs when I set the per_page p`

Problem 5

Install and import the lyricsgenius library in Python, which is a wrapper around requests that works specifically with the Genius API. .

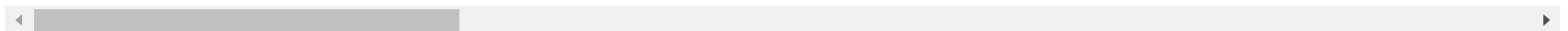
Follow the guide on the GitHub repository for this library (<https://github.com/johnwmillr/LyricsGenius>) for instructions on using the library. Use the lyricsgenius library to download and display the lyrics to "Tangled Up in Blue" by Bob Dylan. [4 points]

In []: `#pip install lyricsgenius`

In []: `import lyricsgenius
genius = lyricsgenius.Genius(os.getenv("CLIENT_ACCESS_TOKEN"))`

In []: `# search for the song "Tangled Up In Blue"
song = genius.search_song("Tangled Up In Blue", "Bob Dylan")`

```
print(song.lyrics)
```



Searching for "Tangled Up In Blue" by Bob Dylan...

Done.

Tangled Up in Blue Lyrics[Verse 1]

Early one morning the sun was shining
I was laying in bed
Wondering if she'd changed at all
If her hair was still red
Her folks they said our lives together
Sure was going to be rough
They never did like Mama's homemade dress
Papa's bankbook wasn't big enough
And I was standing on the side of the road
Rain falling on my shoes
Heading out for the East Coast
Lord knows I've paid some dues
Getting through
Tangled up in blue

[Verse 2]

She was married when we first met
Soon to be divorced
I helped her out of a jam, I guess
But I used a little too much force
We drove that car as far as we could
Abandoned it out west
Split up on a dark sad night
Both agreeing it was best
She turned around to look at me
As I was walking away
I heard her say over my shoulder
"We'll meet again someday
On the avenue"
Tangled up in blue

[Verse 3]

I had a job in the great north woods
Working as a cook for a spell
But I never did like it all that much
And one day the ax just fell
So I drifted down to New Orleans
Where I lucky was to be employed
Working for a while on a fishing boat
Right outside of Delacroix

But all the while I was alone
The past was close behind
I seen a lot of women
But she never escaped my mind
And I just grew
Tangled up in blue
You might also like[Verse 4]
She was working in a topless place
And I stopped in for a beer
I just kept looking at the side of her face
In the spotlight, so clear
And later on, when the crowd thinned out
I was just about to do the same
She was standing there, in back of my chair
Said, "Tell me, don't I know your name?"
I muttered something underneath my breath
She studied the lines on my face
I must admit, I felt a little uneasy
When she bent down to tie the laces
Of my shoe
Tangled up in blue

[Verse 5]
She lit a burner on the stove
And offered me a pipe
"I thought you'd never say hello," she said
"You look like the silent type"
Then she opened up a book of poems
And handed it to me
Written by an Italian poet
From the thirteenth century
And every one of them words rang true
And glowed like burning coal
Pouring off of every page
Like it was written in my soul
From me to you
Tangled up in blue

[Verse 6]
I lived with them on Montague Street
In a basement down the stairs
There was music in the cafes at night
And revolution in the air

Then he started into dealing with slaves
And something inside of him died
She had to sell everything she owned
And froze up inside
And when it finally, the bottom fell out
I became withdrawn
The only thing I knew how to do
Was to keep on keeping on
Like a bird that flew
Tangled up in blue

[Verse 7]
So now I'm going back again
I got to get to her somehow
All the people we used to know
They're an illusion to me now
Some are mathematicians
Some are carpenter's wives
Don't know how it all got started
I don't know what they're doing with their lives
But me, I'm still on the road
A-heading for another joint
We always did feel the same
We just saw it from a different point
Of view
Tangled up in blue

In []: