

labassignment4

July 7, 2022

1 Lab Assignment 4: Using APIs in Python

1.1 DS 6001: Practice and Application of Data Science

1.1.1 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.

1.2 Problem 0

Import the following libraries:

```
[2]: 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
```

1.3 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
2. 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]

The first step was to go to the documentation link provided. After that I clicked on the link in the documentation to go to the API Client Management Page. On the Client Management Page I entered the app name as well as the requested URL links. The final step was clicking the save button and then generating the access token.

1.4 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]

```
[29]: dotenv.load_dotenv()
client_id = os.getenv('client_id')
client_secret = os.getenv('client_secret')
client_access_token = os.getenv('client_access_token')
```

1.5 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]

```
[19]: root = 'https://api.genius.com'
endpoint = '/search'
useragent = 'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36_
↳(KHTML, like Gecko) Chrome/103.0.0.0 Safari/537.36'
```

```

params = {'q': 'Bob Dylan'}
r = requests.get(root+endpoint,
                  headers = {'User-agent': useragent, 'Authorization': "Bearer " +
↪ client_access_token},
                  params = params)
r

```

[19]: <Response [200]>

```

[48]: df = pd.json_normalize(json.loads(r.text), record_path = ['response', 'hits'])
df.columns
df['result.primary_artist.api_path']

```

```

[48]: 0    /artists/181
1    /artists/181
2    /artists/181
3    /artists/181
4    /artists/181
5    /artists/181
6    /artists/181
7    /artists/181
8    /artists/181
9    /artists/181
Name: result.primary_artist.api_path, dtype: object

```

1.6 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]

```

[49]: endpoint_songs = endpoint = '/artists/181/songs'
useragent = 'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36
↪ (KHTML, like Gecko) Chrome/103.0.0.0 Safari/537.36'
params = {'sort': 'popularity', 'per_page': 20}
r = requests.get(root+endpoint_songs,
                  headers = {'User-agent': useragent, 'Authorization': "Bearer " +
↪ client_access_token},
                  params = params)
r

```

[49]: <Response [200]>

```

[65]: df2 = pd.json_normalize(json.loads(r.text), record_path = ['response', 'songs'])
df2

```

```

[65]:      annotation_count      api_path      artist_names \
0              16    /songs/96286      USA For Africa

```

1	12	/songs/79424	Bob Dylan
2	126	/songs/5393247	Bob Dylan
3	1	/songs/68146	Adele
4	17	/songs/62605	Bob Dylan
5	15	/songs/98664	Bob Dylan
6	7	/songs/103982	Guns N' Roses (Ft. The Waters)
7	24	/songs/54784	Bob Dylan
8	10	/songs/84846	Bob Dylan
9	10	/songs/63341	The Jimi Hendrix Experience
10	10	/songs/79749	Bob Dylan
11	22	/songs/87402	Bob Dylan
12	20	/songs/75446	Bob Dylan
13	36	/songs/105186	Bob Dylan
14	14	/songs/154239	Darius Rucker
15	19	/songs/224	Bob Dylan
16	62	/songs/92350	Bob Dylan
17	27	/songs/118799	Bob Dylan
18	27	/songs/62628	Bob Dylan
19	6	/songs/199531	Bob Dylan

	full_title \
0	We Are the World by USA For Africa
1	Blowin' in the Wind by Bob Dylan
2	Murder Most Foul by Bob Dylan
3	Make You Feel My Love by Adele
4	The Times They Are A-Changin' by Bob Dylan
5	All Along the Watchtower by Bob Dylan
6	Knockin' on Heaven's Door by Guns N' Roses (Ft...
7	Like a Rolling Stone by Bob Dylan
8	Don't Think Twice, It's All Right by Bob Dylan
9	All Along the Watchtower by The Jimi Hendrix E...
10	Make You Feel My Love by Bob Dylan
11	Hurricane by Bob Dylan
12	Mr. Tambourine Man by Bob Dylan
13	A Hard Rain's A-Gonna Fall by Bob Dylan
14	Wagon Wheel by Darius Rucker
15	Subterranean Homesick Blues by Bob Dylan
16	Desolation Row by Bob Dylan
17	Tangled Up in Blue by Bob Dylan
18	Masters of War by Bob Dylan
19	Knockin' on Heaven's Door by Bob Dylan

	header_image_thumbnail_url \
0	https://images.genius.com/9b0683e7bbd3567ac6f9...
1	https://images.genius.com/afd28edb1b2d6d5d556a...
2	https://images.genius.com/7fbaf838ffdf99315408...
3	https://images.genius.com/e23228f25b76446cf8de...

4 https://images.genius.com/e00b4dcec135cb5ab3ee...
5 https://images.genius.com/f727dfc7b28942c59cd6...
6 https://images.genius.com/cb2614550098bf753ab3...
7 https://images.genius.com/5de9704b9bd8773ddbcb...
8 https://images.genius.com/afd28edb1b2d6d5d556a...
9 https://images.genius.com/892e94dacb1ac51070e5...
10 https://images.genius.com/cd0a26733cc459710d09...
11 https://images.genius.com/2ae7853a0fc26b8340ce...
12 https://images.genius.com/2fb972dceb4a8e726359...
13 https://images.genius.com/afd28edb1b2d6d5d556a...
14 https://images.genius.com/71f204d1ae373a8a004a...
15 https://images.genius.com/2fb972dceb4a8e726359...
16 https://images.genius.com/5de9704b9bd8773ddbcb...
17 https://images.genius.com/9146ba54ed06288f10b2...
18 https://images.genius.com/afd28edb1b2d6d5d556a...
19 https://images.rapgenius.com/328b31b5fe67895fa...

	header_image_url	id \
0	https://images.genius.com/9b0683e7bbd3567ac6f9...	96286
1	https://images.genius.com/afd28edb1b2d6d5d556a...	79424
2	https://images.genius.com/7fbaf838ffdf99315408...	5393247
3	https://images.genius.com/e23228f25b76446cf8de...	68146
4	https://images.genius.com/e00b4dcec135cb5ab3ee...	62605
5	https://images.genius.com/f727dfc7b28942c59cd6...	98664
6	https://images.genius.com/cb2614550098bf753ab3...	103982
7	https://images.genius.com/5de9704b9bd8773ddbcb...	54784
8	https://images.genius.com/afd28edb1b2d6d5d556a...	84846
9	https://images.genius.com/892e94dacb1ac51070e5...	63341
10	https://images.genius.com/cd0a26733cc459710d09...	79749
11	https://images.genius.com/2ae7853a0fc26b8340ce...	87402
12	https://images.genius.com/2fb972dceb4a8e726359...	75446
13	https://images.genius.com/afd28edb1b2d6d5d556a...	105186
14	https://images.genius.com/71f204d1ae373a8a004a...	154239
15	https://images.genius.com/2fb972dceb4a8e726359...	224
16	https://images.genius.com/5de9704b9bd8773ddbcb...	92350
17	https://images.genius.com/9146ba54ed06288f10b2...	118799
18	https://images.genius.com/afd28edb1b2d6d5d556a...	62628
19	https://images.rapgenius.com/328b31b5fe67895fa...	199531

	lyrics_owner_id	lyrics_state \
0	4733728	complete
1	73267	complete
2	3360167	complete
3	82481	complete
4	49202	complete
5	779	complete
6	168784	complete

7	7	complete
8	125524	complete
9	31298	complete
10	5307	complete
11	132320	complete
12	74226	complete
13	16	complete
14	10380	complete
15	4	complete
16	145715	complete
17	1850	complete
18	49202	complete
19	225680	complete

	path	...	stats.hot	\
0	/Usa-for-africa-we-are-the-world-lyrics	...	False	
1	/Bob-dylan-blowin-in-the-wind-lyrics	...	False	
2	/Bob-dylan-murder-most-foul-lyrics	...	False	
3	/Adele-make-you-feel-my-love-lyrics	...	False	
4	/Bob-dylan-the-times-they-are-a-changin-lyrics	...	False	
5	/Bob-dylan-all-along-the-watchtower-lyrics	...	False	
6	/Guns-n-roses-knockin-on-heavens-door-lyrics	...	False	
7	/Bob-dylan-like-a-rolling-stone-lyrics	...	False	
8	/Bob-dylan-dont-think-twice-its-all-right-lyrics	...	False	
9	/The-jimi-hendrix-experience-all-along-the-wat...	...	False	
10	/Bob-dylan-make-you-feel-my-love-lyrics	...	False	
11	/Bob-dylan-hurricane-lyrics	...	False	
12	/Bob-dylan-mr-tambourine-man-lyrics	...	False	
13	/Bob-dylan-a-hard-rains-a-gonna-fall-lyrics	...	False	
14	/Darius-rucker-wagon-wheel-lyrics	...	False	
15	/Bob-dylan-subterranean-homesick-blues-lyrics	...	False	
16	/Bob-dylan-desolation-row-lyrics	...	False	
17	/Bob-dylan-tangled-up-in-blue-lyrics	...	False	
18	/Bob-dylan-masters-of-war-lyrics	...	False	
19	/Bob-dylan-knockin-on-heavens-door-lyrics	...	False	

	stats.pageviews	primary_artist.api_path	\
0	502358	/artists/370890	
1	498306	/artists/181	
2	482459	/artists/181	
3	453238	/artists/2300	
4	441595	/artists/181	
5	409542	/artists/181	
6	379423	/artists/637	
7	378138	/artists/181	
8	334776	/artists/181	
9	332485	/artists/634985	

10	320040	/artists/181
11	315514	/artists/181
12	233386	/artists/181
13	211449	/artists/181
14	198783	/artists/21867
15	197247	/artists/181
16	167965	/artists/181
17	160241	/artists/181
18	146240	/artists/181
19	145010	/artists/181

	primary_artist.header_image_url	primary_artist.id	\
0	https://images.genius.com/3fb2d9f68c911b547339...	370890	
1	https://images.genius.com/facc753d420efc53bbe1...	181	
2	https://images.genius.com/facc753d420efc53bbe1...	181	
3	https://images.genius.com/87aa5d8c32965a10e0e7...	2300	
4	https://images.genius.com/facc753d420efc53bbe1...	181	
5	https://images.genius.com/facc753d420efc53bbe1...	181	
6	https://images.genius.com/6f9f5a6fb2f049bb3c02...	637	
7	https://images.genius.com/facc753d420efc53bbe1...	181	
8	https://images.genius.com/facc753d420efc53bbe1...	181	
9	https://images.genius.com/4a0926e479ac3a397a7e...	634985	
10	https://images.genius.com/facc753d420efc53bbe1...	181	
11	https://images.genius.com/facc753d420efc53bbe1...	181	
12	https://images.genius.com/facc753d420efc53bbe1...	181	
13	https://images.genius.com/facc753d420efc53bbe1...	181	
14	https://images.genius.com/6a629cf1a4b6fec5b21a...	21867	
15	https://images.genius.com/facc753d420efc53bbe1...	181	
16	https://images.genius.com/facc753d420efc53bbe1...	181	
17	https://images.genius.com/facc753d420efc53bbe1...	181	
18	https://images.genius.com/facc753d420efc53bbe1...	181	
19	https://images.genius.com/facc753d420efc53bbe1...	181	

	primary_artist.image_url	\
0	https://images.genius.com/3fb2d9f68c911b547339...	
1	https://images.genius.com/22306423b6ad8777d1ed...	
2	https://images.genius.com/22306423b6ad8777d1ed...	
3	https://images.genius.com/638bddc79cd2ada64040...	
4	https://images.genius.com/22306423b6ad8777d1ed...	
5	https://images.genius.com/22306423b6ad8777d1ed...	
6	https://images.genius.com/53ddc7640957b4279d9c...	
7	https://images.genius.com/22306423b6ad8777d1ed...	
8	https://images.genius.com/22306423b6ad8777d1ed...	
9	https://images.genius.com/06f36798cfdc89d29602...	
10	https://images.genius.com/22306423b6ad8777d1ed...	
11	https://images.genius.com/22306423b6ad8777d1ed...	
12	https://images.genius.com/22306423b6ad8777d1ed...	

13 <https://images.genius.com/22306423b6ad8777d1ed...>
 14 <https://images.genius.com/7f0039853bb37822392f...>
 15 <https://images.genius.com/22306423b6ad8777d1ed...>
 16 <https://images.genius.com/22306423b6ad8777d1ed...>
 17 <https://images.genius.com/22306423b6ad8777d1ed...>
 18 <https://images.genius.com/22306423b6ad8777d1ed...>
 19 <https://images.genius.com/22306423b6ad8777d1ed...>

	primary_artist.is_meme_verified	primary_artist.is_verified	\
0	False	False	
1	False	False	
2	False	False	
3	False	False	
4	False	False	
5	False	False	
6	False	False	
7	False	False	
8	False	False	
9	False	False	
10	False	False	
11	False	False	
12	False	False	
13	False	False	
14	False	False	
15	False	False	
16	False	False	
17	False	False	
18	False	False	
19	False	False	

	primary_artist.name	\
0	USA For Africa	
1	Bob Dylan	
2	Bob Dylan	
3	Adele	
4	Bob Dylan	
5	Bob Dylan	
6	Guns N' Roses	
7	Bob Dylan	
8	Bob Dylan	
9	The Jimi Hendrix Experience	
10	Bob Dylan	
11	Bob Dylan	
12	Bob Dylan	
13	Bob Dylan	
14	Darius Rucker	
15	Bob Dylan	


```

16         Bob Dylan
17         Bob Dylan
18         Bob Dylan
19         Bob Dylan

                                primary_artist.url
0         https://genius.com/artists/Usa-for-africa
1         https://genius.com/artists/Bob-dylan
2         https://genius.com/artists/Bob-dylan
3         https://genius.com/artists/Adele
4         https://genius.com/artists/Bob-dylan
5         https://genius.com/artists/Bob-dylan
6         https://genius.com/artists/Guns-n-roses
7         https://genius.com/artists/Bob-dylan
8         https://genius.com/artists/Bob-dylan
9         https://genius.com/artists/The-jimi-hendrix-ex...
10        https://genius.com/artists/Bob-dylan
11        https://genius.com/artists/Bob-dylan
12        https://genius.com/artists/Bob-dylan
13        https://genius.com/artists/Bob-dylan
14        https://genius.com/artists/Darius-rucker
15        https://genius.com/artists/Bob-dylan
16        https://genius.com/artists/Bob-dylan
17        https://genius.com/artists/Bob-dylan
18        https://genius.com/artists/Bob-dylan
19        https://genius.com/artists/Bob-dylan

```

[20 rows x 34 columns]

1.7 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]

```
[59]: import lyricsgenius
```

```
[64]: genius = lyricsgenius.Genius(client_access_token)
      artist = genius.search_artist("Bob Dylan", max_songs=2)
      song = artist.song("Tangled Up in Blue")
      print(song.lyrics)
```

Searching for songs by Bob Dylan...

ERROR! Session/line number was not unique in database. History logging moved to new session 206

Song 1: "Blowin' in the Wind"

Song 2: "Murder Most Foul"

Reached user-specified song limit (2).

Done. Found 2 songs.

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

[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